SAN DIEGO GAS & ELECTRIC COMPANY

EAST COUNTY SUBSTATION PROJECT
HEALTH AND SAFETY PROGRAM
AND SAFETY ASSESSMENT

DECEMBER 2012

PREPARED BY:

SDGE

A Sempra Energy utility™

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1 – INTRODUCTION

This Health and Safety Program and Safety Assessment (Program) describes the measures to be taken by San Diego Gas & Electric Company (SDG&E) and its contractors to address potential safety issues and protect both workers and the general public during all phases of the East County (ECO) Substation Project (Project). The Project involves the construction of a new 500/230/138 kilovolt (kV) ECO Substation, rebuild of the Boulevard Substation in a new location, and construction of an approximately 14-mile-long 138 kV transmission line, consisting of overhead and underground segments in southeastern San Diego County. The Program provides an overview of the measures to be implemented during construction of the Project, as well as safety prevention measures, locations of medical aid kits, hazard response, and notification procedures.

The Program was prepared in accordance with Mitigation Measures (MMs) HAZ-1b and HAZ-4a of the Mitigation Monitoring, Compliance, and Reporting Program (MMCRP) for the Project, which includes minimum requirements for development of the Program and implementation of the procedures to be followed in the field. The Program was developed to address compliance with federal, state, and local regulations, as well as the requirements stipulated by the Bureau of Land Management (BLM) and California Public Utilities Commission (CPUC) in the MMCRP. The Program will pertain to all areas of the Project, including staging areas, throughout the construction period.

2 – OBJECTIVES

The purpose of this Program is to provide the SDG&E construction management team with a description of measures that will be implemented in order to minimize safety-related situations that could occur and provide procedures to assist in the protection of workers and the general public during the construction phase of the Project.

This Program is intended to fulfill the requirements of the Health and Safety Program, as specified in MM HAZ-1b, and the Safety Assessment described in MM HAZ-4a. In addition, Attachment A: Health and Safety Program and Safety Assessment Crosswalk provides a detailed list of the locations within this Program, the Safe Worker and Environmental Awareness Program (SWEAP), and SDG&E's and Beta's Health and Safety Plans where each of the MM requirements are discussed.

The Program provides specific information for implementing MMs HAZ-1b and HAZ-4a. The management practices and activities in this Program are intended to accomplish the following objectives:

- Educate construction workers on the hazards associated with the Project site and how to identify them, the safety measures that must be taken to prevent injury, how to identify potentially contaminated soils and/or groundwater, and the procedures for ensuring personnel receive necessary training

- Identify federal and state occupational standards regarding occupational safety and safe work practices

- Establish fire safety evacuation procedures

- Explain the appropriate response actions for each safety hazard and develop a mechanism for reporting serious accidents to appropriate agencies and for notifying the appropriate authorities of safety issues

- Identify requirements for temporary fencing around staging areas, storage yards, and excavation areas during construction or decommissioning activities, as well as appropriate measures to be taken during construction of the Project to limit public access to hazardous facilities

- Designate an environmental field representative to be on site to observe, enforce, and document adherence to the Health and Safety Program

- Identify where medical kits are located

3 – MITIGATION MEASURES

SDG&E's Construction Contractor (Contractor) will implement the procedures provided in this Program. The Contractor will take all reasonable precautions to prevent safety-related incidents and responsibly address the safety of both workers and the public, including the implementation of MMs HAZ-1b and HAZ-4a, as required by the MMCRP.

MM HAZ-1b states that, "Prior to approval of final construction plans, SDG&E shall prepare a Health and Safety Program for each applicable phase of the project (i.e., construction, operation, and decommissioning). The program shall be developed to protect both workers and the general public during all phases of the project. The program shall be implemented to educate construction workers about the hazards associated with the particular project site and the safety measures that must be taken to prevent injury. The program shall include standards regarding occupational safety, safe work practices for each task, hazard training requirements for workers, and mechanisms for documentation and reporting. Regarding occupational health and safety, the program should identify all applicable federal and state occupational safety standards; establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses; OSHA standard practices for safe use of explosives and blasting agents; and measures for reducing occupational EMF exposures); establish fire safety evacuation procedures; and define safety performance standards (e.g., electrical system standards and lightning protection standards). The program should include a training program to identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. The program should include worker training regarding how to identify potentially contaminated soils and/or groundwater. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies shall be established. The program should identify requirements for temporary fencing around staging areas, storage yards, and excavation areas during construction or decommissioning activities. Such fencing should be designed to

restrict transient traffic, off-highway vehicle (OHV) use, and the general public from accessing areas under construction and should be removed once construction or decommissioning activities are complete. The program should also identify appropriate measures to be taken during operation of the project to limit public access to hazardous facilities (e.g., permanent fencing, locked access). In order to inform workers and the general public of the dangers of abandoned mines, pamphlets with the 'Stay Out-Stay Alive' information used by federal and state governments should be distributed as part of the program. SDG&E shall designate an environmental field representative who shall be on site to observe, enforce, and document adherence to the program for all construction activities. The program shall be submitted to BLM and CPUC at least 30 days prior to construction. In addition, SDG&E shall implement Sempra Energy's Health and Safety Program during the operational phase of the project."

MM HAZ-4a states that, "Prior to commencing construction activities, SDG&E shall conduct a safety assessment to describe potential safety issues associated with the project, how safety prevention measures would be implemented, where medical aid kits would be located, the appropriate response action for each safety hazard, and procedures for notifying the appropriate authorities. The assessment shall address issues such as site access, construction hazards, safe work practices, security, heavy equipment transportation, traffic management, emergency procedures, and fire control."

4 – PROGRAM IMPLEMENTATION

The following subsections describe the Program to be implemented only during construction of the Project. SDG&E's standard Health and Safety Program will be implemented for operations, maintenance, and decommissioning, when required for those activities. This Program is designed to address potential safety issues and protect both workers and the general public during construction of the Project. The Program will pertain to all areas of the Project—including construction work areas, staging areas, and fly/construction yards—throughout the construction period.

4.0 PROTECT WORKERS AND THE GENERAL PUBLIC

Workers are protected through the implementation of the health and safety plans of SDG&E and its Contractor. These plans comply with the California Code of Regulations (CCR), Title 8, Section 3203, which is a requirement for all employers in the State of California. The general public is protected by restricting public access to construction yards and Project rights-of-way (ROWs); by implementing appropriate site security measures, traffic control, dust control, and hazardous material and waste plans; by coordinating with emergency service providers, and notifying property owners of any hazardous operations to be conducted, such as blasting. The following subsections provide further details regarding the procedures to be utilized for the protection of workers and the general public.

4.0.0 Site Access & Security

All Project personnel must have completed the SWEAP and have received a hard-hat decal prior to entering any Project-related job site. Only personnel with a visible hard-hat decal or daily visitor pass, indicating they have completed Project orientation, will be allowed on any Project

ROW. Members of the general public will not be allowed access to potentially hazardous facilities, including construction work sites and staging yards for materials and equipment. Visitors to any construction site or material yard must have a signed Safety & Environmental Visitor Form indicating that they have been apprised of basic hazards and environmental issues associated with the Project. Visitors must be escorted at all times by Project personnel, who have completed the SWEAP orientation and are familiar with the Project site.

In addition, access to material and equipment staged at substation sites and material yards will be restricted by means of fencing, locked gates, and/or posted security guards. Where fencing is used, it will be suitable to restrict transient traffic, OHVs, and the general public from accessing potentially hazardous areas. Existing gates on the ROW will be locked, monitored, or left open as determined by the property owner. Personal vehicles must be parked in designated locations, as determined by the Contractor. Only approved Project vehicles will be allowed on construction sites, material yards, and transmission ROWs.

Security guards will be stationed at major sites as necessary. Cameras and night lighting will be utilized, as outlined in the Project's Construction Lighting Mitigation Plan. SDG&E's security team will also maintain close working relationships with local law enforcement and United States (U.S.) Border Patrol agents.

4.1 SAFE WORK PRACTICES, TRAINING, DOCUMENTATION, AND REPORTING

SDG&E and its contractors will maintain appropriate standards, safe work practices, hazard training, documentation, and reporting in accordance with their respective health and safety plans. As described in Section 4.0 Protect Workers and the General Public, these plans conform to the requirements of the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA), Title 8.

4.1.0 Safe Work Practices for Each Task

The Contractor has developed task-specific Job Safety Analyses (JSAs) for each construction task. The JSAs provide a list of steps, potential hazards, safety procedures, and recommended controls. They specify equipment to be used, as well as inspection and training requirements. Training on general safe work practices is a requirement for SDG&E and its contractors, as specified in their respective plans. JSAs will be items of discussion at the daily tailgate meetings. Training topics may include heat illness prevention, cardiopulmonary resuscitation (CPR)/automatic external defibrillator (AED), first aid, emergency action and fire prevention, safe driving, and office ergonomics. No horseplay or fighting will be tolerated. Guns, drugs, and alcohol are prohibited, and pets are not permitted on any Project site or ROW. Unless otherwise posted, vehicles must not exceed 15 miles per hour (mph) along the ROW, or 5 mph in construction yards. In addition, seatbelts must be worn in all motorized vehicles. An index of JSAs proposed for the Project is provided in Section 25 Job Safety Analyses of Attachment C: BETA Health and Safety Plan.

4.1.1 Worker Training Procedures and Requirements

All Project personnel will participate in the SWEAP training and sign a roster verifying their attendance. Information from rosters will be logged into a spreadsheet for ease of verifying

Project SWEAP attendance records. All attendees will be provided with a hard-hat decal, as a visible means of verifying their attendance. Trade personnel will be required to receive essential skill and safety training through an appropriate apprenticeship program, which qualifies them to perform the work of their trade. Non-trade personnel will be required to have received essential skill and safety training appropriate to their job tasks through their employers' training programs. Records of all training will be available for audit, as required.

Hazard Training Requirements

Each Contractor has an appropriate training program, in accordance with its health and safety practices, as well as federal, state, and local laws and regulations. As described in Section 4.1.0 Safe Work Practices for Each Task, JSAs provide specific information for individual tasks to be performed. The JSAs provide a list of steps, potential hazards, safe procedures, and recommended controls. They also specify equipment to be used, inspection requirements, and training requirements.

Job-specific construction hazards may be addressed before work begins each day at a safety tailgate meeting. Typically, the daily tailgate meetings will include a review of the JSA for the work being performed. If the work plan changes later in the day, an additional tailgate meeting may be held. Anyone arriving at the site after the tailgate meeting will be briefed on the JSA and other tailgate issues discussed prior to entering the construction site, and will sign the tailgate roster.

Contaminated Soils and/or Groundwater Awareness

The SWEAP and compliance with MM HAZ-2b will also address identification of and appropriate response actions for potentially contaminated soils and/or groundwater

4.1.2 Safety Performance Standards

SDG&E will monitor all Project-related workplace injuries and illnesses utilizing Occupational Safety and Health Administration (OSHA) Recordkeeping and Reporting Standards. This includes recordable cases, as well as first aid cases. In addition, SDG&E monitors close calls and motor vehicle incidents reflecting standard OSHA metrics, including recordable cases and cases resulting in lost time.

SDG&E and its contractors will provide the proper tools, equipment, personal protective equipment, and appropriate training for their respective personnel as needed to perform their specific job duties. All safety requirements will be implemented in accordance with Cal/OSHA Title 8 safety regulations.

4.2 FEDERAL AND STATE OCCUPATIONAL SAFETY STANDARDS

All equipment, materials, and labor furnished by the Contractor during the performance of work will conform to the latest revisions, as of the execution date, of the applicable standards, which include but are not limited to the following listed organizations:

- American Association of State Highway and Transportation Officials
- American Concrete Institute

- American Institute of Steel Construction
- American National Standards Institute
- American Society for Testing and Materials
- American Society of Civil Engineers
- American Welding Society
- Cal/OSHA
- California Department of Transportation
- CCR
- CPUC, General Order 95 and 128
- Edison Electric Institute
- Federal Aviation Regulations
- Institute of Electrical and Electronic Engineers (IEEE)
- IEEE Standard 524 and 524a Guide to Installation of Overhead Transmission Line Conductors and Grounding
- IEEE Standard 951 Guide to Assembly and Erection of Metal Transmission Structures
- IEEE Standard 977 Guide to Installation of Foundations for Transmission Line Structures
- National Bureau of Standards
- National Electrical Code
- National Electrical Manufacturers Association
- National Electrical Safety Code
- National Fire Protection Agency
- Standard Specification for Public Works Construction ("Greenbook")
- Underwriters Laboratory
- Uniform Building Code

4.3 POTENTIAL SAFETY ISSUES

Potential safety issues include, but are not limited to the following:

- working around heavy equipment;
- working in or near traffic;
- driving and hiking in rugged terrain;
- working in inclement weather and in extremes of heat and cold;
- coming into contact with poisonous snakes, spiders, and plants;
- falling into excavation areas;
- falling from structures or from ladders;
- working with or around blasting materials;
- working near energized electric facilities;
- working in confined spaces;
- working in isolated areas prone to wildland fire;
- working in areas located far from emergency medical services;
- performing tasks that can result in trips or falls, strains or sprains, cuts or bruises, or head or eye injuries;
- working around noisy equipment and/or helicopters; and

- potential exposure to lightning.

4.3.0 Dangers of Abandoned Mines

To date, some open-mining operations, but no abandoned mine shafts, have been identified within the Project ROW. Therefore, abandoned mines are not anticipated to be an issue on the Project site; however, pamphlets with the "Stay Out-Stay Alive" information will be distributed during the SWEAP orientation.

4.3.1 Fire Control and Evacuation Procedures

The Construction Fire Prevention Plan (CFPP) was developed in conjunction with and approved by the appropriate fire agencies in San Diego's East County. The Contractor will implement the CFPP, which will be monitored by the SDG&E Project Fire Marshal and other Project staff. As part of the CFPP, the Contractor will provide fire patrols, firefighting equipment, personnel training, and water.

4.3.2 Heavy Equipment Transportation and Traffic Management

The Contractor will secure all necessary permits to transport oversize loads on public roadways. In addition, San Diego County-approved traffic control plans will be prepared for all lane closures or traffic disruptions in compliance with MM TRA-1.

4.4 RESPONSE ACTIONS FOR SAFETY HAZARDS

In accordance with Cal/OSHA Title 8 safety requirements, at least two personnel on each crew will have first aid, CPR, AED, and bloodborne pathogen training. Fire Brigade personnel will periodically inspect work along the ROW, and will be certified Emergency Responders. Crews will also be familiar with evacuation routes should emergency evacuation be needed.

Additional emergency support will be available by contacting Project Base (Base), which provides direct lines to the County of San Diego Emergency Medical Services, Life Flight, California Department of Forestry and Fire Protection, San Diego County Sheriff's Department, California Highway Patrol, and U.S. Border Patrol. Base is located at Alpine Headquarters in Alpine, California, and is staffed by personnel that are trained to monitor construction field activities, both in the air and on the ground. Base will provide and/or coordinate necessary emergency responses, notifications, and formally document events. When appropriate, Base will trigger a call to emergency services. Crews will have direct contact with Base by means of 900 megahertz radios, cell phones, and satellite phones if necessary. While working through the appropriate procedures, Base will provide the following support:

- Dispatching field security agents and field safety advisors to the scene of an incident/event.

- Beginning an incident/event timeline as an event unfolds, documenting times when actions or events occur.

- Launching a wide variety of notifications to Project and SDG&E leadership. These notifications will be made to different distribution lists based on the level and type of

incident/event. Notifications will be made within minutes of an event and contain information regarding who, what, when, where, any action taken, and the status of the incident/event.

- Staying in communication with the field personnel reporting an incident/event and the emergency response agency until responders reach the target destination. This procedure will ensure expeditious response and accurate information.

4.4.0 Authority Notification

The crew will immediately alert the on-site SDG&E representative of all incidents. The SDG&E representative will provide appropriate notification to Base. If an SDG&E representative is not on site, Contractor personnel will be provided with a radio to make notification themselves. Base will then be responsible for notifications to appropriate Project personnel and SDG&E leadership. These notifications will be made to different distribution lists based on the level and type of incident/events. Notifications will be made within minutes of an event and provide information regarding who, what, when, where, any action taken, and the status of the incident/event.

4.4.1 Fire Safety Evacuation

The Program includes fire safety evacuation procedures and incorporates the CFPP. As previously described, SDG&E will also maintain a Base operation, which will be available during all work hours, to assist with effective communications with crews, emergency agencies, and Project management. Base will facilitate evacuation/rescue efforts if required. An Evacuation Route Map showing safe exit routes and assembly locations will be shared as part of the SWEAP orientation. In the event of fire or other site emergency, the following evacuation procedures will be followed to track personnel leaving the work site:

- At each work site the designated point of contact will verify the current head count and notify Base.
- Base will notify fire dispatch and emergency responders of personnel locations, head count, rally points, and headings to assist in evacuation operations.
- Radios and global positioning system tracking units will be monitored at Base. Updated information will be relayed to Base as needed.
- Upon arrival at the rallying points, all personnel to be evacuated will be required to check out with Base before leaving.

4.4.2 Medical Aid Kit Locations

Per Cal/OSHA Title 8 safety regulations, each substation and construction yard will contain first aid kits that are appropriate for the number of personnel working at the respective sites. First aid kits and fire extinguishers will also be stored in Project vehicles. An AED will be maintained at each substation site.

4.4.3 Reporting Serious Accidents

As previously described, Base will monitor field personnel and maintain radio communications with a designated point of contact at each work site. All incidents will be reported immediately

to Base, which will initiate notifications as described previously. In addition, SDG&E will have environmental monitors, contract administrators, field safety advisors, fire marshals, and security agents in the field to monitor, respond to, and report any incidents.

4.5 ENVIRONMENTAL FIELD REPRESENTATIVE

Mike Toby has been designated as SDG&E's Field, Fire, Safety, and Security Team Lead. In this role, Mr. Toby will be responsible for safety, fire preparedness, security, and Project Base operations and will provide management oversight for Project personnel fulfilling these roles. Mr. Toby will work closely with these individuals to implement this Program during construction.

5 – REFERENCES

CCR, Title 8, Construction Safety Orders. November 2012.

ATTACHMENT A: HEALTH AND SAFETY PROGRAM AND SAFETY ASSESSMENT CROSSWALK

Attachment A: Health and Safety Program and Safety Assessment Crosswalk

Item	Mitigation Measure (MM) Requirement	Location in Health and Safety Program and Safety Assessment (Program)	Portion of Safe Worker and Environmental Awareness Program (SWEAP) where the Item is Covered	Location in Attachment B: SDG&E Health and Safety Plan	Location in Attachment C: Beta Health and Safety Plan
MM HAZ-1b					
1.	Prepare a Health and Safety Program for the construction, operation, and decommissioning phases	San Diego Gas & Electric Company's (SDG&E's) standard operating procedures in Section 4 – Program Implementation	Not Applicable or Not Specified (N/A)	Entire Plan	Entire Plan
2.	Protect workers and the general public during all phases of construction	Section 4.0 Protect Workers and the General Public	Environmental Training	Entire Plan	Entire Plan
3.	Designate an environmental field representative	Section 4.5 Environmental Field Representative	N/A	N/A	N/A
4.	Identify all applicable federal and state occupational safety standards	Section 4.2 Federal and State Occupational Safety Standards	N/A	• Section 5.0 Applicable Codes and Safety Regulations • Appendix A – Injury and Illness Prevention Program • Appendix D – Code of Safe Practices • Appendix K – Heat Illness Prevention • Appendix M – Emergency Action and Fire Prevention Plans	• Section 1.2.7 All Personnel Rights • Section 1.4 Safety Goals • Section 1.7 First Aid Program • Section 2 Hazard Communication Program • Section 3.6 (Personal) Fall Arrest System • Section 4.1 Ladders • Section 4.2 Scaffolding • Section 4.3 Swinging Scaffolds • Section 5.1.11 Hazardous atmosphere • Section 7.2 Minimum Personal Protective Equipment Requirements • Section 7.6 Respiratory Protection in Respirators, Breathing Apparatus, Etc. • Section 8.0 Excavation and Trenching Program • Section 15.35 Responsibilities • Section 15.37 Designation of Competent Person • Section 18 Man Basket Lift Check List • Section 19.1 Hearing Conservation Program • Section 19.2.30 Recordkeeping in Section 19.2 Bloodborne Pathogens • Section 19.3.8 Methods of Compliance in Section 19.3 Asbestos Awareness • Section 19.4. Benzene Awareness • Section 19.6 Lead Awareness • Section 20.1.7 Overhead electrical lines • Section 20.2 Assured Grounding Program • Section 20.3 Assured Equipment Grounding Conductor Program • Section 21.1 Welding and Cutting Responsibilities • Section 21.2.6 Flammable Liquids in Section 21.2 Fire

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					Protection and Prevention Requirements • Section 21.3 Emergency Action Plan & Fire Escape Procedures • Section 24.3.3 Usual Procedure for Injury or Accident in Section 24.3 Safety Inspections • Section 24.5 Posting Requirements
5.	Establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses; Occupational Safety and Health Administration standard practice for safe use of explosives and blasting agents; and measures for reducing occupational electric and magnetic field exposures)	• Section 4.1.0 Safe Work Practices for Each Task • As Project construction progresses and new tasks arise, modifications to the safety standards may be necessary, and additional safe work practices may be implemented in the field, as needed.	Safety Training	• Section 10.0 Construction Safety – General • Section 11.0 Construction Safety – Overhead Transmission • Section 12.0 Construction Safety – Underground Transmission • Section 13.0 – Construction Safety – Substation • Section 17.0 Safety Equipment • Appendix D – Code of Safe Practices • Appendix F-1 – SWEAP Tailgate Kick-off Check List • Appendix I-2 – Helicopter Operations Code of Safe Practices • Appendix J – Safety Tailgate Checklist	• Section 1.5 General Project Safety Rules • Section 3 Fall Protection Plan • Section 4 Ladders and Scaffolding • Section 5 Confined Space Entry Program • Section 6 Lock Out Tag Out Program • Section 7 Personal Protective Equipment • Section 8 Excavation and Trenching Program • Section 9 Housekeeping • Section 10 Machine Guarding • Section 11 Hand and Power Tools • Section 15 General Work Rules • Section 16 Construction Safety Program • Section 17 Mobile Equipment Programs • Section 18 Man Basked Lift Check List • Section 19 Industrial Hygiene Programs • Section 20 Electrical Programs • Section 21 Fire and Hot Work Programs • Section 22 Blasting Plan Safety Protocol • Section 23 Security • Section 25 Job Safety Analyses • Attachment D – Helicopter Safety Plan
6.	Establish fire safety evacuation procedures	Section 4.4.1 Fire Safety Evacuation	Fire Training	• Section 16.0 Emergencies • Appendix C-2 – ECO Project Base Emergency Evacuation Scenarios, for helicopters • Appendix H-1 – ECO Construction Fire Prevention Plan • Appendix M – Emergency Action and Fire Prevention Plan • Appendix O –Evacuation Route Map	• Section 21.3 Emergency Action Plan & Fire Escape Procedures, (pages 21-16 and 21-17) • Attachment A – SDG&E East County Substation Construction Fire Prevention Plan

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7.	Define safety performance standards (e.g., electrical system standards and lightning protection standards)	Section 4.1.2 Safety Performance Standards	N/A	• Section 5.0 Applicable Codes and Safety Regulations • Section 10.2 Qualified and authorized to do work • Section 11.0 Construction Safety – Overhead Transmission • Section 12.0 Construction Safety – Underground Transmission • Section 13.0 Construction Safety – Substation • Appendix A – Injury and Illness Prevention Program • Appendix D – Code of Safe Practices • Appendix E-1 – Field Communications Guidance • Appendix H-2 – ESP-113.1 (Revised) • Appendix I-2 – Helicopter Operations Code of Safe Practices • Appendix K – Heat Illness Prevention • Appendix M – Emergency Action and Fire Prevention Plan	• Section 2 Hazard Communication Program • Section 3 Fall Protection Plan • Section 4 Ladders and Scaffolding • Section 5 Confined Space Entry Program • Section 6 Lock Out Tag Out Program • Section 7 Personal Protective Equipment • Section 8 Excavation and Trenching Program • Section 10 Machine Guarding • Section 11 Hand and Power Tools • Section 12 Communication Systems • Section 14 Utilities Identification and Protection • Section 16 Construction Safety Program • Section 17 Mobile Equipment Programs • Section 18 Man Basket Lift Check List • Section 19 Industrial Hygiene Programs • Section 20 Electrical Programs • Section 21 Fire and Hot Work Programs • Section 24.3.3 Usual Procedure for Injury or Accident • Section 24.5 Posting Requirements • Attachment C – Heat Illness Prevention Program • Attachment D – Helicopter Safety Plan • Attachment E – Blasting Plan
8.	Worker training program to identify hazard training requirements for workers; establish procedures for providing training to all workers	Section 4.1.1 Worker Training Procedures and Requirements	Safety Training	• Appendix G – Hazard Communications Program • Section 7.0 Compliance with Safe Work Practices • Section 8.0 Wildland Fire Safety and Prevention • Appendix A – Injury and Illness Prevention Plan, Element #7: Training and Instructions (page 6) • Appendix F-1 – SWEAP Tailgate Kick-off Check List • Appendix F-2 – Training Form 5300 • Appendix K – Heat Illness Prevention • Appendix M – Emergency Action and Fire Prevention Plan	• Section 2 Hazard Communication Program • Section 1.2 Employee Rights and Responsibilities • Section 2.2.4 in Section 2.2 Program Coordinator Responsibilities • Section 2.6.2 in Material Safety Data Sheets (MSDS) • Section 2.9 Employee Information and Training in Hazard Communication Program • Section 2.11 Labeling at the Project Site • Section 3.2 Training Requirements • Sections 4.2.25 and 4.2.26 in Ladders and Scaffolding • Section 5.6 Training/ Responsibilities in Confined Space Entry Program • Section 6.11 Training in Lock Out Tag Out Program • Section 7.7 Employee Training in Personal Protective Equipment • Section 12.2 in Communication Systems • Section 19.1.6 Training and Motivation in Hearing Conservation Program • Section 19.2.22 Training in Bloodborne Pathogens • Section 19.4.8 Training in Benzene Awareness • Section 19.5.17 Training (Hydrogen Sulfide Awareness)

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					• Section 19.6.13 Training in Lead Awareness • Section 20.1.3 Training in Electrical Safety Program • Section 21.1.8 Training in Welding and Cutting Responsibilities • Sections 21.2.2 Fire Protection Training in Fire Protection and Prevention Requirements • Section 23.1.10.6 Traffic and Pedestrian Protection • Section 24.7 Discipline • Section 25 Job Safety Analyses • Attachment A – Construction Fire Prevention Plan, Section 12: Training Requirements for SDG&E & Contract Personnel and Attachment 6: Electric Standard Practice ESP 113.1, Section 4.9 Recommended Fire Related Training • Attachment B – Injury and Illness Prevention Program, Section 1.6 Training and Instruction • Attachment C – Heat Illness Prevention Plan, Section 3.1 Heat Illness Training
9.	Worker training regarding how to identify potentially contaminated soils and/or groundwater	If contaminated soils or groundwater are encountered, the requirements of MM HAZ-2b Contingency Plan for Encountering Contaminated Soils will be implemented.	Environmental Training	N/A	N/A
10.	Establish mechanism for reporting serious accidents to appropriate agencies	Section 4.4.3 Reporting Serious Accidents	• Environmental Training • Safety Training	• Appendix E-1 – Field Communications Guidance • Appendix L – Rule 1800, Incident and Injury Reporting • Appendix M – Emergency Action and Fire Prevention Plan • Appendix N – Incident Action Plan	Section 24.3.3 Usual Procedure for Injury or Accident
11.	Establish documentation of training	Section 4.1.1 Worker Training Procedures and Requirements	N/A	• Section 7.0 Compliance with Safe Work Practices, (pages 5 and 6) • Section 19.2 Safety Meetings and Training Documentation, (page 21) • Appendix F-2 –Training Form 5300	• Section 1.7.15 Training Requirements • Section 23.1 Record Keeping

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12.	Worker training should identify requirements for temporary fencing around staging areas, storage yards, and excavation areas during construction or decommissioning activities (such fencing should be designed to restrict transient traffic, off-highway vehicle use, and the general public from accessing areas under construction and should be removed once construction or decommissioning activities are complete)	Section 4.4 Response Actions for Safety Hazards	N/A	Appendix Q – Project Security Plan, Sections 2.0 Establish an End of Day Security Check Routine and 4.0 Yard/Site Security	• Section 15.17 Protection of the Public • Section 20.3.8.11 in General Requirements for Temporary Wiring
13.	Identify appropriate measures to be taken during operation of the project to limit public access to hazardous facilities (e.g., permanent fencing, locked access)	Section 4 – Program Implementation	N/A	Appendix Q – Project Security Plan	• Section 20.3.8.11 in Section 20.3.8 General Requirements for Temporary Wiring • Section 20.3.17 Guarding of Live Parts • Section 20.3.19 Enclosure for Electrical Installations • Section 20.3.21 Installations Accessible to Unqualified Person(s) • Section 23 Security
14.	Pamphlets with the “Stay Out-Stay Alive” information used by federal and state governments should be distributed in order to inform workers and the general public of the dangers of abandoned mines	Section 4.3.0 Dangers of Abandoned Mines	Safety Training	N/A	N/A

Item	Mitigation Measure (MM) Requirement	Location in Health and Safety Program and Safety Assessment (Program)	Portion of Safe Worker and Environmental Awareness Program (SWEAP) where the Item is Covered	Location in Attachment B: SDG&E Health and Safety Plan	Location in Attachment C: Beta Health and Safety Plan
MM HAZ-4a					
15.	Describe potential safety issues associated with the project	Section 4.3 Potential Safety Issues	Safety Training	• Section 8.0 Wildland Fire Safety and Prevention • Section 9.0 Helicopter Operations • Section 10.0 Construction Safety – General • Section 11.0 Construction Safety – Overhead Transmission • Section 12.0 Construction Safety – Underground Transmission • Section 13.0 Construction Safety – Substation • Appendix D – Code of Safe Practices • Appendix F – Safety and Environmental Training • Appendix H – Construction Fire Prevention Plan (PDF page 9 table) • Appendix K – Heat Illness Prevention	• Section 3 Fall Protection Plan • Section 4 Ladders and Scaffolding • Section 5 Confined Space Entry Program • Section 6 Lock Out Tag Out Program • Section 7 Personal Protective Equipment • Section 8 Excavation and Trenching Program • Section 10 Machine Guarding • Section 11 Hand and Power Tools • Section 12 Communication Systems • Section 14 Utilities Identification and Protection • Section 16 Construction Safety Program • Section 17 Mobile Equipment Programs • Section 18 Man Basket Lift Check List • Section 19 Industrial Hygiene Programs • Section 20 Electrical Programs • Section 21 Fire and Hot Work Programs • Section 22 Blasting Plan Safety Protocol • Section 25 Job Safety Analyses • Attachment A – Construction Fire Prevention Plan, (pages 10 – 12) • Attachment C – Heat Illness Prevention Plan
16.	Describe how safety prevention measures would be implemented	Section 4 –Program Implementation	Safety Training	• Section 8.0 Wildland Fire Safety & Prevention • Section 9.0 Helicopter Operations • Section 10.6 Prevention of Heat Illness • Section 11.3 Grounding • Section 16.1 Emergency Action and Fire Prevention Plans • Section 16.12 Hazardous Spill and Waste Control • Section 17.0 Safety Equipment • Appendix A – Injury and Illness Prevention Plan • Appendix D – Code of Safe Practices • Appendix H – Construction Fire Prevention Plan • Appendix K – Heat Illness Prevention Plan • Appendix M – Emergency Action and Fire Prevention Plan • Appendix Q – Section 9.0 Personal Awareness Advisory	• Section 3 Fall Protection Plan • Section 4 Ladders and Scaffolding • Section 5 Confined Space Entry Program • Section 6 Lock Out Tag Out Program • Section 7 Personal Protective Equipment • Section 10 Machine Guarding • Section 15 General Work Rules • Section 16 Construction Safety Program • Section 17 Mobile Equipment Programs • Section 19 Industrial Hygiene Programs • Section 20 Electrical Programs • Section 21 Fire and Hot Work Programs • Section 22 Blasting Plan Safety Protocol • Section 25 Job Safety Analyses • Attachment A – Construction Fire Prevention Plan, (pages 10 – 12) • Attachment B – Injury and Illness Prevention Program • Attachment C – Heat Illness Prevention Plan • Attachment D – Helicopter Safety Plan • Attachment E – Blasting Plan

Item	Mitigation Measure (MM) Requirement	Location in Health and Safety Program and Safety Assessment (Program)	Portion of Safe Worker and Environmental Awareness Program (SWEAP) where the Item is Covered	Location in Attachment B: SDG&E Health and Safety Plan	Location in Attachment C: Beta Health and Safety Plan
17.	Describe where medical aid kits would be located	Section 4.4.2 Medical Aid Kit Locations	N/A	• Section 17.0 Safety Equipment, (starting on page 15) • Appendix J – Safety Tailgate Checklist	• Section 1.5.11 in General Project Safety Rules • Section 1.7.12 First Aid Stations/First Aid Kits
18.	Describe the appropriate response action for each safety hazard	Section 4.4 Response Actions for Safety Hazards	N/A	• Section 10.0 Construction Safety – General • Section 11.0 Construction Safety – Overhead Transmission • Section 12.0 Construction Safety – Underground Transmission • Section 13.0 Construction Safety – Substation • Section 16.0 Emergencies • Appendix D – Code of Safe Practices • Appendix E-1 – Field Communications Guidance • Appendix G – Hazard Communications Program • Appendix H – ECO Construction Fire Prevention Plan • Appendix I – Helicopter Operations • Appendix M – Emergency Action and Fire Prevention Plans • Appendix N – Incident Action Plan	• Section 1.6 Emergency Program • Section 1.7.13 Emergency Eye/Body Wash Stations • Section 2 Hazard Communication (HAZCOM) Program • Section 3 Fall Protection Plan • Section 5 Confined Space Entry Program • Section 19.2.28 Exposure Incidents in Section 19.2 Bloodborne Pathogens • Sections 19.5.11 Evacuation and 19.5.13 Emergency Rescue and First Aid in Section 19.5 Hydrogen Sulfide Awareness • Section 21.3.4 Emergency Fire-Fighting Procedures • Section 22.2 Blasting Safety Protocols • Section 25 Job Safety Analyses • Attachment A – Construction Fire Prevention Plan • Attachment C – Heat Illness Prevention Plan • Attachment D – Helicopter Safety Plan
19.	Describe procedures for notifying the appropriate authorities	Section 4.4.0 Authority Notification	• Safety Training • Fire Training • Environmental Training	• Section 15.2 Contractor personnel • Section 16.1 Emergency Action and Fire Prevention Plans • Section 16.5 Evacuation • Section 16.7 Earthquake & Landslides • Appendix A – Injury and Illness Prevention Plan, Section Element #6: Correcting Unsafe or Unhealthy Conditions, Work Practices and Procedures in a Timeline Manner • Appendix C-1 – ECO Project Base Operating Outline • Appendix E-1 – Field Communications Guidance • Appendix H-1 – Construction Fire Prevention Plan • Appendix H-2 – ESP 113-1 • Appendix L – Rule 1800, Incident and Injury Reporting • Appendix M – Emergency Action and Fire Prevention Plan	• Section 21.3.4 Emergency Fire-Fighting Procedures • Section 21.1.7.10 in Welding and Cutting Responsibilities • Sections 22.2.5 Emergency Evacuation Procedures, 22.2.6 Misfires, and 22.3 Public Liaison in Section 22.2 Blasting Safety Protocols • Section 24.3.3.4 in Usual Procedure for Injury or Accident • Section 25 Job Safety Analyses • Attachment A – SDG&E East County Substation Construction Fire Prevention Plan • Attachment 6 SDG&E Electric Standard Practice (ESP) 113.1 – Wildland Fire Prevention & Fire Safety in Attachment A – SDG&E East County Substation Construction Fire Prevention Plan

Item	Mitigation Measure (MM) Requirement	Location in Health and Safety Program and Safety Assessment (Program)	Portion of Safe Worker and Environmental Awareness Program (SWEAP) where the Item is Covered	Location in Attachment B: SDG&E Health and Safety Plan	Location in Attachment C: Beta Health and Safety Plan
				• Appendix N – Incident Action Plan	
20.	Address issues such as site access, construction hazards, safe work practices, security, heavy equipment, transportation, traffic management, emergency procedures, and fire control	Section 4 – Program Implementation	• Safety Training • Fire Training	• Section 10.0 Construction Safety – General • Section 11.0 Construction Safety – Overhead Transmission • Section 12.0 Construction Safety – Underground Transmission • Section 13.0 Construction Safety – Substation • Section 16.0 Emergencies • Section 17.0 Safety Equipment • Appendix D – Code of Safe Practices • Appendix G – Hazard Communication Program • Appendix H – ECO Construction Fire Prevention Plan • Appendix M – Emergency Action and Fire Prevention Plans • Appendix N – Incident Action Plan • Appendix Q –Project Security	• Section 1.6 Emergency Program • Section 2 Hazard Communication Program • Section 3 Fall Protection Plan • Section 4 Ladders and Scaffolding • Section 5 Confined Space Entry Program • Section 6 Lock Out Tag Out Program • Section 7 Personal Protective Equipment • Section 8 Excavation and Trenching Program • Section 10 Machine Guarding • Section 11 Hand and Power Tools • Section 12 Communication Systems • Section 14 Utilities Identification and Protection • Section 15 General Work Rules • Section 16 Construction Safety Program • Section 17 Mobile Equipment Programs • Section 18 Man Basket Lift Check List • Section 19 Industrial Hygiene Programs • Section 20 Electrical Programs • Section 21 Fire and Hot Work Programs • Section 22 Blasting Safety Protocol • Section 23Security • Section 25 Job Safety Analyses • Attachment A – Construction Fire Prevention Plan • Attachment B – Injury and Illness Prevention Program • Attachment C – Heat Illness Prevention Program • Attachment D – Helicopter Safety Plan • Attachment E – Blasting Plan

ATTACHMENT B: SDG&E HEALTH AND SAFETY PLAN

SAN DIEGO GAS & ELECTRIC COMPANY

EAST COUNTY SUBSTATION PROJECT
HEALTH AND SAFETY PLAN

NOVEMBER 8, 2012

PREPARED BY:

SDGE

A Sempra Energy utility

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L	Rule 1800- Incident and Injury Reporting
M	Emergency Action and Fire Prevention Plans
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Q	Project Security Plan

1.0 PROJECT OVERVIEW (SEE APPENDIX A)

The East County Substation Project will be constructed in southeastern San Diego County. It will consist of the rebuild of SDG&E's existing Boulevard Substation located in the community of Boulevard, the new East County Substation (ECO) to be constructed just east of the community of Jacumba, a new 138 kV transmission line from the rebuilt Boulevard Substation to ECO, and an interconnect (loop-in) to the SDG&E's existing 500kV Southwest Powerlink (SWPL) at the ECO Substation. The total distance of the new 138kV transmission line is 13.9 miles with an affected right of way area that ranges from 60 to 100 feet across. The Project will be constructed and maintained within the wild land areas of southern San Diego County including areas determined to be moderate, high, and very high Fire Hazard Severity Zones

All SDG&E employees are covered under the SDG&E Injury and Illness Prevention Plan (IIPP) which is provided as Appendix A. The IIPP is the governing safety policy for all SDG&E Employees. Where differences are found between the IIPP and any Project Specific Safety Plans, the more stringent requirement will be enforced.

2.0 PLAN OBJECTIVES

The objectives of this Project Specific Health and Safety Plan are as follows:

- Promote a safe work environment free from recognized hazards to workers and the public. Commit resources to detect hazards and ensure hazard correction.
- Achieve an incident-free project by advocating the belief that all incidents are preventable. Encourage consultants and contractors selected to work on this project to share and promote that same belief.
- Verify that safety policies and procedures are in place to assure worker and public health and safety.
- Enlist employee involvement with project safety to improve the quality of safety and health. This includes brainstorming, inspecting, detecting and correcting, from project startup to project completion.
- Ensure that all employees, consultants, and contractors have the knowledge, awareness, and training to accomplish the task ahead.
- Implement emergency response plans and procedures. Provide effective project communication plans and equipment.

3.0 PROJECT ORGANIZATION (SEE APPENDIX B)

A project organization chart is provided in Appendix B. The organization chart is subject to frequent revision and should only be relied upon after verifying with the appropriate manager.

4.0 RESPONSIBILITIES

4.1 Safety Team

The East County Substation Project Safety team is to work with the larger project team, and our partnering Contractors and consultants, to identify and minimize safety risks throughout the project. This will be accomplished by ensuring the proper systems and procedures are in place in

advance of construction and that, during construction, project personnel are following safe work practices as determined by applicable Federal and State rules and regulations and job safety analyses (JSAs). The East County Substation Project Safety team will draw upon expertise as required from the San Diego Gas & Electric (SDG&E) Safety team, SDG&E's construction & operations departments, Contractor's operations and safety personnel, and Cal/OSHA consultation services. The East County Substation Project Safety team's main areas of responsibility include:

- Arranging for SDG&E Employee Safety Training as needed
- Ensuring Safety Awareness presentations are administered for all Project personnel
- Identifying and acquiring Personal Protective Equipment (PPE) for SDG&E employees
- Reviewing of Contractor Safety Programs
- Inspecting and auditing Contractor field operations for compliance with safe operating procedures. Reporting deficiencies to Construction Manager
- Ensuring project personnel comply with the project Fire Plan
- Reviewing Site Security requirements and implementing necessary protocols
- Ensuring adequate Communications are in place
- Monitoring and reporting on SDG&E and Contractor Project Safety Metrics
- Ensuring Incident Notification, Investigation, & Reporting is effective
- Providing Safety & Training Records
- Coordinating Emergency & Disaster Response Procedures
- Ensuring Company Safety Compliance Requirements are met in accordance with the Environmental & Safety Compliance Management Program (ESCMP). ESCMP provides the framework for effective compliance programs in order to protect SDG&E's employees and the environment. This includes initial and annual training as well as training upon transfer to a new department or job description.
- Regularly attending and participating in Contractor's daily safety/tailboard meetings

4.2 Project Base (Base) (see Appendix C-1 and Appendix C-2)

Project Base is located in the East County Substation Project Headquarters in Alpine. Its responsibilities are set out in Appendix C-1 and include:

- Monitoring construction field activities (both air & ground)
- Providing and/or coordinating emergency response
- Making required notifications and formally document events
- Perform routine training in various emergency scenarios as depicted in Appendix C-2

4.3 Burns & McDonnell

Burns & McDonnell (BMcD) has been retained as an owner's agent in support of the project's environmental, safety, and construction management requirements. BMcD's responsibilities with respect to safety include the following:

- Provide safety expertise and support as requested by SDG&E.

- Review Contractor safety submittals.
- Provide field safety advisors as requested to augment the efforts of SDG&E's safety team.
- Immediately report all incidents, unsafe work practices, security breaches or and third party complaints/concerns to SDG&E.

4.4 Project Manager

An SDG&E Project Manager has been assigned to lead specific areas of the Project, including the ECO substation, the underground segment, the overhead segment and the Boulevard substation upgrade. The Project Manager has the following general responsibilities with respect to safety:

- Monitor construction of the entire project, including safety performance.
- Establish and maintain safe and secure site facilities for use by SDG&E and BMcD.
- Assure all contractual requirements, including safety & health obligations and daily reporting, have been met by each Contractor and sub-Contractor on the Project.
- Act on any safety related issues brought forward for resolution by the safety team, BMcD, or the Contractor.
- Report any Contractor safety deficiencies and associated corrective action plans to the SDG&E Project Director.
- Ensure that the Contractor is taking adequate security precautions to protect the Project from risk related to associated environmental, health and safety non-compliance concerns.

4.5 Contract Administrator

The Contract Administrator will:

- Always be alert to site safety issues.
- Consult with Contractor's foreman regarding any safety concerns.
- Not hesitate to request assistance from the Safety Team on issues that are not resolved to his/her satisfaction.

The Contract Administrator is also responsible to:

- Verify that the Contractor has provided equipment and material necessary to prevent starting any fire
- Control spread of fires if started, and
- Provide assistance for extinguishing fires started as a result of transmission line construction activities.
- Report any security concerns to the project security team for investigation and resolution.

4.6 Contractors and Subcontractors (See Appendix D)

At a minimum, every Contractor and subcontractor shall establish, implement and maintain an effective Injury and Illness Prevention Program (IIPP) in accordance with Section 3203 of the

General Industry Safety Orders. The following elements are required in the IIPP:

- Management commitment/assignment of responsibilities;
- Safety communications system with employees;
- System for assuring employee compliance with safe work practices;
- Regularly scheduled inspections/evaluation system;
- Accident investigation;
- Procedures for correcting unsafe/ unhealthy conditions;
- Safety and health training and instruction; and
- Recordkeeping and documentation.

Every Contractor shall adopt a written Code of Safety Practices which relates to the employer's operations. The Code shall contain language equivalent to the relevant parts of Plate A-3 of the Appendix contained within the Cal/OSHA Construction Safety Orders. The Code of Safe Practices shall be posted at a conspicuous location at each job site office or be provided to each supervisory employee who shall have it readily available. Plate A-3 is provided as Appendix D to this Health & Safety Plan.

Every Contractor shall provide a Heat Illness Prevention Program (HIPP) in accordance with CAL-OSHA provisions.

Periodic meetings of supervisory employees shall be held under the direction of management for the discussion of safety problems and accidents that have occurred. Supervisory employees shall conduct safety meetings with their crews at least every 10 working days to emphasize safety.

Crew leaders shall conduct "toolbox" or "tailgate" meetings with their crews each day prior to commencing work. The tailgate meeting will typically cover a job task Job Safety Analysis (JSA) and ensure that all crewmembers are aware of potential hazards associated with the work to be performed and safety measures to mitigate those hazards.

5.0 APPLICABLE CODES AND SAFETY REGULATIONS

All work will be performed in compliance with the following Health and Safety Standards and applicable references there in.

- California Department of Industrial Relations, Division of Occupational Safety and Health (CAL-OSHA)
- Federal Aviation Regulations (FARS)
- State of California Public Utilities Commission, General Order 95 and 128
- Uniform Building Code (UBC)
- California Department of Transportation (CALTRANS)
- Federal OSHA

6.0 COMMUNICATIONS (SEE APPENDIX E)

Safety is absolutely critical for the employees working on the East County Substation Project. Effective communications are necessary to ensure everyone's safety. Appendix E provides the East County Substation Project Field Communications Policies and Procedures. Everyone who goes to the field must be familiar with this policy.

7.0 COMPLIANCE WITH SAFE WORK PRACTICES

7.1 Project Safety Orientation (See Appendix F-1)

Compliance begins with awareness and training. All project personnel must attend the Safe Worker and Environmental Awareness Program (SWEAP) orientation. Wild land Fire training will be provided as part of this orientation. The SWEAP training roster is maintained by Burns & McDonnell. Hardhat stickers shall be affixed to each worker's hardhat showing they have completed this orientation.

Key elements of the SWEAP orientation are included in a SWEAP Visitor Form to be reviewed and signed by personnel making short term, non-construction related visits to the ECO project right of way. The form is included as Appendix F-1.

7.2 Employee Safety Training (SEE APPENDIX F-2)

SDG&E employees must complete all training designated as part of the annual Environmental and Safety Compliance Management Program (ESCMP). All ESCMP training is monitored on the Employee Training Matrix and entered into the MyInfo Learning Module. Some training is identified for SDG&E employees based on specific CAL-OSHA requirements, such as Heat Illness Prevention and CPR/AED/First Aid. Other Company sponsored safety training requirements include Smith System Defensive Driving. Depending on the specific job hazards anticipated for each employee, various training is assigned. Training records are documented by a sign-in sheet (normally a Form 5300) and entered into the Learning Module for SDG&E employees. For ease of tracking, a training matrix is maintained showing all required "R" and Completed "C" classes. The training matrix is frequently updated with the most current version available on the Project Share Point site. A copy of the Form 5300 is included in Appendix F-2.

7.3 Hazard Communication Program (HAZ-COM) (SEE APPENDIX G)

The Haz-com program provides employees with information and training on hazardous substances in the workplace. This Hazard Communication Program does not apply to employees who use consumer products except when consumer products are used in a duration and frequency of exposure greater than normal consumers' experience. The Haz-com program is provided as Appendix G.

7.4 Contractor Safety Training

Contractors are responsible for documenting and maintaining all training records and safety meetings for their employees and making them available to SDG&E upon request.

8.0 WILDLAND FIRE SAFETY & PREVENTION (SEE APPENDIX H-1 AND APPENDIX H-2)

The East County Substation Project route is located in part of San Diego County prone to wildfires. An East County Substation Project Construction Fire Prevention Plan has been developed and will be implemented on the project. The Major Projects Fire Marshal, who reports to the Major Projects Safety Lead, will be responsible for overseeing compliance with this Plan. All project employees will follow the approved Fire Prevention Plan. The Plan is included as Appendix H-1. All Fire Emergencies will be coordinated with the prime construction Contractor.

Fire safety and prevention measures will be taken to reduce the risk of fire ignition on the project. These measures include, but are not limited to:

- Training of all project personnel on wild land fire safety and prevention
- Fire patrols and fire reporting
- Fire suppression tools & equipment requirement for work in high risk fire areas
- Vegetation clearance for certain work locations or activities
- Implementing work restrictions during high or extreme fire conditions

Fire Suppression Equipment will be maintained in all project vehicles as noted above or in fire boxes to be maintained at remote work locations or as an alternative to tools carried in vehicles at accessible work locations. Equipment maintained in fire boxes will include the following (per Electric Standard Practice, ESP-113.1, attached as Appendix H-2):

- 1 - Round point shovels 46” for each employee on site
- 1 - 5 gallon backpack pump
- 2 – Pulaski’s or axes
- 2 – McLeod fire tools
- During “Elevated” fire conditions 1-5 gallon backpack pump with 10 gallons of refill water is required per 3 personnel at the work site.

Pad clearing accessible areas in or adjacent to wild land vegetation during “Elevated” fire conditions will require a standby water truck w/pump and hose with a minimum of 50 gallons staged, available, and within 1 mile of work site. Supplies of 250 gallons within 3 miles and 500 gallons within 5 miles can serve more than 1 work site.

9.0 HELICOPTER OPERATIONS (SEE APPENDIX I)

Minimal helicopter operations are anticipated on this project; however, when required, the provisions established in Appendix I-1 Helicopter Flight Safety Checklist, Appendix I-2 – Helicopter Operations Code of Safe Practices will apply.

10.0 CONSTRUCTION SAFETY--GENERAL

10.1 Job Briefing (See Appendix J)

The Contractor shall have an all-hands safety briefing at the start of each work day wherever employees congregate. This should include all personnel at the site including subcontractors, environmental monitors, and owner's representatives. In addition, the Contractor shall ensure that prior to starting any construction activity the foreman or employee in charge will call the crew and any other on-site personnel together for a "Tailgate" or "Job Briefing." Each worker should understand:

- The purpose of the job.
- What he/she is to do.
- What the other members of the crew are to do.
- The intended manner of carrying out the job.
- Any environmental considerations identified and any measures to be taken to address them.
- Potential safety hazards or trouble spots anticipated.
- How the employee in charge is proposing to overcome such problems.
- Evacuation procedures for weather, fire, other emergencies.

The employee in charge will encourage questions, comments and suggestions by the crew members. The briefing will continue until all crew members understand the job at hand. If, during the course of the work, changes in procedure become necessary, all crewmembers will be called together so that the change can be properly explained and any questions are answered. If, during the course of the work new crewmembers or visitors show up to the jobsite, they will not enter the construction zone until first meeting with the foreman or his designee and receiving a full tailgate describing the work and hazards of the job. A sample Tailgate form is provided as Appendix J.

10.2 Qualified and authorized to do work

Only those qualified and authorized to do the work will be allowed to perform any function on the Project.

- Competent Person

  One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate problems.

- Qualified Person

  One who, by possession of a recognized degree, license, certificate or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work or the project.

- Authorized Person

  A person approved or assigned by the employer to perform a specific type of duty or duties, or to be at a specific location or locations at the job site.

All personnel operating vehicles or equipment must have the proper license or permit to operate it.

10.3 Job Safety Analysis or Job Hazard Assessment

A Job Safety Analysis or Job Hazard Assessment (JSA or JHA), is required for all construction activities. The results of the analysis will be shared at tailgate meetings with all employees involved in that work.

10.4 Personal Protective Equipment (PPE)

All PPE will be furnished as needed by the workers' employer. Workers shall be familiar with the hazards of the job and wear PPE furnished to provide protection from hazards which cannot be engineered out of the work or otherwise mitigated through administrative measures. All personnel on any construction site must wear hi visibility clothing or safety vest. PPE is the last defense in providing for a worker's safety. PPE must be appropriate for the work at hand and worn properly by the worker involved. Project Managers, Field Safety Advisors, and Contract Administrators will monitor use of appropriate PPE on job sites and request Company and Contractor leadership to enforce their respective safety rules.

10.5 Awareness of Natural Hazards

There are several natural hazards in the vicinity of the project site, including rough terrain, remote worksites, dangerous species of cactus, and several species of rattlesnakes, black widow and desert recluse spiders, stinging or biting insects, ticks, and poison oak.

10.6 Prevention of Heat Illness (See Appendix K)

Heat illness is a potentially dangerous problem for those working outdoors during hot weather. All SDG&E employees will abide by the Heat Illness Prevention Plan provided as Appendix K, which includes Heat Illness Training, Drinking Water Requirements, Shade Requirements, and Heat Illness Emergency Procedures. All Contractors will have a Heat Illness Prevention Plan and will administer it per applicable Federal and State Rules and Regulations.

10.7 Fall Protection

Prior to starting operations that require fall protection, a competent person will provide a fall protection plan. The fall protection plan shall include, but not be limited to, the following: Name of qualified person in charge of the operation, description of work operation, list of fall exposures, description of fall protection methods used to eliminate the fall exposures, and training and enforcement methods used to ensure employee compliance with the plan.

10.8 Rigging

Many types of cranes, hoists, and rigging devices are used for lifting and moving materials. Competent person(s) must ensure all equipment is properly inspected and all workers are properly trained for the planned tasks.

11.0 CONSTRUCTION SAFETY--OVERHEAD TRANSMISSION

There are many hazards associated with overhead power line construction. Below are some of the areas of greatest concern with overhead transmission line construction, which require constant vigilance in adhering to all safety procedures. Just because a function or activity is not specifically addressed below does not mean it can't also be dangerous if all safety precautions are not taken. Always be aware of the hazards associated with any activity you are working around, follow all safety rules, and wear all required PPE as specified in section 10.4 or otherwise required. Always refer to the contractor's safety plan for specific hazard mitigation for the types of work being performed.

11.1 Foundation Construction

Employees entering drilled pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it in accordance with all Cal-OSHA standards. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation. Proper fall protection shall be worn by employees working on the surface around the pier holes. Contractor shall submit its Fall Protection Plan to SDG&E for review.

Jobsite personnel will verify that excavations, protection of excavations, and disposal of excavated material are being performed accordingly. Holes must be checked after digging for cave-ins, providing proper cover for personal protection for unattended holes, and setting of forms prior to pouring of concrete.

When soil material is too hard to excavate with auger or a loose boulder is encountered, it may require the use of explosives or other means. The CA is responsible to check the permits to make sure blasting is allowed and that the Contractor's personnel are qualified for the type of work required. Blasting shall be in accordance with the project permits and or local, state and federal jurisdictions, if applicable.

11.2 Induced Voltage

Induced voltage and current in a de-energized transmission line, caused by other high voltage lines nearby or by a hovering helicopter, can be created by electric-field and magnetic-field induction. These voltages and currents present a serious work hazard for line-crew personnel. Proper understanding and identification of the associated hazards are necessary to safely perform de-energized line work.

11.3 Grounding

Personal Protective Grounding (PPG) provides protection against an induced voltage from parallel and/or adjacent lines as well as accidental re-energizing of lines or cables from unknown sources. Protective Grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential. There shall be a minimum of one ground on the conductors or equipment being worked on. Contractor shall provide its grounding plan to SDG&E for review.

Multiple crews working on the same circuit shall provide their own work site Personal Protective Grounds.

12.0 CONSTRUCTION SAFETY--UNDERGROUND TRANSMISSION

There are many hazards associated with underground power line construction. Below are some of the areas of greatest concern with underground transmission line construction, which require constant vigilance in adhering to all safety procedures. Just because a function or activity is not specifically addressed below does not mean it can't also be dangerous if all safety precautions are not taken. Always be aware of the hazards associated with any activity you are working around, follow all safety rules, and wear all required PPE. Always refer to the contractor's safety plan for specific hazard mitigation for the types of work being performed.

12.1 Trenching & shoring

Trenches in soft or unstable soil, 5 feet or more in depth, must be sloped, shored or otherwise supported by means of sufficient strength to protect persons working in them.

Trenches in hard or compact soil, 5 feet in depth and 8 feet or more in length, shall be shored or the trench sides above the 5 foot level sloped to be not steeper than one foot vertical to each 1/2 foot horizontal.

Proper fall protection per Federal and State rules and regulations shall be installed and employed around trench and vault excavations.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

12.2 Traffic Safety

Employees exposed to construction and public vehicular traffic shall work within safety zones properly identified and coned off in accordance with approved traffic plans. Workers shall be provided with and shall wear warning vests or other suitable garments marked with high-visibility reflective material.

13.0 CONSTRUCTION SAFETY--SUBSTATION

There are many hazards associated with electric substation construction. Below are some of the areas of greatest concern, which require constant vigilance in adhering to all safety procedures. Just because a function or activity is not specifically addressed below does not mean it can't also be dangerous if all safety precautions are not taken. Always be aware of the hazards associated with any activity you are working around, follow all safety rules, and wear all required PPE. Always refer to the contractor's safety plan for specific hazard mitigation for the types of work being performed.

13.1 Site work

Mobile earth-moving equipment used for road construction or site development, including, but not limited to, bulldozers, motor graders, scrapers, loaders, skid steer loaders, compaction equipment, backhoes, end dumps, side dumps, and dump trucks, shall have all factory installed and/or OSHA required safety devices and alarms.

Operators and all other employees working on the ground, exposed to mobile earth-moving equipment, shall be trained in the safe work procedures pertaining to mobile earth-moving equipment and in the recognition of unsafe or hazardous conditions.

Each employee working on the ground who is exposed to mobile earth-moving equipment shall be provided with and required to wear a high-visibility warning vest or other high-visibility garments. For work during hours of darkness or low light conditions, this protective equipment must be made of or marked with retro-reflective material.

13.2 Construction Yards

A single point-of-contact yard manager needs to be in charge of each yard to manage placement of equipment and materials, to resolve issues relating to compliance, parking, etc. The final site plan must be communicated to all subcontractors working on the site and any changes must be approved by the designated site manager. The yard manager needs to oversee move-in of all subcontractors to ensure plans are carried out.

When laying out a yard, the following critical activities must be considered:

- Security related to all points of ingress/egress
- Established flight corridors and helicopter landing zones,
- Office space and delineated parking,

- Material and equipment staging areas,
- Fuel and other hazardous material storage.
- Structure assembly areas, etc.

14.0 SCHEDULED INSPECTIONS/EVALUATIONS

14.1 Environmental & Safety Compliance Program (ESCMP)

Bi-annual facility inspections will be conducted by Safety Team personnel and documented in SIMS. These facility inspections along with employee safety training will be used to demonstrate compliance with the Sempra ESCMP.

14.2 Environmental & Safety Audits

In addition to routine inspections, Sempra Internal Auditing may be requested to perform an Environmental & Safety Audit of the project. All personnel and contractors will cooperate with the audit team assigned.

15.0 INCIDENT INVESTIGATIONS (SEE APPENDIX L)

15.1 Company personnel

All SDG&E East County Substation Project employees are responsible for reporting every safety related incident, including serious injury, vehicle incident, property damage, minor injury or close call, to their Supervisor immediately after said occurrence. The employee's immediate supervisor is responsible for gathering the necessary information from the employee(s) involved and performing an incident investigation in accordance with Safety Rule 1800, Incident and Injury Reporting (attached as Appendix L).

15.2 Contractor personnel

Contractors and Consultants will immediately notify the SDG&E Construction Manager or other primary contact, by the most effective means, of all safety incidents including near misses, vehicle incidents, first-aids, OSHA recordables, hospitalization, property damage in excess of $25,000, or any serious incident resulting in death. A written summary of the incident will be submitted to the appropriate Construction Manager with a copy to the Safety Manager within 24 hours and a complete incident investigation report will be submitted within 20 calendar days of the incident. Contractor/Consultant shall cooperate with SDG&E and responsible Governmental Authorities with respect to their independent investigations of the incident.

16.0 EMERGENCIES

The frequency and severity of emergency situations can be dramatically reduced through training, safety awareness, and daily safety briefings. However, if an emergency does occur, quick and decisive action is required since delays in minutes can create or escalate life-threatening situations. In an emergency situation, SDG&E personnel involved must be prepared to respond immediately.

16.1 Emergency Action and Fire Prevention Plans (See Appendix M)

Required Emergency Action and Fire Prevention Plans, emergency phone numbers and procedures, and hospital locations are included in this section to ensure rapid, effective response to an emergency.

Each facility for the East County Substation Project will have a written Emergency Action and Fire Prevention Plan specific for that facility. These plans will be distributed, posted, and SDG&E personnel will be trained on the procedures within.

Emergency Action/Fire Prevention Plans (EAFPP) are in place to facilitate a coordinated response in the event of a workplace emergency. These plans describe the roles and responsibilities of the Facility Responsible Official, Supervisors, Employees, and Emergency Response Teams (ERT) during workplace emergencies. The plans include, but are not limited to: communication strategies; evacuation routes; procedure for accounting for all employees; rescue and medical duties (for those assigned to perform). See Appendix M for Alpine EAFP Plans.

16.2 Incident Action Plan (See Appendix N)

An Incident Action Plan was developed to establish processes and provide a general plan to help effectively manage moderate to large scale incidents that may occur during the East County Substation Project. Principles of the Incident Command System (ICS) will be used to manage each incident and help bring structure to what can often be a chaotic event lacking organization and communication. The IAP is provided in Appendix N.

16.3 Evacuation Procedures at work sites (See Appendix O)

Preparation for potential evacuation is important due to the concerns regarding the environmental hazards associated with the remote locations on East County Substation Project. An Evacuation Route Map has been developed to show safe exit routes and assembly locations. This is incorporated as Appendix O.

NOTE: This plan is to work in conjunction with Contractor's Emergency Action Plan.

16.4 Helicopter Coordination for evacuation

Flying helicopters to extraction points must be coordinated with Base and Emergency Responders. High wind or poor visibility may prevent helicopters from flying, and therefore retrieving personnel. This must be evaluated before leaving the work area.

16.5 Evacuation

In the event of fire or other site emergency, the following evacuation procedures should be followed in tracking personnel leaving the work site:

- At each work site the designated Point of Contact (POC) will verify the current head-

count and notify Base.

- Base will notify Fire Dispatch and Emergency Responders of personnel locations, head-count, rally points and headings to assist in evacuation operations.
- Radios and GPS tracking units will be monitored at Project Base. Updated information will be relayed to the Project Base as needed.
- Upon arrival at rallying points, all personnel to be evacuated will be required to check out with Base before leaving.

16.6 Heavy Rain or Snow

When possible, avoid entering the project right of way during or within 24 hours following a rain event—greater than a half inch of rain. However, in the event that vehicles have already entered the right of way prior to a rain event occurring and an emergency situation arises, serious consideration must be made to traveling on access roads due to the slick conditions. Additionally, during heavy rain or snow, it may not be possible to fly helicopters due to visibility. Personnel with vehicles are advised to stay with their vehicles.

16.7 Earthquake & Landslides

Helicopter evacuation may be the safest method of evacuation if available. If an evacuation by hiking and vehicle pick up is necessary, Project Base will make an assessment of the roads to be traveled by vehicle for safety before personnel attempt to hike to an extraction point. If roads are blocked or deemed unsafe for travel, Emergency Services will be notified.

16.8 Responsibilities of All Field & Monitoring Personnel

- Assess situations and determine the action to take to ensure your safety.
- If evacuations are required, prioritize evacuations of field personnel by proximity to the immediate danger.
- Plan extraction site locations (rally points) for evacuation.
- Coordinate evacuation personnel and vehicles / helicopters
- Maintain contact with Base to coordinate efforts.
- Verify head-count at each work site with radio or cell phone.
- Assign recovery location and personnel to verify head-count.

Project Base will maintain a daily work site and head-count list of all SDG&E, Burns & McDonnell, and sub-consultants on-site personnel.

16.9 This section is intentionally left blank

16.10 This section is intentionally left blank

16.11 Emergency contact information (SEE APPENDIX P)

All SDG&E employees must ensure their emergency contact data in MyInfo is accurate. Contract employees working under SDG&E supervision must fill out and keep current at all times, an Emergency Contact Card as shown in Appendix P. This will be kept on file at Base. All Contractors and Consultants must ensure they have current emergency contact information for all their employees.

16.12 Hazardous Spill and Waste Control

Contractor shall provide equipment and material to prevent spill of any hazardous or non-hazardous materials, control any waste generated during construction, and cleanup of all hazardous waste spills generated by the vehicles, equipment, or construction activities.

All spills and releases shall be reported to agencies in accordance with the ECO Project Hazardous Spill and Waste Control Plans.

In case of an emergency, contact Base immediately at 619-717-8118.

17.0 SAFETY EQUIPMENT

17.1 Personal Protective Equipment (PPE)

Personal protective equipment (PPE) is provided by the Company and is issued to employees to protect them from hazards that cannot be effectively engineered out of the work or administratively controlled. PPE will be issued through the East County Substation Project Safety team or through the SDG&E storerooms as needed.

Some PPE is required for every employee who works in and/or visits the field, while additional PPE is required only on a situational basis. Optional PPE is recommended but not required for employees who may encounter hazards where a specific requirement has not been established or when an individual has sensitivities to environmental conditions he/she may encounter. All PPE, required and optional, is to ensure the safety of employees from jobsite/worksite hazards. A list of required and optional PPE is provided below for all field employees:

Required Personal Protective Equipment
Hard hat meeting ANSI Z-89.1
Safety glasses meeting ANSI Z-87.1
Hi Visibility Safety vests meeting ANSI/ISEA107
Safety Toed Work boots with ankle support meeting ASTM F2413
Ear plugs (when conditions warrant) meeting ANSI S12.68
Safety goggles (when conditions warrant) meeting ANSI Z-87.1

Optional PPE and Safety Items*
Back pack (for storing small PPE items)
Sun visor
Snake chaps
Sunscreen (highly recommended) minimum SPF30
Small flash light
Mylar blanket (space blanket)

*Optional PPE is highly recommended based on conditions encountered.

17.2 Office Safety Equipment

Field offices shall be equipped with First Aid Kits, Fire Extinguishers, an Automated External Defibrillator (AED), and additional PPE and first aid supplies for restocking and employee checkout. All first aid kits shall be supplied and fully stocked per Company requirements in accordance with Cal/OSHA.

17.3 Vehicle Safety Equipment

At a minimum, all Project vehicles shall be equipped with the following: refer to ESP 113.1

First aid kit	
Fire extinguisher	2BC
Fire tools	1 round point shovel with overall length of at least 46", 1 axe or Pulaski, 1 5 gallon backpack pump.

18.0 PROJECT SECURITY (SEE APPENDIX Q)

Secure worksites are important to the safety of all project personnel. Appropriate measures must be taken to account for material and to prevent theft and vandalism. A Project Security Plan is attached as Appendix Q.

19.0 RECORDS & DOCUMENT MANAGEMENT

All records, documents, reports, and inspections including and/or pertaining to SDG&E employees or SDG&E contract employees, will be kept at the Alpine headquarters location. Some records, such as incident investigations and ESCMP inspections, may also be found archived within the SDG&E Safety Information Management System (SIMS) but a physical copy will be kept at the Alpine Headquarters location. Project documentation will also be maintained on the Project SharePoint site.

19.1 Daily Reports

Field Safety Advisors, along with Contract Administrators and other field personnel, will observe Contractor activities and document observations daily. Any unsafe conditions, effects of weather, job hazards, crew actions, etc. shall be recorded. Any violations of safety rules, regulations, suggestions, warnings, and instructions to the Contractor regarding unsafe conditions and any corrective action taken by the Contractor regarding unsafe conditions shall be recorded. Serious violations and incidents shall be reported immediately to the East County Substation Project Base and then to the East County Substation Project Safety Manager and assigned Construction Manager.

19.2 Safety Meetings and Training Documentation (See Appendix F-2)

All safety meetings conducted or administered by any SDG&E personnel shall be documented at a minimum by a sign-in sheet (See Appendix F-2 for a 5300 form). Sign-in sheets will note the date, time, location, topic, and every participant shall print and sign their name to show attendance.

APPENDIX A: INJURY AND ILLNESS PREVENTION PROGRAM

APPENDIX A- INJURY AND ILLNESS PREVENTION PLAN

RULE 1100

INJURY AND ILLNESS PREVENTION PROGRAM

1100. PURPOSE AND SCOPE

This purpose of this program is to outline the seven essential elements of SDG&E's Injury and Illness Prevention Program (IIPP).

NOTE: The requirements of this program apply to SDG&E employees, and are effective on the date of issue.

1101. ELEMENT #1: AUTHORITY AND RESPONSIBILITY FOR THE PROGRAM

A. **Chief Executive Officer**: Has overall authority and responsibility for implementation of the IIPP.

B. **Safety and Environmental Officer**: Provides policy guidance, compliance oversight, and executive safety leadership.

C. **Officers**: Have overall authority and responsibility for program implementation and performance in their areas.

D. **Directors**: Have direct authority and responsibility for program implementation and performance in their areas.

E. **Department Heads/Managers and Supervisors**: Have responsibility for implementing and maintaining the injury and illness program in their work areas and for answering questions about the injury and illness prevention program.

F. **All Employees**: Perform only work they are qualified to do in a safe and efficient manner.

G. **Executive Safety Council**: Review, and/or support company wide initiatives for safety and health as well as remove barriers that inhibit a strong safety program.

H. **Safety and Health Department**: Specifies employee protection, interprets all applicable safety related regulations, creates safety policies and programs, identifies and evaluates workplace hazards, periodically, conducts safety and health assessments, and manages health and safety functions.

1102. ELEMENT #2: PROMOTING COMPLIANCE WITH SAFE AND HEALTHY WORK PRACTICES

A. All employees are responsible for using safe work practices, for following all directives, policies, and procedures, and for assisting in

maintaining a safe work environment. Employees who fail to follow safety procedures and rules are subject to disciplinary action.

B. Management is responsible for ensuring all safety and health policies and procedures are clearly communicated and understood by all employees. Management is expected to enforce the rules fairly and consistently.

C. Personal recognition, as well as award and recognition programs, is used to recognize employees, organizations, and employee safety committees for safety leadership and safe performance. Refer to the Safety Recognition Policy for more details.

D. Our systems of ensuring all levels of employees comply with the rules and maintain a safe work environment include job observations, inspections, audits, incident evaluations, performance appraisals, and safety training as well as those mentioned in the above paragraphs.

E. Compliance deficiencies may indicate the need for additional employee training and/or retraining, revision of policies and procedures, review of equipment and tools, etc.

1103. **ELEMENT #3: COMMUNICATING WITH EMPLOYEES IN A READILY UNDERSTANDABLE FORM**

A. Open, two-way communication between management and employees on safety and health issues is essential to an injury-free, productive workplace. The following system of communication is used to ensure a continuous flow of information is shared:

- Supervisors communicate safety and health information with all employees to whom they provide work direction including office employees.
- Employees report hazards, injuries, and incidents without fear of reprisal of any kind.
- Various committees are as follows with their associated responsibilities:

  a. Executive Safety Council: Communicates to employees at regularly scheduled meetings to gain a deeper understanding of safety at the frontline.

  b. Safety Action Team: Communicate between union and management on health and safety issues.

  c. Local Safety Committees; Create and maintain active interest in their department's safety issues and initiatives.

     i. Safety committees will be established for each department involved in construction, operations, maintenance or other manual work.

ii. Size and representation will be determined by the department. One member of supervision shall be a regular committee member.

iii. Safety committees will meet regularly and documentation of committee meetings, activities, and recommendations will be made in writing and provided to the department head.

- The incident phone tree is used to communicate injuries and incidents.
- Other means of communicating safety and health issues are:

a. Safety and health training, including formal training instructions such as the safety lesson plans and classroom training.

b. Employee newsletter, safety bulletins, posters, Cal-OSHA Log and Summary of Occupational Injuries and Illnesses, Safety Standards, surveys, incident evaluation reports, Safety and Health Department intranet website and MS Outlook public folders.

c. Safety Committee Congress.

d. Safety meetings, department staff meetings and tailgates.

i. Office employees shall receive safety information through department staff meetings, safety meetings and email alerts. The goal is to ensure office employees are provided safety information and opportunities to discuss safety issues

ii. Safety meetings are as follows:

1. Every 10 days for employees engaged in field construction or construction associated activities.

2. Monthly for employees involved in operations, maintenance or other manual work (employee who spend at least 50% of their time in the field).

iii. Tailboard conferences or job briefings will be conducted by crew leaders to enhance understanding of the job plan prior to starting any job or day's work and whenever the job plan changes during the work.

iv. Safety meetings must be recorded on a 5300 form (or the Safety Meeting Record form) and filed locally. Records must be maintained for three years at a designated location within each department.

1104. ELEMENT #4: IDENTIFYING AND EVALUATING WORK HAZARDS

A. Safety inspections are conducted to identify and evaluate hazards and results of inspections will be documented in the Safety Information Management System (SIMS) and communicated to affected employees.

B. Periodic inspections are performed depending on the hazards involved and are conducted at a frequency to ensure workplace safety. At a minimum, inspections should be conducted:

- Daily or weekly depending on project for construction areas and jobs.
- Semiannually for operating bases and office areas.
- Daily for Class A and B vehicles and forklifts

C. When new substances, process, procedures, or equipment which present potential hazards are introduced into our workplace.

D. When workplace conditions warrant an inspection, i.e., new unidentified hazard is recognized, injury or illness occurs, etc.

E. Supervisors routinely observe their area(s) of responsibility and correct at-risk work practices and conditions.

F. Employees shall report immediately any hazardous conditions, defective tools or equipment, or at-risk procedures to their supervisor.

G. In addition, work place hazards and at-risk work practices can be identified through safety committee meetings, safety meetings, job observations, incident statistics and incident evaluation reports, near misses, audits, safety assessments and manufacturer warnings and information.

H. All inspection records are retained in SIMS.

1105. ELEMENT #5: INVESTIGATING OCCUPATIONAL INJURIES AND ILLNESSES

A. Employees report all work-related incidents promptly to their supervisors.

B. Department heads/supervisors will investigate work-related injuries, illnesses, incidents, and near misses to determine underlying/contributing factors and actions necessary to prevent recurrences.

C. Incident evaluation procedures include:

- Proper notification is made.
- Visit the incident scene as soon as possible.
- Interview injured employees and witnesses.
- Examine all factors associated with the incident
- Determine the contributing factors of the incident
- Develop and implement corrective actions to prevent reoccurrence.
- Document the findings and corrective actions using incident evaluation form.

D. Incident evaluation process will conform to Incident Notification, Investigation, and Reporting standard. In addition, for more information, refer to the

Safety and Health department website, the injury and illness reporting section.

1106. **ELEMENT #6: CORRECTING UNSAFE OF UNHEALTHY CONDITIONS, WORK PRACTICES AND PROCEDURES IN A TIMELY MANNER**

A. Unsafe and unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on severity of hazard.

B. Supervisors correct and control identified hazards as soon as practical. When hazards are beyond supervisor's authority, supervisors communicate hazardous conditions with recommended corrective action to management and/or Safety and Health will be contacted for assistance.

C. When a hazard is identified, the following steps are taken:

- Eliminate the hazard source immediately if practical.
- Take immediate temporary action until permanent controls are in place.
- Permanent controls are done in this order:

  i. If practical, build engineering controls into the process and eliminate the hazard. Examples are: use barriers or mechanical guards; provide ventilation; substitute less hazardous substances; change the design; etc.

  ii. Apply administrative controls to reduce or limit employees' exposure to hazards. They include training, personal hygiene, and reduction of employee exposure time.

  iii. Provide personal protective equipment to the employee. It must be correct for the hazard. This includes eye and face protection, protective coveralls, respirators, gloves, foot protection, head protection, etc.

D. When an imminent hazard exists and cannot be abated immediately, all exposed persons must leave the area. Only properly trained and equipped employees are allowed to correct imminent hazards.

E. A serious concealed danger is one which, (1) results from normal company operations, (2) poses a substantial probability of death or great bodily harm, and (3) is not readily apparent to the individual who is likely to be exposed. For these conditions that cannot be corrected immediately, take the following steps:

- Notify and remove the employee(s) and call the Field Safety Advisor.
- Outside normal working hours, contact the SCG message center or SDG&E Trouble Desk and ask for the on-call Field Safety Advisor.
- If corrections cannot be made within 15 days, Safety and Health must report the condition to Cal-OSHA.

F. Records of hazard control actions must be retained by each department for a minimum of three years.

1107. ELEMENT #7: TRAINING AND INSTRUCTIONS

A. All employees, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices as well as on specific hazards associated with employee's job tasks. When employees know how to do their job properly, know the hazards of the job, and understand their supervisor's expectations, they work safely. The required training is provided:

- To all new employees which include training on the IIPP, rules for safe work, notation of all hazardous materials and conditions etc.;
- To all employees given new job assignments for which training has not previously been received;
- Whenever new substances, processes, procedures or equipment are introduced into the workplace and represent a new hazard;
- For supervisors to familiarize them with the safety and health hazards to which employees under their immediate direction and control may be exposed and how to communicate information about those hazards effectively.

B. Training and instruction is provided depending on employees job tasks and may include the following:

- How and when to use personal protective equipment.
- Employee Safety Handbook
- Smith System® defensive driving
- Potential hazards, protective measures and safety practices associated with new job assignments before exposure
- Information on chemical hazards to which employees could be exposed and other hazard communication program information
- Emergency action and fire prevention plans

C. For a listing of all Safety and Health training required and Safety and Health training requirements, go to the Safety Training section of the Safety and Health Department website.

D. Training records must be documented and maintained as required in the Employee Safety Training Standard (G8301).

1108. RECORDKEEPING

A. All inspections are recorded on the SIMS safety inspection checklists. Copies of the SIMS safety inspection checklists can be found at the Safety and Health Department website.

B. Safety and Health training is documented and maintained as required in the Employee Safety Training standard (G8301).

C. Inspection records are maintained for at least three years and in accordance with the company retention policy.

1109. DOCUMENTS

A. The IIPP is the foundation of SDG&E's safety and health program. In addition to the IIPP, other safety and health documents and program are established and must be adhered to, those include but are not limited to:

- Safety Standards
- Safety Lesson Plans,
- SDG&E Employee Safety Handbook,
- SDG&E Safety and Security Policies and Programs Manual,

B. These documents are equivalent in providing required training and information to employees, as outlined in federal, state, and local regulations as well as company policy.

1110. DEFINITIONS

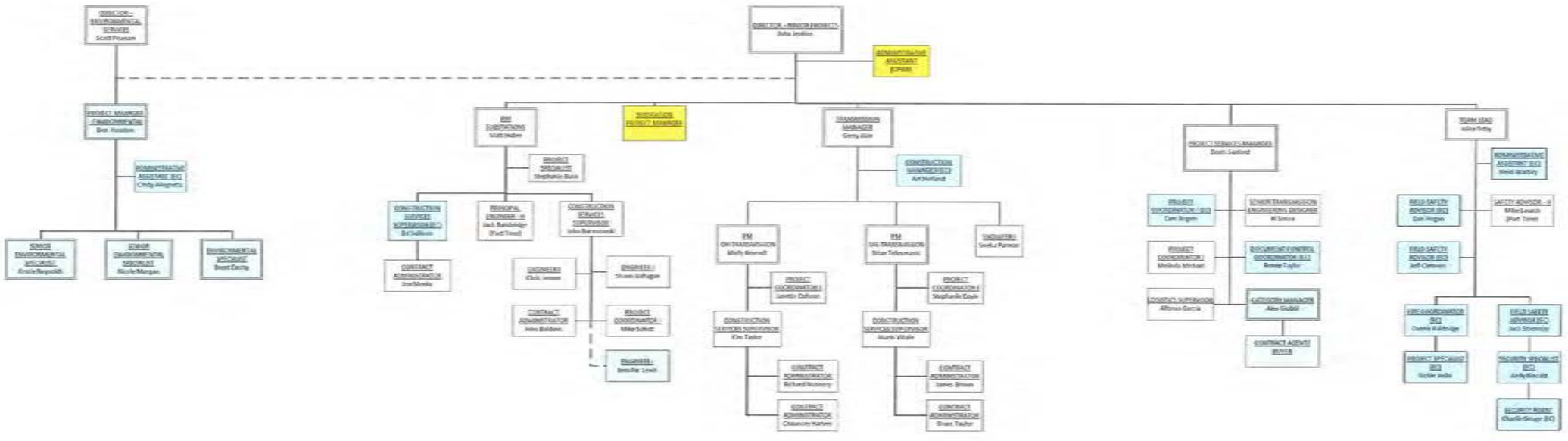
A. **Incident:** Any work related injury, illness, damage, or near miss.

1111. REFERENCES

A. California Code of Regulations, Title 8, Section 3203, Injury and Illness Prevention Program

APPENDIX B: PROJECT ORGANIZATION CHART

Major Projects Group



PROJECTS INCLUDED:
ECO & BLVD
SOUTH BAY
SOUTH ORANGE COUNTY RELIABILITY PROJECT
WOOD TO STEEL (ENF)
OTHER SMALLER PROJECTS

SDG&E REGULAR MAJOR PROJ EMPLOYEES:	27
OPEN POSITIONS:	2
SDG&E CONTRACT EMPLOYEES:	12
SDG&E MATRIX EMPLOYEES:	7
TOTAL:	48

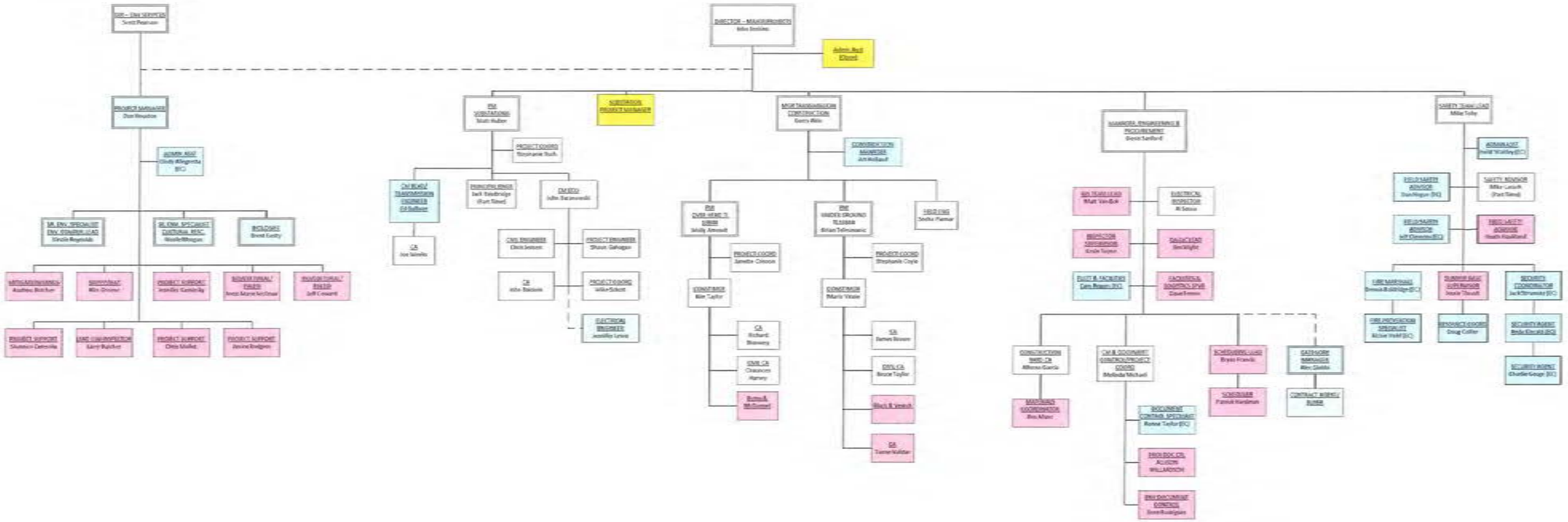
Legend

Open Position

SDG&E Matrix

Employee Contract

Major Projects Group



PROJECTS INCLUDED
ECO & BEYD
SOUTH BAY
SOUTH ORANGE COUNTY RELIABILITY PROJECT
WOOD TO STEEL (DNF)
OTHER SMALLER PROJECTS

SDG&E REGULAR MAJOR PROJ EMPLOYEES:	27
OPEN POSITIONS:	1
SDG&E CONTRACT EMPLOYEES:	13
SDG&E MATRIX EMPLOYEES:	7
CONSULTANTS:	23
TOTAL:	71

Legend

Open Position

SDG&E Position

Employee Contract

Consultant

Open Consultant/ Contractor Position

APPENDIX C-1: ECO PROJECT BASE OPERATING OUTLINE

Major Projects Base Operations Outline for ECO Substation

Major Project Base (Base) is a physical location equipped, staffed and trained to adequately monitor construction field activities (both air & ground) and when needed will provide and/or coordinate emergency response, provide notifications and formally document events.

BASE team members are trained in CPR and emergency response, but will not provide lifesaving medical instructions to any field personnel.

Authority:
Base has been granted authority to implement field communications protocols by SDG&E project leadership, Safety and Corporate Security.

All field personnel are required to comply with check-in, reporting, emergency directions (if given) and follow-up procedures.

Physical Location:
Alpine Headquarters, 1010 Tavern Road, Alpine, CA 90901.

Base Contacts:
Primary Phone……619-717-8118

Jesse Thrush, Base Supervisor…… 619-888-4900

Resources:
BASE continues to collect information and train to assist field and Base personnel so that they are prepared to react quickly in response to any type of incident/event. The Base is equipped with a dedicated phone, printer/fax, computer stations, 800 & 900MHtz radio's, a project version of Google Earth – referred to as "One Touch", GPS flight following technology for project helicopters and GPS ground personnel tracking units.

Additional resources Base has at its disposal:

- Direct line into the Sherriff's communication center otherwise known as 911
- Direct lines to Sherriff's substations along the ROW
- Direct lines to Border Patrol substations
- Direct line to air rescue (ASTREA/Mercy Air Rescue)
- Direct line to SDG&E's emergency dispatch center Sta. Y
- Direct communication with SDGE Field Security Agents patrolling the ROW daily, who provide updates on activity in the field
- Direct communication with security posts at Alpine HQ and Rough Acres Material yards
- Lat/long's of all the tower sites
- Lat /long's of the walk-out rally points
- Direct access to meteorologist
- Variety of weather resources for both aviation and ground
- List of hospitals

- List of clinics
- List of San Diego County Airports
- List of towing companies
- List of 24/7 lock smiths
- Gas station locations along the ROW
- Access to project phone lists and/or leadership personnel

Capabilities:

- Immediately determine worksite locations by long/lat and/or closet road or monument
- Ability to plot a long/lat location quickly
- Ability to convert long/lat to structure #
- Ability to directly contact emergency response agencies quickly
- Ability to direct emergency response agencies by translating long/lats/ into driving directions or helicopter extraction points
- Authorization to request aerial rescue resources
- Through scenario and procedural training the ability to calmly and methodically work through any type of incident/event.
- Ability to broadcast to all field personnel
- Ability to notify specific locations to transmit alerts or notify

Staffing:

Base personnel are trained and equipped to provide a timely response when an incident/event arises. Each member of the team is coached and prepared to deliver quick, calm and effective support in all situations.

The incident and events Base personnel are trained for are fires, severe weather, medical emergencies, criminal activities and aircraft emergencies.

Hours of Operations:

Hours of operation begin at 0600 and continue until the final person is determined to be off of the Right of Way. Phone coverage is maintained 24 hours per day to be available for night crews. Coverage is provided Monday through Saturday and Sundays as needed.

Operating Charter:

BASE will monitor field personnel via radio, phone and GPS systems.

SDG&E, project related, helicopter operations will coordinate with Base on a daily basis and be in constant contact via radio communications.

Project Personnel Safety -

Radio check-in requirements are outlined in the ECO Project Field Communication Policy, and will be strictly enforced. Failure to follow check-in procedures will initiate Emergency action in accordance with Base emergency procedures. These emergency procedures include immediate contact and coordination with emergency responders such as but not limited to S.D County Sherriff's, Air Rescue (Sheriff ASTREA and/or Air ambulance services).

BASE Response to Report of an Incident –

When an incident is reported Base will quickly gather information and determine the response actions necessary. Base will trigger emergency services call immediately when appropriate. Base procedures include but are not limited to:

- Assign/dispatch field security agents and field safety advisors to the scene of an incident/event.

- Start an incident/event timeline as the event unfolds, documenting on or about the time when actions or events happen and;

- Launch a wide variety of notifications to project and SDGE leadership. These notifications are made to different distribution lists Based on level and type of incident/events Notifications made within minutes of an event and contain information on who, what, when, where, action taken and status of the incident/event and;

- Stay in communications with field personnel reporting any incident/event and the emergency response agency until responders reach the target destination. This ensures expeditious response and accurate information.

Timely Emergency Response -

The geography and remoteness of the worksites can pose challenges that result in delays for emergency agencies not familiar with the project right-of-way. For that reason Base is interested in your whereabouts - the more precise and timely information we can relay to emergencies response agencies the faster the response.

Below is a list of incidents and events that Base is trained to assist field personnel with:

- **Vehicles**
  - Mechanical problems
  - Towing Services
  - Locksmith services
  - Motor vehicle accidents (with and/or without injuries)
  - When you are a witness to a motor vehicle accident

- **Criminal**
  - Confrontations with land owner/residents
  - Assault
  - Observation of a crime
  - Recreational Gun Fire
  - Trespassing
  - Vandalism
  - Theft

- **Medical Services**
    - Ground response of medical treatment & transport
    - Evacuation via helicopter
    - Direction of emergency response
    - Assistance with location of local medical facilities
    - Notifications to employer

- **Aircraft**
    - Complaints of a pilot operating unsafely
    - Complaints of a passenger not complying with safety procedures
    - Suspected aircraft safety issues, e.g., equipment issue, rigging
    - Mechanical aircraft problems
    - Aircraft accidents
    - Weather interruptions with aircraft schedules

- **Fire**
    - Reporting of and/or observed smoke
    - Reporting of fire and/or observed proximal to crews
    - Reporting of and/or observed fire – not project related
    - Notification of personnel on ROW
    - Notification of SR Fire Managers
    - Reporting to emergencies response agencies

APPENDIX C-2: ECO PROJECT BASE EMERGENCY EVACUATION SCENARIOS

ECO PROJECT BASE EMERGENCY EVACUATION SCENARIO'S

This document contains risk scenario's ranked moderate to high. ECO BASE personnel are required to exercise against these scenario's at least monthly to ensure proper execution proficiency

Evacuation Scenario's include:

1. Evacuation of a helicopter only remote work site where non-life threatening injuries have occurred to one or more of the personnel.

2. Evacuation of a helicopter only remote work site where life threatening injuries have occurred to one or more of the personnel.

3. Evacuation of a helicopter only remote work site where weather is approaching that may prevent later transport of one or more personnel.

4. Evacuation of a helicopter only remote work site where fire has ether broken out at the work site or fire is nearby and may pose a threat to personnel at the work site.

5. Evacuation assistance is requested by an agency for an event close in proximity but not necessarily connected to Major Project Base.

*note similar scenario's can be exercised for evacuation of site other than helicopter only.

ECO Project Base Procedural Outline

1. Confirm the evacuation request with field supervision and escalate to "priority action"
2. Collect required facts from the requestor
3. Determine and notify appropriate air resource(s) (project aircraft vs. Air Rescue)
4. Provide pilots and/or agencies with required response information and coordination if requested
5. Start an event timeline and further collect facts from the requester
6. Within minutes of the call begin internal notifications including phone and email
7. Provide coordination support if necessary to pilots
8. Continue the plotting timeline of events
9. Provide additional factual and informational updates as required
10. Close out the event
11. Send a final notification
12. Critique the bases response for process improvement

APPENDIX D: CODE OF SAFE PRACTICES

APPENDIX D – CODE OF SAFE PRACTICES

PLATE A-3 CODE OF SAFE PRACTICES

(This is a suggested code. It is general in nature and intended as a basis for preparation by the contractor of a code that fits his/her operations more exactly.)

GENERAL

1. All persons shall follow these safe practices rules, render every possible aid to safe operations, and report all unsafe conditions or practices to the foreman or superintendent.

2. Foremen shall insist on employees observing and obeying every rule, regulation, and order as is necessary to the safe conduct of the work, and shall take such action as is necessary to obtain observance.

3. All employees shall be given frequent accident prevention instructions. Instructions shall be given at least every 10 working days. When applicable, the accident prevention instructions shall also include specific instruction on the safe use, care and maintenance of fall protection equipment (i.e. fall arrest systems, positioning device systems, safety nets, etc.) used at the jobsite.

4. Anyone known to be under the influence of drugs or intoxicating substances which impair the employee's ability to safely perform the assigned duties shall not be allowed on the job while in that condition.

5. Horseplay, scuffling, and other acts which tend to have an adverse influence on the safety or well-being of the employees shall be prohibited.

6. Work shall be well planned and supervised to prevent injuries in the handling of materials and in working together with equipment.

7. No one shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness, or other causes that it might unnecessarily expose the employee or others to injury.

8. Employees shall not enter manholes, underground vaults, chambers, tanks, silos, or other similar places that receive little ventilation, unless it has been determined that it is safe to enter.

9. Employees shall be instructed to ensure that all guards and other protective devices are in proper places and adjusted, and shall report deficiencies promptly to the foreman or superintendent.

10. Crowding or pushing when boarding or leaving any vehicle or other conveyance shall be prohibited.

11. Workers shall not handle or tamper with any electrical equipment, machinery, or air or water lines in a manner not within the scope of their duties, unless they have received instructions from their foreman.

12. All injuries shall be reported promptly to the foreman or superintendent so that arrangements can be made for medical or first aid treatment.

13. When lifting heavy objects, the large muscles of the leg instead of the smaller muscles of the back shall be used.

14. Inappropriate footwear or shoes with thin or badly worn soles shall not be worn.

15. Materials, tools, or other objects shall not be thrown from buildings or structures until proper precautions are taken to protect others from the falling objects.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

History:

1. Amendment filed 4-3-85; effective thirtieth day thereafter (Register 85, No. 14).

2. Amendment of first paragraph and provision number 3. filed 7-30-97; operative 8-29-97 (Register 97, No. 31).

PLATE A-3-a

16. Employees shall cleanse thoroughly after handling hazardous substances, and follow special instructions from authorized sources.

17. Hod carriers should avoid the use of extension ladders when carrying loads. Such ladders may provide adequate strength, but the rung position and rope arrangement make such climbing difficult and hazardous for this trade.

18. Work shall be so arranged that employees are able to face ladder and use both hands while climbing.

19. Gasoline shall not be used for cleaning purposes.

20. No burning, welding, or other source of ignition shall be applied to any enclosed tank or vessel, even if there are some openings, until it has first been determined that no possibility of explosion exists, and authority for the work is obtained from the foreman or superintendent.

21. Any damage to scaffolds, false work, or other supporting structures shall be immediately reported to the foreman and repaired before use.

USE OF TOOLS AND EQUIPMENT

22. All tools and equipment shall be maintained in good condition.

23. Damaged tools or equipment shall be removed from service and tagged "DEFECTIVE."

24. Pipe or Stillson wrenches shall not be used as a substitute for other wrenches.

25. Only appropriate tools shall be used for the job.

26. Wrenches shall not be altered by the addition of handle-extensions or "cheaters."

27. Files shall be equipped with handles and not used to punch or pry.

28. A screwdriver shall not be used as a chisel.

29. Wheelbarrows shall not be pushed with handles in an upright position.

30. Portable electric tools shall not be lifted or lowered by means of the power cord. Ropes shall be used.

31. Electric cords shall not be exposed to damage from vehicles.

32. In locations where the use of a portable power tool is difficult, the tool shall be supported by means of a rope or similar support of adequate strength.

MACHINERY AND VEHICLES

33. Only authorized persons shall operate machinery or equipment.

34. Loose or frayed clothing, or long hair, dangling ties, finger rings, etc., shall not be worn around moving machinery or other sources of entanglement.

35. Machinery shall not be serviced, repaired or adjusted while in operation, nor shall oiling of moving parts be attempted, except on equipment that is designed or fitted with safeguards to protect the person performing the work.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

History:

1. Amendment filed 4-3-85; effective thirtieth day thereafter (Register 85, No. 14).

PLATE A-3-b

36. Where appropriate, lock-out procedures shall be used.

37. Employees shall not work under vehicles supported by jacks or chain hoists, without protective blocking that will prevent injury if jacks or hoists should fail.

38. Air hoses shall not be disconnected at compressors until hose line has been bled.

39. All excavations shall be visually inspected before backfilling, to ensure that it is safe to backfill.

40. Excavating equipment shall not be operated near tops of cuts, banks, and cliffs if employees are working below.

41. Tractors, bulldozers, scrapers and carryalls shall not operate where there is possibility of overturning in dangerous areas like edges of deep fills, cut banks, and steep slopes.

42. When loading where there is a probability of dangerous slides or movement of material, the wheels or treads of loading equipment, other than that riding on rails, should be turned in the direction which will facilitate escape in

case of danger, except in a situation where this position of the wheels or treads would cause a greater operational hazard.

BLASTING OPERATIONS

1. Cases that have contained explosives shall be destroyed by burning out-of-doors. Do not burn in a stove or furnace.

2. Shoes with nails or metal plates shall not be worn in magazines or near explosives.

3. Blasting caps shall only be carried in approved containers.

4. The least amount of proper strength explosive that will do the job effectively shall be used.

5. Detonators and primers shall be separated from the explosives until it is necessary to bring them together in preparing for the blast.

6. Holes loaded during a shift should be fired during that shift.

7. The operations of loading and firing should be carried out with as few workers as possible.

8. Drill holes shall be blown out and made ready before explosives are brought to the site.

9. In tamping explosives, steady, even pressure should be used.

10. For electric blasting, the following shall apply:

(a) Tight electrical connections.

(b) No short circuits or breaks in the wires.

(c) Enough current to fire all shots.

(d) A strong, properly-applied force when using a blasting machine operated by physical effort.

(e) Care not to damage the insulation of wires when tamping charges.

11. If misfires occur, the licensed blaster shall be contacted.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section142.3, Labor Code.

History:

1. Amendment filed 4-3-85; effective thirtieth day thereafter (Register 85, No. 14).

2. Amendment filed 8-29-86; effective thirtieth day thereafter (Register 86, No. 39).

APPENDIX E: FIELD COMMUNICATIONS GUIDANCE

East County Substation (ECO) Project
Field Communications Guidance –Construction Phase
Revision 1a – Effective August 24, 2012

Ensuring the safety for all employees is critical for the ECO Project. Creating guidance around routine and emergency communication, identifying who needs training and the devices that will be used are all important elements for employee safety. This communications plan is a key element to ensuring employee safety while working in the field.

Purpose: The purpose of this document is to explain how communications will be used during the construction phase of the ECO Project (ECO). This guidance document is to ensure that all ECO employees have an effective means of communication and understand their roles and responsibilities as they pertain to communication on the ECO Project.

Definitions:

Project Personnel – refers to all persons engaged in project activities on the ECO Project, including employees of SDG&E, Burns & McDonnell, Beta Engineering, and all associated subcontractors.

ECO or Project: The East County Substation Project that includes the ECO Substation, Boulevard Substation, the transmission line between ECO Substation and Boulevard Substation and the transmission loop-in of the existing Southwest Powerlink (SWPL) into the ECO Substation.

Base – A project communications organization established at Alpine Headquarters to monitor construction field activities (both air & ground). When needed, Base will provide and/or coordinate emergency response, provide notifications and formally document events.

POC – Point of Contact. Employee designated at each work site that will interact with BASE during the shift. These individuals shall ensure they have a functioning communications device capable of being in contact with Base at all times. The preferable communications device is a 900 MHz radio.

Field **–** Project sites along the right of way, including construction yards, access roads, substations, material yards and fly yards.

Device – 900 MHz, Tracplus personal GPS, satellite phone or an employee's assigned or personal cellular phone.

Requirement

Employees working in a crew or group shall identify their POC for the day. Employees who are working in the field, acting as a POC for project personnel, must have a communication device capable of service at all points on the ROW with them at all times. A 900 MHz radio is the preferred device. The 900 MHz system and handhelds have been tested and is considered the primary and most reliable means of communications from the field to Base. It is the responsibility of the field employees to ensure there is a POC for their work site and that they have an effective means of communications from their work site to Base. This generally is accomplished by way of the morning safety tailgate and including a start- of-the-day radio check. **If a 900MHz radio is lost or stolen, Base must be immediately notified and requested to contact Project Security for follow-up.**

ECO Project Radio System:

Base has several radio systems in service for construction support.

- 900 MHz - Primary communication method
- 450 MHz – Sometimes referred to as "wire-stringing" radios are typically line-of-site or point-to-point radios and should be used for work task coordination.
- More information is available for Tracplus GPS, Satellite phones and other devices listed in the document.

900 MHz System:

The 900 MHz system has been set up for wide-area coverage from Alpine to the Imperial Valley.

RADIO DISPLAY NAME	PURPOSE
SPL MSTR	Wide area communications
SPL 1	Project Area coverage

BASE can currently monitor and work **only** on the master talk group. POC's and/or project employees with overall work site responsibilities shall monitor and maintain two-way communications with BASE on the master talk group. **BASE cannot monitor radio traffic on SPL-1**.

900 MHz HAND-HELD EMERGENCY/RED BUTTON – the button located on the top of each hand-held radio should NOT be used to hail help for ECO emergencies (See emergency section below). The button if activated may actually delay emergency resources and requires the reset from the SDG&E Trouble department (aka Station Y). Should this button be activated for any reason, you **must** contact BASE immediately to advise them of the situation. **Do not turn off your radio.**

All employees must adhere to the Safe Use of Portable Electronic Devices Policy For your safety, DO NOT DRIVE while distracted by any means. It is against the law to text or talk on a cell phone (without hands free) while driving.

Communication Devices & Training

All employees whose job requires them to work in the field must be trained and familiar with the operational capabilities of the communication devices that apply to their specific job tasks and the specific areas.

Safety and/or BASE in collaboration with SDG&E Telecom will make training available to employees. Training requires face-to-face training time with someone from Safety, BASE or Telecom. Generally one business day notice is required to arrange training.

Devices:

- Hand-held 900 MHz radios (Primary means of communication)

- Cell phones (including camera and text messaging) (Secondary means of communication)

Alternate devices:

- Satellite phones (Alternate means of communication)
- Truck mounted 900 MHz radios (Alternate means of communication)
- Person to person radios (stringing radios) (Alternate means of communication)
- Mobile Data Terminals (MDT) (Alternate means of communication)
- Tracplus field personnel GPS Device

For more information on 900 MHz radios see the Use of Company Radio (900 MHz), Electric Standard Practice No. 108.

Equipment Check-out/Check-in:

BASE requires one business day notice to reserve equipment.

- Each employee must reserve a device from BASE. Each individual checking out a device(s) must have a brief operational review and sign for the equipment.
- It is the responsibility of the ECO employees to verify that the communication devices are working properly prior to and once at the work site.
- Each employee will sign for and be responsible for the equipment and accessories. No notice is required for checking back in equipment.
- Each individual and his organization will be responsible for lost equipment and/or obviously abused equipment.

Daily Communications Requirements by Construction Work Groups:

Overhead Work Sites on the Right of Way

Where crews or groups of people will be working at one general location, a single point of contact (POC) will be designated at the beginning of the shift (after the tailgate meeting). The POC will communicate with BASE during the work shift. The POC shall be someone who will be physically located at the work site at all times and is responsible for monitoring the radio and maintaining a communications link with BASE. If the POC needs to leave the worksite while employees are still present, a new POC will be designated. Prior to the pass down the new/replacement POC will contact BASE with a brief informational update that includes; name, radio unit number, cell phone number.

Boulevard and ECO Substations and Under Ground Work Sites

The designated person in charge will check in with Base at beginning and end of shift. The designated person in charge will insure all personnel are accounted for before checking out at end of shift.

Employees Working Individually or in a Group of two

Employees working solo are required to check in when entering the ROW in an unpopulated area. This group shall also check-out with Base once back in a populated work area or leaving the project ROW.

Non-project Employees and/or Visitors to the Project

Non-project employees and visitors shall be escorted by a project employee equipped with a functional communication device.

Base Daily Communications (POC)

- Just prior to entering any project site, contact the Base to provide notification that you are entering the Project. **Radio is the preferred method for reporting your presence and location**. Use a secondary device only if the radio is not working, cell phone where coverage is available. Provide your name, your intended work location(s), number of people in your crew/group, contact information, and your vehicle number if applicable. During the work day crews or groups larger than two working at a fixed location for the entire day shall, at a minimum, check in at the beginning of the shift and check out at the end of the shift.
- All *POC's* for Crews and/or smaller groups leaving the project area during the work day MUST notify Base prior to, or while in the process of leaving the ROW/Work site.
- POC's must monitor the radio to hear emergency traffic and other important communications.

Contact information for the Base is as follows:

- By Radio: 900MHz Base - Talk group: SPL-MSTR
- By Phone: (619) 717-8118

For non-emergencies - If the Base cannot be reached for any reason, please contact

- Jesse Thrush 619-888-4900
- Mike Toby 619-209-9076

Base Responsibilities

Base has the responsibility to monitor field employee status at work sites along the ROW for the purpose of notifying emergency agencies and coordinating an emergency response when needed. BASE is prepared with emergency contact information, emergency response and internal notification procedures during an incident. Base will work with the reporting party in the field to manage the appropriate response. Base will assume incident command unless otherwise assigned by project leadership.

Field Emergencies

It is the responsibility of all field employees to report and work with BASE to resolve field emergencies. Primarily it is the responsibility of the field work site POC to notify and work collaboratively with BASE to resolve field emergencies. Field events include but are not limited to: construction accidents, employee illness/injury while in the field, other observed public incidents like wild land fire, vehicle incident, acts of violence, security threats/breaches, theft and sabotage.

Note: Potential Safety Zones and Emergency Walk-out Routes have been identified for remote project locations and are available to download into a GPS unit via OneTouch or through ECO Safety. Depending on the nature of the emergency these safety zones and walk-out routes may be the most expeditious way to leave the site or shelter in place.

When a Field Emergency Occurs - Reporting

For privacy reasons the reporting of an emergency to Base should be done via phone if at all possible. If it is not possible the 900 MHz radio is acceptable, however NO NAMES OR IDENTIFIYING INFORMATION ABOUT THE INJURED MAY BE GIVEN OVER THE RADIO! The Base contact number is 619 717- 8118.

When reporting an emergency by Phone

1. Call Base at 619-717-8118 and state that you are reporting an emergency
2. Stay as calm as possible and provide a brief report about the emergency
3. Prepare to stay on the phone with Base team member until help arrives or unless directed by Base to end the call.

When reporting an emergency by Radio

1. Hail Base and state that you are reporting an emergency
2. Wait for Base to acknowledge your transmission.
3. Stay as calm as possible and provide a brief report about the emergency
4. Prepare to stay on the Radio with Base team member until help arrives or unless directed to end the transmission by Base.
5. NO NAMES OR IDENTIFYING INFORMATION OF THE INJURED MAY BE GIVEN OVER THE RADIO!

During a field emergency Base is prepared to provide help from a variety of resources. Base coordinators will work with the reporting party to gather information and initiate the appropriate response. Resources include internal field safety personnel, internal field security agents, City & County Fire resources, San Diego County Sheriff, San Diego County Sheriff's Search & Rescue (Astrea), Mercy Air Trauma Patient transport and internal helicopter services.

Upon confirmation of an emergency BASE will initiate event notifications to a variety of internal sources.

If an emergency occurs after you have notified Base that you have left the jobsite and Base has shut down for the day (i.e. when traveling home), you may reach a team member of Base after hours by calling the Base contact number 619-717-8118.

Emergency Reporting Directory:

1) Base (First Call Priority):

- **By Phone: (619) 717-8118**
- **By Radio: 900mhz Major Projects Base – Talk group: S SPL MSTR**

2) SDG&E Trouble department (aka "Station Y") this is the backup if Base can't be reached.

By Radio: 900mhz Station Y Talk group 1G – DSP S
By Phone: (619) 725-5199

3) Dial "911" (as a last resort in case of emergency only)

Below are listed important facilities, agencies, and departments for easy reference. Always report work related injuries/illnesses to Base and your supervisor prior to securing care at any health facility.

1) Area Hospitals and Urgent Care Facilities

- Sharp Grossmont Hospital
  5555 Grossmont Center Drive
  La Mesa, CA 91942
  619-740-6000 General
  - Heliport

- Urgent Care of East San Diego County
  Monday – Friday 8:15 – 17:30 Saturday – Sunday 9:00 – 15:45
  1625 East Main Street
  El Cajon, CA 92021-5240
  619-442-9896

- Southern Indian Health Council
  Monday – Friday 8:00 – 12:00; 13:00 – 16:00
  4058 Willows Road
  Alpine, CA 92901
  800-400-1189

- Southern Indian Health Council
  Monday – Friday 8:00 – 12:00; 13:00 – 16:00
  36350 Church Road
  Campo, CA 91906
  619-445-1188

2. Law Enforcement

Sheriff (SD County)

- Alpine station (619) 659-2600
- Boulevard/Jacumba substation (619) 766-4585
- Campo substation (619) 478-5378
- Pine Valley (619) 473-8774

Sheriff (Imperial County)

- El Centro (760) 339-6301

California Highway Patrol (CHP)

- El Cajon (619) 401-2000

US Border Patrol (619) 652-9966 Ext: 100

3. Fire Agencies

- Cal Fire (Monte Vista) (619) 590-3100

4. Other Governmental Agencies

- US Forest Service (619) 445-6235
- BLM (El Centro) (760) 337-4400
- Cal Trans (619) 688-6699
- DigAlert (800) 227-2600

In addition, employees should have the following SDG&E Emergency Contact phone numbers available at all times:

- ECO Safety 858-637-7930
- SDG&E Safety 858-654-1895
- Sempra Security 619-725-8611
- Sempra Claims 858-650-4100
- Media Relations 877-866-2066
- Community Relations 877-775-6818
- SDG&E Labor Relations 858-637-7924/619-890-1020

- Emergency Operations Center (EOC) Primary Site 858-636-6920
- Emergency Operations Center (EOC) Alternate Site 858-574-7076
- Employee Identification Badges/Access Control 619-696-2013
- Fleet (for breakdowns-Cam Rogers) 858-503-5014
- Gas Control 323-266-5800

Emergency Contact Card

All SDG&E employees must ensure their emergency contact data in MyInfo is accurate. Contract employees working under SDG&E supervision must fill out and keep current at all times, an Emergency Contact Card which will be kept on file at Base. All Contractors and Consultants must ensure they have current emergency contact information for all their employees.

Employee Incident & Injury Reporting (SDG&E EMPLOYEES)

All SDG&E ECO Project employees are responsible for reporting any office, field and/or vehicle incident, minor injury or close call to their Supervisor immediately after said occurrence. If incident occurs in the field, employee will follow emergency reporting protocol above; i.e. immediately notify the BASE, Following initial notification, the reporting of incidents and/or injuries will be done in accordance with Rule 1800 Incident and Injury Reporting. Supervisors will ensure timely communication up through their chain of command and with Disability Management and Project Safety & Compliance. Project leadership will share information on serious incidents and injuries through an established phone tree. Incidents will be recorded per Safety Rule 1800 in the Safety Incident Management System (SIMS).

Contractor Incident Reporting and Investigation

Contractors and Consultants will immediately notify the SDG&E Project Manager or other primary contact, by the most effective means, of all safety incidents including near misses, vehicle incidents, first-aids, OSHA recordables, hospitalization, property damage in excess of $25,000, any serious incident resulting in death, and any project related theft or vandalism. A written summary of the incident will be also be submitted within 24 hours and a complete incident investigation report will be submitted within 20 calendar days of the incident. Contractor/Consultant shall cooperate with SDG&E and responsible Governmental Authorities with respect to their independent investigations of the incident.

APPENDIX F-1: SWEAP VISITOR FORM

Appendix F-1
ECO Substation Project
Safe Worker and Environmental Awareness Program (SWEAP)

Visitor Form

(Under Development)

APPENDIX F-2: TRAINING FORM 5300

ENTERPRISE – TRAINING FORM 5300

INSTRUCTIONS

Last Updated: 09/10/08

For Facilitator Only	For Training Administrator Only
Upon completion of training, make a copy of this form. File the original at the facility where the training was conducted. Send the copy to [illegible] Enterprise Training Administrator for Enterprise entry. [illegible] Refer to the detailed instructions on pages 5 and 6 for more information, including documenting make-up sessions and [illegible] retention. [illegible]	Input to Enterprise within 30 days of training date (unless requested sooner by Site Manager). [illegible] Refer to the detailed instructions on pages 5 and 6 for more information, including properly recording make-up sessions in Enterprise. [illegible]
Date Routed to Training Admin: ______ Initials: ______	Date Input to Enterprise: ______ Initials: ______

TRAINING DATE & LOCATION INFORMATION

Date(s): ____________ **Facility/Room:** ____________ **Vendor/Company Name:** ____________ (if applicable)

COURSE INFORMATION

Course Code	Course Title	Course Time	Facilitator	Delivery Method*	Session ID # Entered by Training Admin Only
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		

* **Delivery Method Key:** B = Bypass **C** = Computer Based (CD-ROM) **E** = External **F** = Facilitator Led-Internal **O** = On-the-Job **S** = Self-Study **V** = Video **W** = Web Based (e-Learning).

SEE NEXT PAGE FOR PARTICIPANT INFORMATION

ENTERPRISE – TRAINING FORM 5300

PARTICIPANT INFORMATION Facility/Room:_____ Vendor/Company: _____

	Employee ID #	Name (Printed)	Signature	Work Facility (e.g., Kearny, Pico, etc.)	Supervisor	Today's Date	Course Grade*
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

* Course Grade Column for Facilitator Only: P = Pass F = Fail I = Incomplete NS = No Show

APPENDIX G: HAZARD COMMUNICATIONS PROGRAM

Appendix G - Hazard Communications Program

HAZARD COMMUNICATION PROGRAM (HAZ-COM)

Purpose

The Haz-com program provides employees with information and training on hazardous substances in the workplace. This Hazard Communication Program does not apply to employees who use consumer products except when consumer products are used in a duration and frequency of exposure greater than normal consumers' experience.

Program

- Hazardous Substance Evaluation
- Approval of new materials/substances
- Product Approval Request Form
- Periodic evaluations

Material Safety Data Sheets and Hazardous Substance Inventories

- Current and complete MSDSs
- Master inventory of hazardous substances
- MSDS availability for employees

Labeling

- Containers
- Transferring to secondary container

Hazardous Substances Information and Training

- Training prior to exposure and use
- Training when new hazardous substances are introduced

Contractors

- Contractors informed
- SDG&E approval of Contractors' hazardous substances

Proposition 65 Warnings

Proposition 65 prohibits the exposure of any individual to a chemical known to the State of California to cause cancer, birth defects or reproductive harm, without first providing a "clear and reasonable warning." Visible warning signs shall be present at any location of the project where there is exposure or possible exposure to a prop 65 chemical.

Responsibilities

Supervisors

- Plan, review and document control measures and emergency response procedures
- Ensure new hazardous substances are approved (see 1.1 above)
- Ensure Contractors receive Hazmat info(2.3.1), and Contractors info is provided to SDG&E(1.15 and 1.16)
- Ensure labeling of containers
- Ensure employees know location of Hazcom program and MSDS
- Provide employees with Hazmat info and training
- Provide employees assigned to new or non-routine task Hazmat info and training
- Provide employees, working on or near areas where there may be UXO, identification, potential hazards, safety precautions that will be taken.

Employees

- Attend Hazcom training
- Use only approved substances
- Review label, sign, fact sheet, and MSDS info
- Follow safety procedures
- Use and maintain PPE
- Use approved container labels
- Responsibility for own chemical safety
- Inform supervisor of injury/illness

Contract Administrators/Project Managers

- Ensure Contractors are provided with info regarding hazardous substances
- Obtain info of substances brought in by Contractors

Environmental Coordinator/Stores Function

- Provides proper management of hazardous materials and wastes
- Advises dept. heads and Field Environmental Specialist of Hazmat and waste matters requiring corrective action
- Ensures product approval process is followed
- Verifies containers have proper labeling prior to release

Field Environmental Monitor or designated site representative

- Provides assistance and guidance regarding proper management of Hazmat and waste
- Conducts and maintains records of required Hazcom training
- Ensures training records are entered into record keeping system

- Participates in annual chemical inventories for designated facilities

Environmental Services

- Reviews MSDS and Product Approval Request forms for proposed materials and/or their containers, approves or prohibits materials, establishes protective measures for the environment and returns MSDS and Product Approval Request form to Safety

Material ordering departments

- Requests MSDS on all orders placed with the supplier

Safety Department

- Coordinates the product approval process for proposed materials
- Ensures approved products are entered into 3E Company database
- Monitors compliance and provides assistance with this program

APPENDIX H-1: ECO CONSTRUCTION FIRE PREVENTION PLAN

EAST COUNTY SUBSTATION PROJECT
CONSTRUCTION FIRE PREVENTION PLAN

November 26, 2012

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Table of Contents

1. CONSTRUCTION FIRE PREVENTION PLAN DEFINITIONS

1. **Activity Risk:** An activity risk includes those activities that present a risk of igniting a wildfire.

2. **"Elevated" Fire Risk Conditions:** Fire conditions will be considered to be elevated when the average live fuel moisture content in the service territory is equal to or less than 75%.

3. **ESP 113.1 SDG&E Wildland Fire Prevention & Fire Safety Plan (SDG&E ESP 113.1):** This is an internal San Diego Gas & Electric (SDG&E) standard practice or procedure outlining fire suppression tools and equipment required for its employees and contractors, fire prevention requirements, and fire related training. It serves as an attachment to this Plan.

4. **Fire Marshal:** An SDG&E employee who serves as liaison or agency representative to the fire agencies and other emergency services during an emergency and with other fire related activities in non-emergency situations.

5. **Project Fire Marshal:** An SDG&E employee assigned full-time during the construction phase to monitor compliance with this plan, to continually evaluate fire prevention and fire safety issues, and to be the primary contact with the fire agencies.

6. **Fire Patrols:** SDG&E shall implement ongoing fire patrols during the fire season as defined each year by local, state, and federal fire agencies. An individual will be assigned as "Fire Patrol" specifically to monitor work activities when an Activity Risk exists for fire compliance. This person verifies proper tools and equipment are on-site, assesses any fire agency work restrictions, and serves as a lookout for fire starts, including staying behind to make certain no residual fire exists.

7. **Fire Suppression Resource Inventory:** SDG&E will provide the fire agencies with 24 hour contact information and on-site fire suppression equipment, tools, and personnel list, updated on a quarterly basis, and make amendments as changes occur.

8. **"Normal" Fire Risk Conditions:** Since fire season is no longer officially proclaimed SDG&E will identify normal fire risk conditions as the average live fuel moisture content in the service territory (as determined by CALFIRE & USFS) is greater than 75% or formal determination that area has received sufficient rain to adequately mitigate fire danger.

9. **Plan:** This Construction Fire Prevention Plan, designated as Mitigation Measure FF-1 in the joint CPUC/BLM Final Environmental Impact Report/Environmental Impact Statement issued in December 2010.

10. **Red Flag Warning (RFW):** A Red Flag Warning is issued for a stated period of time by the National Weather Service (NWS) using pre-determined criteria to identify particularly critical danger in a particular geographic area. All construction and maintenance activities shall cease during RFWs, as discussed in the plan.

11. **ECO or Project:** The East County Substation Project that includes the ECO Substation, Boulevard Substation, the transmission line between ECO Substation and Boulevard Substation and the transmission loop-in of the existing Southwest Powerlink (SWPL) into the ECO Substation.

2. PROJECT DESCRIPTION

General location: The East County Substation Project (Project) will be constructed and later maintained in south eastern San Diego County. It will consist of the rebuild of SDG&E's existing Boulevard Substation located in the community of Boulevard, the new East County Substation (ECO) to be constructed just east of the community of Jacumba, a new 138 kV transmission line from the rebuilt Boulevard Substation ECO, and an interconnect (loop-in) to the SDG&E's existing 500kV Southwest Powerlink (SWPL) at the ECO Substation. The total distance of the new 138kV transmission line is 13.9 miles with an affected right of way area that ranges from 60 to 100 feet across (see Attachment 1). The Project will be constructed and maintained within the wildland areas of southern San Diego County including areas determined to be moderate, high, and very high Fire Hazard Severity Zones (see Attachment 2). The Project will be located in fire jurisdictional and land management responsibility areas for the following departments or agencies; Bureau of Land Management (BLM), California Department of Forestry and Fire Protection (CALFIRE), San Diego County Fire Authority (SDCFA), and the San Diego Rural Fire Protection District (SDRFPD). The fire suppression and cost recovery for suppression for the BLM land is contracted to CALFIRE. Other fire management services for the BLM land, such as, Fire Mitigation, Fire Education and fuels management remain the responsibility of BLM.

Table 1- Fire jurisdiction & land ownership

Ownership/Responsibility within Project	Fire Suppression Responsibility	Approximate. Miles in Project Area
Private land (SRA)	CALFIRE (DPA)	12.0
Private land (LRA)	SD RURAL FIRE	7.9
Private land (LRA)	SD County Fire Authority	6.0
Bureau of Land Mgmt. (FRA)	CALFIRE (DPA)	0.1

(DPA, Direct Protection Area, SRA, State Responsibility Area; FRA, Federal Responsibility Area; LRA, Local Responsibility Area)

Scope and Intent of Proposed Project: The proposed ECO Substation site is located approximately 0.5 miles south of Interstate 8 (I-8) and 4 miles east of the community of Jacumba. The substation will be located on private land, just east of Old Highway 80, 0.5 miles west of the Imperial County border, and 0.5 miles north of the U.S.–Mexico border in southeastern San Diego County (see Attachment 4). Privately owned, undeveloped land borders the northern, western, and southern sides of the ECO Substation site and undeveloped land managed by the BLM is located to the east. Attachment 4, *ECO Substation Temporary and Permanent Footprint Map*, shows the fenced portion of the ECO Substation, which will encompass approximately 58 acres. The permanent impacts of the ECO Substation will be approximately 83.56 acres and will include the fenced substation, a 20-foot buffer around the perimeter of the substation yards, permanent slope and grading impacts, permanent access roads to the substation from Old Highway 80, and drainage facilities.

The SWPL loop-in will be constructed in the same general location as the ECO Substation. A short transmission connection to the existing 500 kV SWPL transmission line into the new

substation will begin along the existing SWPL right-of-way (ROW), traverse south-southwest for approximately 1,600 feet, then will turn westerly for 770 feet, and enter at the east side of the new substation.
An approximately 13.9-mile-long 138 kV transmission line will be constructed from the ECO Substation to the rebuilt Boulevard Substation (located within the unincorporated community of Boulevard in southeastern San Diego County), The line will travel west out of the ECO Substation for approximately 800 feet and then turn north until reaching the SWPL ROW. The 138 kV line will then go underground for approximately 2.8 miles. It will be constructed along Old Highway 80 heading west toward Carrizo Gorge Road. At Carrizo Gorge Road, the new underground transmission line will turn North and continue along Carrizo Gorge Road until it reaches the SWPL ROW. At this point, the new transmission line will continue overhead parallel to the south side of the SWPL for approximately 3.4 miles. At this point, the line will cross under the SWPL and continue parallel for approximately 3.2 miles along its north side until it intersects with an existing dirt access road. At this point, the line will go underground and turn to the north. The transmission line will continue heading north along existing dirt roads for approximately 4 miles to the rebuilt Boulevard Substation.

The new 138 kV transmission line will require a 60 foot wide permanent ROW for the underground segments and a100 foot wide permanent ROW for the overhead segments. Approximately 6.8 miles of the new transmission line that parallels the SWPL will be adjacent to SDG&E's existing easements. This area is predominantly privately owned, undeveloped open space.

The existing Boulevard Substation and its rebuild site are located approximately 12 miles northwest of the proposed ECO Substation site. SDG&E has acquired one 8.5 acre parcel immediately east of the existing Boulevard Substation to rebuild the substation. The fenced portion of the new substation will encompass approximately 2 acres. Nine existing structures located on this property will be removed prior to substation construction. In addition, the existing Boulevard Substation will be dismantled and removed after the new substation is put in service. Single-family residences on large lots surround the existing and rebuilt substation sites. The site can be accessed by traveling east from San Diego on I-8, heading south on Highway 94 (Jewel Valley Road), and then heading west on Old U.S. Highway 80.

As a result, the Project will traverse through wildland areas of various hazard classes, including approximately 0.5 miles within the moderate, 3.7 miles within the high, and 9.7 miles within the very high Fire Hazard Severity Zones, see attachment 2, *Fire Hazard Severity Zone Map.* The construction phase will involve multiple operations that can present a fire ignition risk. The intent of this Plan is to identify those potential ignition risks and plan reasonable mitigation measures to eliminate or reduce such risks as much as possible. It is also the intent of this Plan to look at the pre-existing hazards along the route and plan Project activities in a manner that best minimizes the risk of fire. In the higher hazard areas avoidance of hazards, scheduling, vegetation management work, or other means will be used to minimize fire risk. Lastly, it is the intent of the Plan to identify tools, equipment, and training requirements necessary to rapidly extinguish a small fire, should one start during any of the Project operations.

Project Timeframes: This Project is scheduled to begin construction in mid 2012 and is expected to be completed by the end of 2013. However, this projected construction schedule is dependent upon licensing and permitting for the Project. Regardless of this proposed schedule, construction will continue until the project is complete. Work on the Project will take place during all seasons within the proposed time frames including summer and fall, when wildland fire concerns are generally elevated. Although there will be a heightened concern when the annual grasses cure each year, fire mitigations will be addressed for two distinct conditions; "NORMAL", when live fuel moistures are equal to or above 75% (determined by USFS/CALFIRE sampling data) and "ELEVATED", when live fuel moistures are less than 75%. During the "ELEVATED" time of the year there will be more restrictive operations combined with additional fire risk mitigation requirements. SDG&E will assign a Project Fire Marshal for the Project duration. The Project Fire Marshal will oversee all fire related activities for SDG&E and their contractors.

Description of work activities that will take place in the SDG&E Wildland Fire Area: The following work activities will take place in areas considered to be wildland as referenced by the SDG&E Wildland Fire Area *(*see attachment 3*).*

Construction Phase

- Vegetation removal; chain saws, brush cutters, chippers, excavators, tractors
- Road, tower pad, & staging area development; bulldozers, graders, loaders, other equipment
- Aviation activities; helicopter heavy lift and cargo transportation, landing zones, fueling activities
- Other construction related activities with the potential to ignite a wildfire:
    - Generators, augers
    - Grinding, welding, and blasting
    - Staging areas with fuel and/or other hazardous or flammable materials (emphasis on flammable)
    - ECO and Boulevard Substation construction specific fire related issues
    - Other, as determined by Project Fire Marshal, Project Supervisor, or Fire Agency

3. PROJECT FIRE RISKS:

During the construction phase of the Project, SDG&E shall implement ongoing Fire Patrols during the fire season as identified each year by local, state, and federal fire agencies when performing any activity in the SDG&E Wildland Fire Area (see Attachment 3). The following describes activities creating fire risks associated with the Project that will occur within the SDG&E Wildland Fire Area; where they apply, to what extent they apply, and what time frame they are applicable. Others will be added as they become identified by SDG&E or a participating fire agency.

Activity Risk:	Location on Project:	Miles or Acres on Project:	Time of year and duration:
1. Working on energized or de-energized electrical equipment.	Entire Project	13.9 miles	All year
2. Any off-road vehicle use within Project area.	Entire ECO Project	13.9 miles	All year
3. Any on highway vehicle use within project area.	Entire ECO Project	13.9 miles	All year
4. Chain saw use of any kind.	Entire ECO Project	13.9 miles	All year
5. Use of generators, pumps, augers, or other equipment capable of ignition.	Entire ECO Project	13.9 miles	All year
6. Other tree removal equipment; whole tree grinders, chippers, skidders, etc.	Entire ECO Project	13.9 miles	All year
7. Grinding or welding.	Entire ECO Project	13.9 miles	All year
8. Blasting or other explosive work.	Entire ECO Project	13.9 miles	All year
9. Aviation activities.	Entire ECO Project	13.9 miles	All year
10. Pad clearing accessible areas	Entire ECO Project	13.9 miles	All year
11. Pad clearing inaccessible Areas	Entire ECO Project	13.9 miles	All year
12. ECO Substation	Substation	83.56 acres	All year
13. Personnel smoking areas	Across entire ECO Project	13.9 miles	All year

4. PROJECT FIRE RISK MITIGATION MEASURES:

The following pre-identified "Activity Risk" tool and equipment requirements are based on the *Forest Standard Practice Rules 2008* and in most cases exceed those requirements. Activity Risks identified after Project initiation shall be added to this section with appropriate mitigation measures mutually determined by the Project Fire Marshal and the appropriate fire agency with jurisdictional responsibility.

Activity Risk:	**Risk Mitigation Description:**
1. Working on energized electrical equipment in or adjacent to wildland vegetation.	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box (sealed box of tools) on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [1 (5) gal. backpack pump w/H_2O, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of 1 (5) gallon backpack pump p/3 persons on site and a water reserve that totals 2 refills for each (5) gallon backpack pump w/H_2O.
2. Any off-highway vehicle use within Project area.	"NORMAL", have required tools and equipment available in vehicle, 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O. Visually confirm that no fire has started behind the path of travel. Vehicles must be highway legal and equipped w/spark arresters if required. "ELEVATED", same as above with the additional requirement of having a "Fire Patrol" (individual w/shovel and/or backpack pump w/H_2O) to lag behind vehicle and insure no fire has started and to extinguish rapidly if one has. Use lookouts for early detection of fire starts.
3. On highway activities in particularly hazardous areas.	May not be applicable to this Project, however still prudent to carry all required tools and equipment on vehicles. Work with Fire Agency involved to mitigate any delays to fire response equipment during underground construction near roadways.
4. Chain saw use of any kind in or immediately adjacent to wildland vegetation. (Must comply with PRC Code Div. 4, Ch. 6, 4431 & 4442)	"NORMAL" & "ELEVATED", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. Have 1 round point shovel within 25' of the chainsaw operation or 1 serviceable fire extinguisher in the operator's immediate possession. Refuel chain saw after cooling and in a minimum 10' area cleared of all flammable vegetation. Assign spotter or swamper "Fire Patrol" duties during chain saw operations. Tools utilizing internal combustion engines will be provided with spark arrestors.

Activity Risk:	**Risk Mitigation Description:**
5. Use of generators, pumps, augers, or other equipment capable of ignition and located in or adjacent to wildland vegetation. (Must comply with PRC Code Div. 4, Ch. 6, 4442)	"NORMAL" & "ELEVATED", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. Place equipment in a minimum 10' area cleared of all flammable vegetation. Tools utilizing internal combustion engines will be provided with spark arrestors.
6. Other tree removal equipment; whole tree grinders, chippers, skidders, etc. working in or adjacent to wildland vegetation. (Must comply with PRC Code Div. 4, Ch. 6, 4442)	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of 1 (5) gallon backpack pump w/H_2O p/3 persons on site and a water reserve that totals 2 refills for each (5) gallon backpack pump. Tools utilizing internal combustion engines will be provided with spark arrestors.
7. Grinding or welding, in or immediately adjacent to wildland vegetation (see Forest Std. Practice Act 918.7, 938.7, 958.7 Blasting and Welding and NFPA51B-2009)	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. All welding, cutting and other hot work will require a Hot Work Permit as described in NFPA 51B with SDG&E designated as the Authority Having Jurisdiction and the SDG&E ECO Project Fire Marshal designated as the Permit Authorizing Individual. "ELEVATED", same as above with the additional requirement of assigning a "Fire Patrol" or observer during grinding or welding operation.
8. Blasting or other explosive work in or adjacent to wildland vegetation. (see Forest Std. Practice Act 918.7, 938.7, 958.7 Blasting and Welding)	Any blasting or explosive work will require a separate and independent fire mitigation plan. The contents of this Plan can serve as the foundation, but each proposed blasting event will require specific direction and mitigation requirements. Fire Agency having authority shall be notified prior to any blasting.
9. Aviation activities	All aviation activities and mitigation requirements will be addressed separately in the "Helicopter Operations Safety Plan" later in this document.
10. Pad clearing accessible areas in or adjacent to wildland vegetation.	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site. This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [3 (5) gal. backpack pump,1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of a standby water truck w/pump and hose (minimum 50 gals.) staged, available, and

	within 1 mile of work site, 250 gallons within 3 miles and 500 gallons within 5 miles. (can serve more than 1 work site)

Activity Risk:	**Risk Mitigation Description:**
11. Pad clearing inaccessible areas in or adjacent to wildland vegetation.	"NORMAL", have one fire box on site p/5 personnel containing [1 (5) gal. backpack pump, 1 Pulaski, 1 McCleod, 2 round point shovels]. "ELEVATED", same as above with the additional requirement of 1 (5) gallon backpack pump p/3 persons on site and a water reserve that totals 2 refills for each (5) gallon backpack pump.
12. ECO and Boulevard Substation construction	A site inspection prior to project initiation will determine any additional fire mitigation requirements for the ECO and Boulevard Substations and documentation of those will serve as an amendment to this document. The following minimum requirements however will apply. "NORMAL", have required tools and equipment on site, either available on vehicles within 50' or in a fire box on site. This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of a standby water truck w/pump and hose (minimum 50 gals.) staged, available, and within 5 miles of work site. (can serve more than 1 work site)
13. Personnel smoking areas	Where permitted, smoking will be in designated areas only, 10' cleared circle, with ash cans, and no butts left on ground.

5. STAGING AREAS, FLY YARDS, AND MAJOR OPERATION WORK SITES:

List all staging areas and major operations work sites within Project that are located throughout the Project area; San Diego County entries are located in the SDG&E Wildland Fire Area:

NAME	COUNTY	Fire Agency With Jurisdiction	Township/Range/Section	Acreage
Airstrip	San Diego	SD County FA/CAL FIRE	SE ¼ SW ¼, S33, T17S, R7E	5.50
Boundary Peak	San Diego	SD County FA/CAL FIRE	NW ¼ SW ¼ S9, T18S, R7E	5.66
Jacumba	San Diego	SD Rural/CAL FIRE	NE ¼ SW ¼, S4, T18S, R8E	0.89
ECO Substation	San Diego	SD Rural/CAL FIRE	SW ¼ S1, T18S, R8E	101.91
Boulevard	San Diego	SD County FA/CAL FIRE	SW ¼ NE ¼, S28, T17S, R7E	4.30

The following precautions will take place at each fly yard, staging area, or major operations work area;

- The site will be assessed by the Project Fire Marshal for wildland fire threat and/or risk prior to beginning operations associated with that site.
- Each site will have a minimum of one fire box with tools for 5 personnel and additional tools and equipment as determined by the Project Fire Marshal and/or jurisdictional fire agency. Requirements will be posted visibly at location.
- If a risk of fire propagating out from the staging area into the wildland exists, the Project Fire Marshal will invite the jurisdictional fire agency out for an inspection and additional recommendations or requirements.
- The Project Fire Marshal and appropriate fire agency representative will determine if any hazard reduction will be completed around site perimeter to reduce chance of fire escaping into the wildland.
- Additional specialized tools and/or equipment will be identified during the inspection and requirements posted visibly at the location.
- Additional fly yards, staging areas, or major operation work areas not covered by this document will be reported to the appropriate fire agency prior to initializing activity in those areas. The fire agencies will be given the opportunity to assess these new sites.
- SDG&E will provide the fire agencies with a Fire Suppression Resource Inventory which will include 24 hour contact information and a list of on-site fire suppression equipment and make amendments as changes occur throughout the Project.

6. ECO AND BOULEVARD SUBSTATIONS:

- The site will be assessed by the SDG&E Fire Marshal and the responsible fire agency for wildland fire threat and/or risk prior to beginning operations associated with that site.
- A determination will be made as to additional tools and equipment requirements in addition to those discussed in the "Activity Risks" section of this document.
- A determination will be made as to any hazard reduction measures required around site perimeter to reduce risk of fire escaping into wildland.

7. OTHER PROJECT TOOLS & EQUIPMENT REQUIREMENTS:

(Describe any special tool & equipment requirements above those required of the California State Forest Standard Practice Act)

The following equipment may be required to be staged as proximate as possible to on-going Project activities during "ELEVATED" fire conditions to supplement basic requirements already addressed in this Plan. These items should be strategically placed to afford the best opportunity to help to expeditiously extinguish any fire resulting from Project activities. The Project Fire Marshal, with consultation from jurisdictional Fire Agency will determine additional needs.

- Water storage or water reserve, use water buffalos, (5) gallon cubi-tainers, or fixed tanks to maintain 1,000 gallons of water in the staging areas, fly yards, or major operations work sites for any work activities proximate to that site.
- Pole protection truck, meets the specifications for a Type 6 Fire Truck, or equivalent should be available for staging by the Project Fire Marshal when conditions and work warrant.
- A cache of hose, pumps, fittings, etc. will be available at staging sites. Amount to be determined by consultation between the Project Fire Marshal and responsible fire agency.
- A construction Helicopter should be available for fire suppression as determined by the Project Fire Marshal when conditions and work warrant.
- Each crew member will carry at all times a laminated, Fire Prevention Plan card listing 24-hour contact information, telephone numbers for reporting fires and immediate steps to take if a fire starts. Information on the Fire Prevention Plan card will be updated as needed, redistributed and outdated cards destroyed. On the day the information change goes into effect, the Project Fire Marshal will assure this redistribution is conducted before the initiation of any construction activities.

8. PROJECT SPECIFIC SCHEDULE RESTRICTIONS:

All work will cease should any of the following take place:

- The initiation of a Red Flag Warning for the area involved for the entire duration of the RFW. (See section 10 for work on the substation pads.)
- A special proclamation from an appropriate fire official declaring certain work activities cease for a given period of time due to extreme weather or fire resource availability is at a draw down.

Consideration should be given anytime fire danger is elevated to completing work in early morning hours and not conducting any activities with fire risks during the hot, dry, and breezy part of the afternoon.

Fire Patrols and Fire Suppression Resource Inventory: During the construction phase of the Project, SDG&E will implement ongoing Fire Patrols during those times the State and Federal fire agencies elevate their resource staffing patterns due to the seasonal fire conditions. These dates vary from year to year, generally occurring from late spring through mid-November. Fire Patrols will be conducted by the Fire Marshal, or a qualified employee as assigned. See description under Fire Plan Definitions. At all construction areas requiring a Fire Patrol, a standardized form will be used to document t Fire Patrols, including any preventative actions. Fire Patrols will also verify the Fire Suppression Resource Inventory is maintained; that all crew members have the Fire Prevention Plan card with 24-hour contact information, including numbers for reporting fires and directions for immediate steps to take if a fire starts. See the section in this Plan for Project Fire Risk Mitigation Measures and for Staging Areas, both of which identify an Inventory of Fire Suppression Resources.

9. AGENCY SPECIFIC REQUIREMENTS:

CALFIRE: The Project activities must comply with Title 14 of the California Code of Regulations; California Forest Practice Rules 2011, in its entirety for the duration of the Project with particular attention to Subchapter 4, 5, & 6 Article 8 Fire Protection and Public Resource Codes (PRC) 4427 Operation of Fire Causing Equipment, PRC 4431, Gasoline Powered Saws and Equipment, and PRC 4442, Spark Arrestors. Also requirements for Smoking and Matches in 918.4, 938.4 & 958.4. The project design will comply with applicable NFPA standards and the California Fire Code.

BUREAU OF LAND MANAGEMENT: The same requirements as described for CALFIRE above.

San Diego Rural Fire Protection District: The same requirements as described for CALFIRE above.

San Diego County Fire Authority: The same requirements as described for CALFIRE above.

10. RED FLAG WARNINGS AND OTHER CRITICAL FIRE DECLARATIONS:

All Project activities that would take place in or adjacent to wildland vegetation for the entire duration of any “Red Flag Warning” (RFW) will cease. Project managers and supervisors will be responsible for exchanging their contact information with Grid Operations, to insure they are notified of these events. At the end of the RFW, confirmation should be obtained from the on-call Fire Coordinator that work can begin again and under what continued restrictions.

Other critical declarations can be made by any jurisdictional Fire Chief for a given period of time, due to unusual circumstances or conditions. As soon as these declarations are shared with the SDG&E Fire Marshal, Distribution Operations, Grid Operations, or Service Dispatch; they will be communicated to Project personnel by Grid Operations in the same manner as RFWs. Upon notification, all work activities that apply to the specific declaration will cease in those areas identified.

SDG&E Fire Marshals (company-wide fire managers) have the authority to stop any Project work activity that appears to pose a particular fire risk or hazard not uniquely covered by this Plan. The SDG&E Fire Marshal will contact the Project Fire Marshal, on site supervisor or Project Manager directly and identify clearly what will not be allowed, the projected duration, and the circumstances making this action necessary.

11. HELICOPTER OPERATIONS SAFETY PLAN:

When the Project requires the use of helicopters and involves landing or taking off in areas within or adjacent to wildland fuels and vegetation within the SDG&E Wildland Fire Area, special mitigations may be required. A plan specific to the safety related to the helicopter operations will be completed and serve as a supplement to this document. It will include at a minimum the following:

- Identification of all landing areas within the SDG&E Wildland Fire Area
- Wildland hazard assessment for each site
- Fueling safety plan; this plan will follow *Interagency Helicopter Operations Guide – June 2009, Chapter 13 Fueling Operations, ref. 15.3.*
- Identification of special tool and/or equipment requirements for each landing site where applicable.
- Designate a “Helicopter Safety Officer” or manager responsible for compliance with the plan during all helicopter operations.
- A communications plan will be developed to coordinate air operations with the surrounding fire agencies. Air operations will cease upon request by a fire agency

12. TRAINING REQUIREMENTS FOR SDG&E & CONTRACT PERSONNEL

Prior to Project initiation and each spring prior to the curing of the annual grasses; all Project supervisors *(SDG&E & Contractors)* will receive a minimum of 1 hour training on Wildland Fire Prevention and Safety *(ref. SDG&E ESP113.1).* This training will be provided by

an SDG&E Fire Marshal or their qualified designee. This training will then be shared with all construction personnel either by the Project supervisors or an SDG&E Fire Marshal or designee. Each member of the construction crew shall be:

- Trained in fire reporting
- Trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats.
- Trained in fire prevention
- Trained in Initial Attack Firefighting
- At all times within 100' of required fire related tools and equipment

This supervisory training will be conducted by the Project Fire Marshal or other qualified fire expert and compliance and documentation for all training will be monitored by the Project Fire Marshal.

13. SAFETY BRIEFINGS, INSPECTIONS & COMPLIANCE PLAN

A formal pre-Project inspection and plan review will take place with a minimum of the SDG&E Contract Administrator, the contract Project Manager, the SDG&E Project Manager, the SDG&E Fire Marshal, the ECO Fire Marshal, the Helicopter Manager, and invitations to the respective fire agencies. Monthly inspections of work sites and/or when a new site is initiated will take place with a minimum of the SDG&E Contract Administrator, Fire Marshal, and the contract Project Manager. The ECO Fire Marshal will conduct routine unannounced inspections a minimum of twice weekly. The ECO Fire Marshal will develop an inspection check sheet to document these inspections.

Prior to Project initiation, all Project personnel will receive a ½ hour presentation on the contents of this Plan along with additional fire safety and fire prevention information provided by an SDG&E Fire Marshal. Supervisors will be responsible for sharing its content with transient Project personnel throughout the duration of the Project. A review of the content of this Plan will take place at a formal safety briefing; a minimum of once each month the "ELEVATED" condition. Each daily safety tailboard session should include an assessment of the day's fire related risks or hazards and the mitigation for each. The contractor Project Manager will submit in writing to the Fire Marshal a review of the upcoming month's work activities, a brief fire risk & hazard assessment, and a mitigation plan for the month using the guidance in this Plan.

Compliance with this Plan is mandatory. Monitoring compliance with this Plan is everybody's responsibility. All levels of project management have the authority to shut down any operation that presents an inappropriate amount of fire risk or hazard until it can be properly mitigated. Violations of any of the requirements of this Plan will be addressed immediately. Appropriate consequences for repeated or serious negligence in respect to this Plan will be dealt with accordingly. All project-related vegetation fires, regardless of size, shall be promptly reported to the California Public Utility Commission and Bureau of Land Management to determine if appropriate mitigation measures are being taken.

The Fire Marshal shall develop an inspection checklist that will include daily checks, weekly, and monthly as appropriate. These inspections will conducted, documented, retained and compliance audited by the ECO PROJECT Construction Safety Manager.

14. COMMUNICATIONS PLAN

The ability to communicate with all Project personnel working with the SDGE Wildland Fire Area is mandatory. Cell phone, Satellite phone, and/or radios are all acceptable means provided they work appropriately within the area of the work. Communications must be maintained even if it requires the use of portable repeaters, human repeaters, or other technological means for this to happen. The Fire Marshal, Contract Administrator, or contract Project Manager must be able to contact the appropriate Emergency Communications Center immediately in the event of an emergency. If one of the three is not available to perform this function, the task must be officially delegated for the duration of the absence. SDG&E will provide the fire agencies with a Fire Suppression Resource Inventory which will include 24 hour contact information and a list of on-site fire suppression equipment and make amendments as changes occur throughout the project.

All construction crews and inspectors will be required to have radio and cellular telephone access that is operational along the entire length of the approved route to allow for immediate reporting of fires. As part of the Fire Patrol duties, communication pathways and equipment will be tested and confirmed operational each day prior to initiating construction activities at each construction site. All fires will be reported to the fire agencies with jurisdiction in the Project area immediately upon ignition.

Community Education and Outreach Program: The SDG&E Construction Notification Plan, the Community Fire Safety Program and the Sempra Utilities Wildland Fire Prevention and Fire Safety Guide all are avenues that will be used to communicate SDG&E fire prevention practices. As per the Construction Notification Plan, a public notice mailer will be mailed to all residents, property owners or tenants within 1,000 feet of Project components providing advanced of construction activities. Additionally, a public affairs officer and a dedicated public affairs contact number have been appointed to address community education and outreach.

15. REFERENCES:

California Forest Standard Practice Rules;
http://www.fire.ca.gov/resource_mgt/downloads/2011_FP_Rulebook_with_Diagrams_with_Tech_Rule_No_1.pdf

Interagency Helicopter Operations Guide; http://www.nifc.gov/ihog/

ECO Substation Final EIR/EIS;
http://www.cpuc.ca.gov/environment/info/dudek/ECOSUB/ECO_Final_EIR-EIS.htm

16. PLAN REVIEW AND APPROVAL:

The signatory reviewing officials are acknowledging that SDG&E has a Construction and Fire Prevention Plan that is necessary to mitigate fire hazard and risk for the ECO project construction

and maintenance activities. They do not accept any responsibility for SDG&E interpretation or implementation of this plan during the construction and maintenance of the ECO project or for any resulting actions associated with these activities.

Reviewed by:

SDG&E Fire Program Manager	Date
San Diego Rural Fire Protection District Chief	Date
CAL FIRE Chief	Date
San Diego County Fire Authority	Date
California Public Utilities Commission	Date
Bureau of Land Management	Date

Approved by:

SDG&E ECO Project Manager	Date
SDG&E ECO Fire Marshal	Date

Attachment 1: Project Vicinity/Overview Map

East County Substation Project

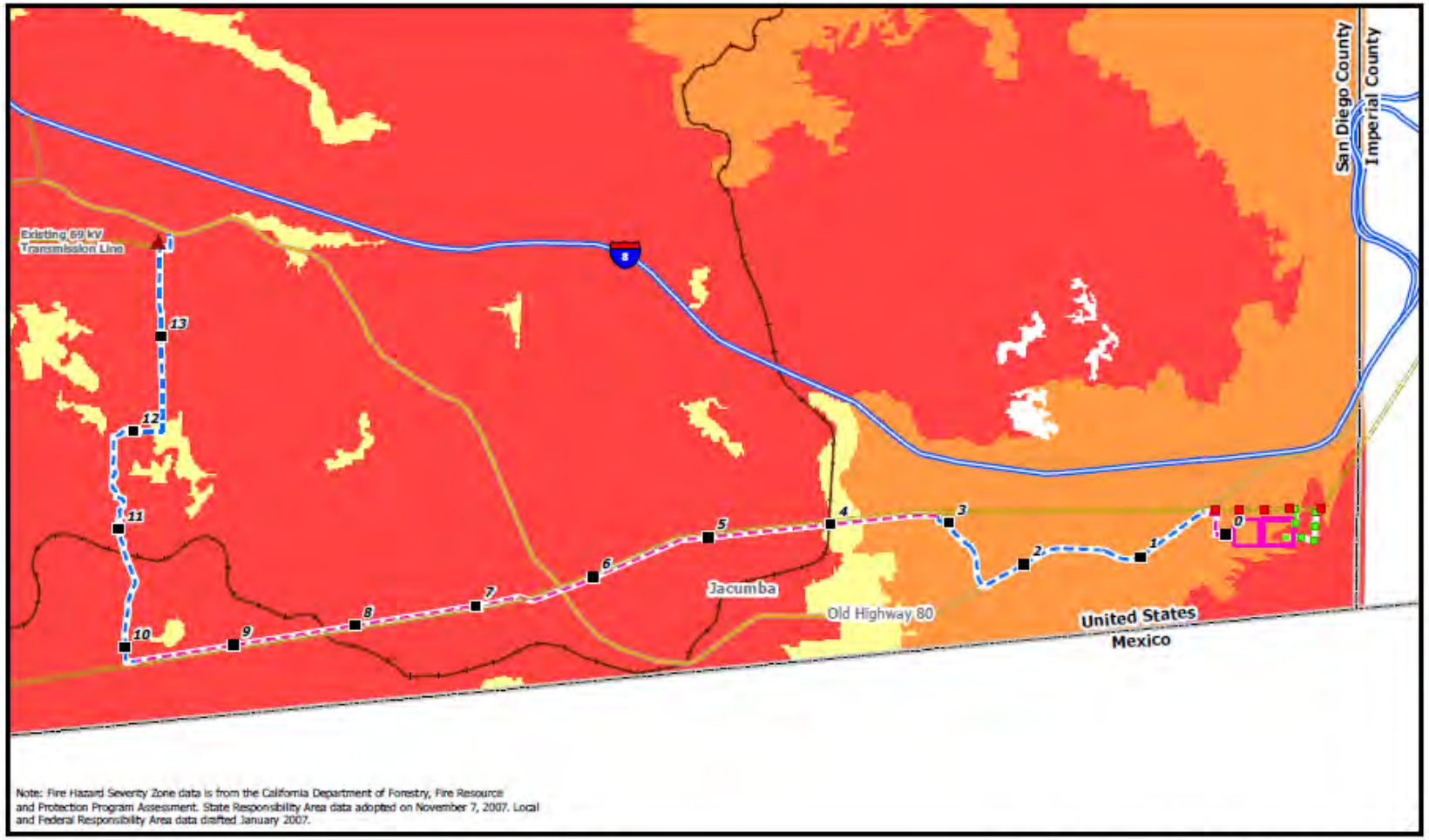
- Proposed 138 kV Line Milepost
- Existing SWPL Structure
- Proposed SWPL Loop-In Structure
- Boulevard Substation Rebuild
- Substation Yard
- Proposed 138 kV Overhead Line
- Proposed 138 kV Underground Line
- Proposed SWPL Loop-In
- Existing Transmission Line
- San Diego County Fire Authority
- San Diego Rural Fire Protection District
- Interstate
- Major Road
- Railroad

SDGE

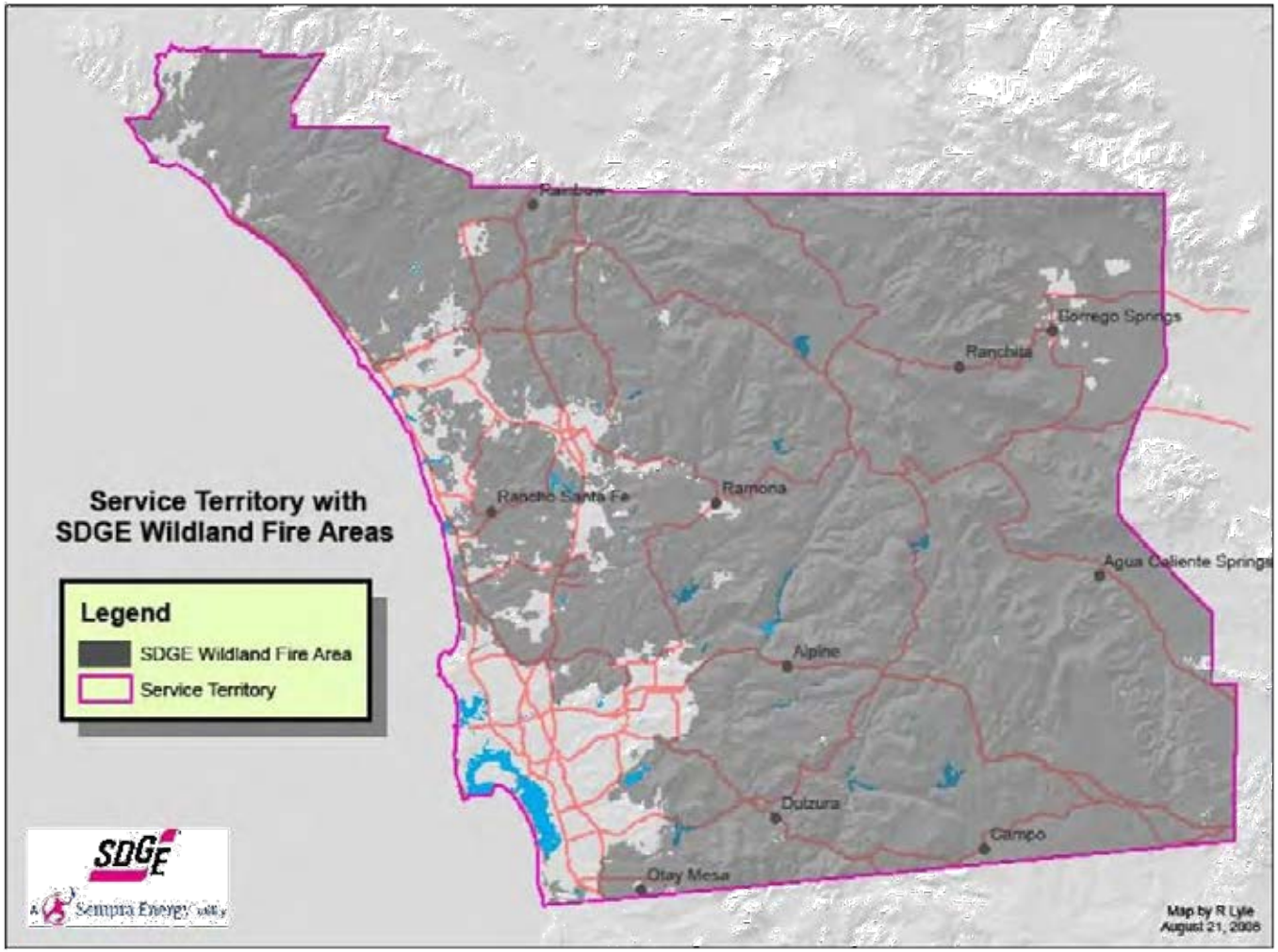
INSIGNIA ENVIRONMENTAL

1:45,000

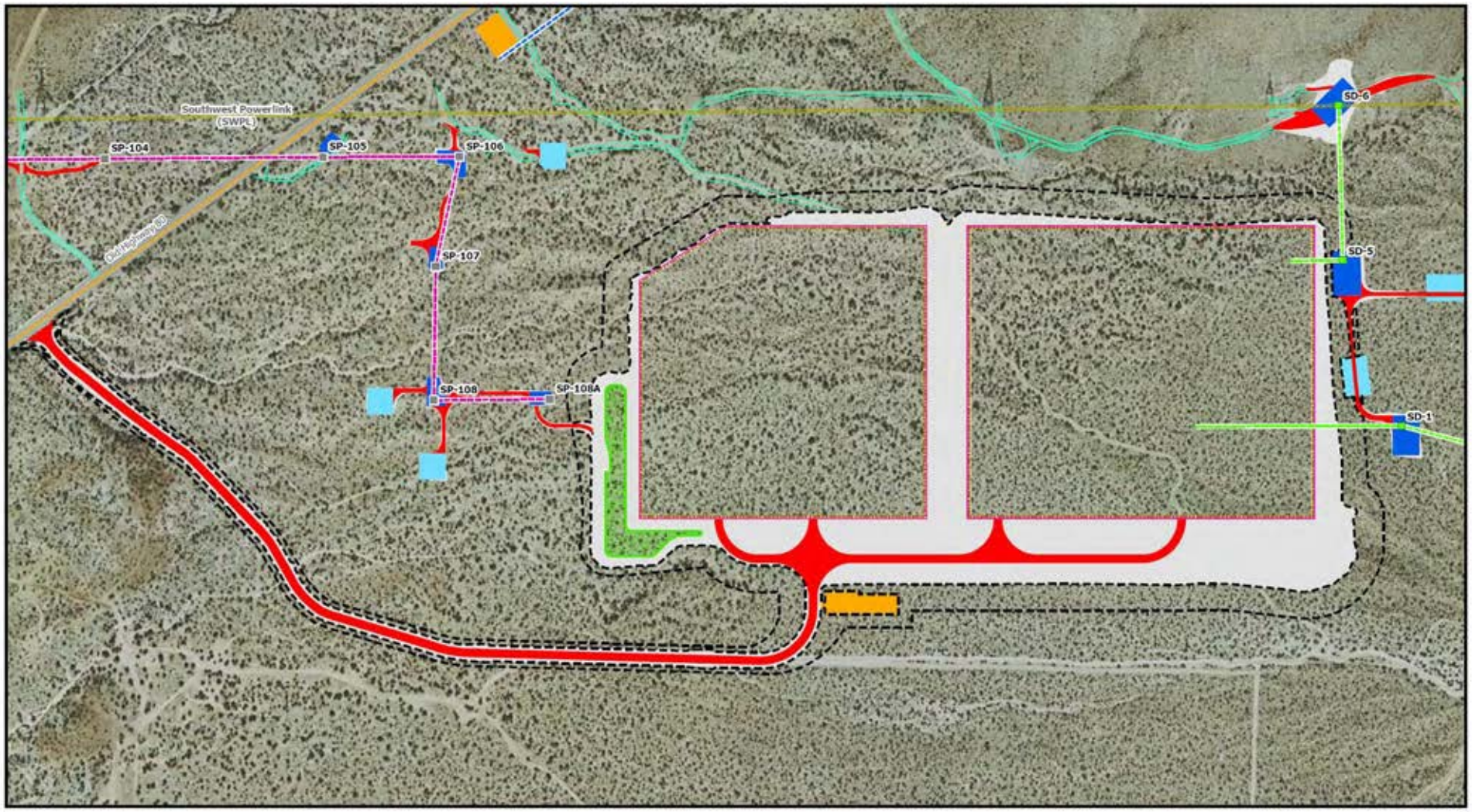
0 0.5 1 2 3 4 Miles



Attachment 2
Fire Hazard Severity Zones



Attachment 3
SDG&E Wildland Fire Areas



Attachment 4

ECO Substation Temporary and Permanent Footprint Map

Attachment 5
National Interagency Fire Council – Helicopter Operations Guide, June 2009
Chapter 13 – Fueling Operations)

IHOG

Interagency Helicopter Operations Guide

NFES 1885

June 2009

IHOG

Interagency Helicopter Operations Guide

NFES 1885
June 2009

The agencies would like to acknowledge the assistance of the many product manufacturers, as well as the National fire Protection Association, the International Fire Service training Association, and the United State Department of the Army, who kindly furnished material used in the production of this document.

National Interagency Aviation Council
3833 South Development Avenue
Boise, Idaho 83705

June 3, 2009

To: IHOps Steering Committee

Subject: IHOG

The IHOG and IHOG Supplemental Forms Package have been revised for new publication in May of 2009. All policy changes become effective at this time. Published hardcopies will be available in June 2009. Changes include revisions proposed by the IHOG Working Group, coordinated by the National Interagency Aviation council, and approved by the U.S. Forest Service and the Department of the Interior. Some revisions to the IHOG were necessary to be compatible with changes made to the national helicopter contracts. Other revisions were based on proposals submitted by field personnel and agency program managers.

Additional or altered language for 2009 is noted with an arrow (→) at the beginning of each section that has been revised.

The IHOG is a dynamic document and will be reviewed again in 2012. Please forward suggested changes for the 2012 revision to the appropriate agency reprehensive from the IHOG Working Group.

Publication as a cache item and placement on the NIFC Website is authorized. The forms package will be maintained in NFES 0660, Air Operations Branch Kit, and NFES 3521, Helicopter Support Kit, Box 2. The IHOG and IHOG Forms Package are available for downloading at http://aviation.blm.gov/library.

A copy of this memo will be included in the front of the IHOG.

Mark L. Bathrick
Associate Director
Aviation Management Directorate
National Business Center
U.S. Department of the Interior

Karyn L. Wood
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Fire and Aviation Management
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NIAC Chair

IHOG Revision 2009

Background

The IHOG Working Group met in March and November of 2008 to review and consolidate proposed revisions to the IHOG that were generated from the field and from user agencies at all levels. The process allowed almost a full year for the field to propose changes. Each proposal was analyzed and either approved or rejected. The IHOG Working Group was represented as follows:

- Dianne MacLean, FWS, Chair
- Carrie Vernon, NPS, Vice Chair
- Cameron Dingman, BLM,
- Bob Quirino, USFS
- Todd Couture, BIA
- Meg Gallagher, USDOI/AMD

The IHOP Steering Committee reviewed and approved the proposed revisions in February, 2009.

- Vince Welbaum, USFS Chair
- Bryan Bitting, BLM
- Dave Underwood, BLM
- Arlyn Miller, AMD
- Chuck Taylor, USFS
- Mike Jefferies, FWS
- Kris Damsgaard, AMD
- Tom Monterastelli, NPS
- Dan Boyle, States

There is no revision summary included in this document, but each change is noted with an ➔.

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CHAPTER 13: FUELING OPERATIONS.

I. Introduction.

Fueling operations, whether conducted by government or vendor personnel, have the potential to result in environmental damages or catastrophic accidents.

It is the responsibility of all personnel, both vendor and government, to ensure that fueling operations are conducted in accordance with procurement document specifications, agency fueling directives, and all other applicable local, state, and federal regulations. Special attention must be paid to federal, state, and local hazardous materials regulations and to agency-specific fuel spill avoidance requirements.

Chapter 15, Helibase and Helispot Management and Operations, contains guidance on location of fueling operations. Appendix I, Remote Fuel Site Reminders List, is a job aid that can be utilized by Helibase Managers and Fueling Specialists.

II. Responsibilities.

A. Management.

Agency heads are ultimately responsible for the management and effective implementation of a Fuel Quality Control Program within their respective agency. Supervisors and managers at all levels are responsible for the safe delivery of uncontaminated fuels during aviation operations under their jurisdiction or control. Within this responsibility is the practical requirement to provide safe working conditions, prevention of injury to persons, and the protection of property.

B. Employees.

To enhance safety, employees of participating agencies who become aware of any fuel-related mishaps (for example, fuel spills, fires, damage to aircraft or fueling facilities or vehicles, incorrect fueling of aircraft, incorrect fuel put in an aircraft, etc.) should report such occurrences utilizing the agency incident/hazard report. Where imminent danger situations exist, the operation should be suspended immediately.

C. Fuel Vendors.

Vendors conducting business for the transportation, storage or dispensing of aviation fuels, including into-aircraft operations, shall adhere to the provisions and specifications for such operations as provided within the procurement document. For the most part, all such operations shall be in accordance with the standards and procedures specified in applicable American National Standards Institute (ANSI) or National Fire Protection Association (NFPA) publications.

D. Pilots.

The Pilot is personally responsible for ensuring that the proper type and grade of clean, dry fuel is pumped into the aircraft.

III. Fuel or Oil Pollution Prevention.

General Environmental Protection Agency (EPA) Requirements. Agencies must be cognizant of the Environmental Protection Agency's (EPA) regulations found in 40 CFR 112.

Regardless of the size or location of an operation, it is necessary that an assessment be made to determine whether or not provisions of the regulations are applicable.

Basically, the criteria is if it can be reasonably expected that a discharge of fuel or oil will enter navigable waters, a facility is subject to the regulations. These regulations require the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) Plan. Exceptions to this requirement are:

- Aboveground facilities having a total aboveground storage capacity of 1,320 gallons or less of fuel, provided no single container has a capacity in excess of 660 gallons.

- Underground facilities having a total storage capacity of less than 42,000 gallons.

Agencies are encouraged to contact their local EPA office for detailed information concerning these regulations.

A. Fuel Spill Prevention Guidelines and Requirements in Environmentally-Sensitive Areas.

Check with the local aviation manager for additional fuel spill prevention guidelines and requirements in place for various geographic locations due to local or national environmental concerns and constraints.

Prior to the start of a project or upon arrival at an incident, the air operations staff should consult with the local Resource Advisor regarding any restrictions that may apply.

Restrictions may include, but are not limited to:

- Locating fueling sites at predetermined locations, occasionally at some distance from the helibase. Since this may have a significant impact on operations, additional planning and helicopters may be required.

- Prohibitions on fuel vehicles traveling on certain roads (usually adjacent to streams and rivers).

- Requirements for containment dikes around fueling pads.

- Proper containment and disposal of fuel samples.

IV. Types Of Fuel.

There are currently two categories of aviation fuel in use: aviation gasoline, commonly called AVGAS, and turbine or jet fuel.

A. Aviation Gasoline (AVGAS).
Aviation gasolines are used in reciprocating engine-powered helicopters. There are currently three grades of aviation gasoline in use:

- 80/87
- 100 Low Lead (100 LL)
- 100/130

B. Turbine (Jet) Fuel.
Aviation turbine fuels are used to power turbofan, turbojet, and turboprop aircraft engines. There are two types of turbine fuel in use:

- A kerosene base (Jet A, Jet A-50, JP-8, and Jet A-1)
- A blend of gasoline and kerosene (Jet B and JP-4)

Most commercial operators use Jet A or Jet A-50. The military normally uses JP-4 and JP-8. The specifications for JP-8 are similar to Jet A except that JP-8 has required additives for anti-icing, corrosion inhibitor, and anti-static.

V. Requirements for and Methods of Identifying Types of Fuel.

A. By Color.
If sample is not the right color, suspend the operation immediately. The following colors are indicative of the type of fuel:

Aviation Gasoline			Turbine Fuel
80/87	100 Octane Low Lead	100/130	(Jet A, Jet A-50, Jet A-1, Jet B, JP-4, and JP-8)
Red	Blue	Green	Clear or straw-colored

➔ WARNING: The Environmental Protection Agency (EPA) and Internal Revenue Service (IRS) have required that certain types of high and low sulpher diesel are colored blue and red. Aviaiton grade 100 LL (low lead) and 80/87 fuels are also colored blue and red respectively. The potential exists for a supplier to furnish diesel fuel instead of 100 LL. The FAA has issued a Notice to Airmen (NOTAM) and a special alert bulletin to pilots warning of the color conflict.

B. By Markings of Fuel Type and Grade.
In addition to coloring fuels, a marking and coding system has been adopted to identify the various fuel handling facilities, pieces of equipment, containers, inlet-outlet joints, and aircraft fuel filler openings according to the type and grade of fuel they contain.

1. Fuel Servicing Vehicles. Each aircraft fuel servicing vehicle shall be conspicuously and legibly marked with an identification decal to indicate the product contained in the vehicle. The markings shall be on each side and the rear of the fueler tank in letters at least 3" high. Vehicles must be marked as follows:

   - JET A - Combustible
   - JET B - Flammable
   - AVGAS - Flammable

Decal color markings are as follows:

Aviation Gasoline			Turbine Fuel
80/87	100 Octane Low Lead	100/130	(Jet A, Jet A-50, Jet A-1, Jet B, JP-4, and JP-8)
White Letters On A Red Background	White Letters On A Blue Background	White Letters On A Green Background	White Letters On A Black Background

2. Valves and Piping at Permanent Storage Facilities. Valves, loading and unloading connections, switches, and other control equipment shall be color-coded to identify the grade and type of fuel they control. The fuel in piping is identified by name and by painted color bands, or a decal placed around the pipe at intervals along its length.

3. Hose Lines. Hose lines shall be marked by decals or labeled adjacent to the nozzle to indicate the type of fuel dispensed. Reference the API Bulletin footnoted below.

4. Portable Storage Facilities - Containers.

   a. Bulk Collapsible Tanks (Bladders and Rollagons). Large fixed collapsible tanking facilities, as well as their accessory fueling lines and equipment, shall be marked or decal attached in accordance with the requirements for fuelers in Section V.B.1.

   b. 250- and 500-Gallon Collapsible Rollagons. Each end of a rollagon shall be marked in letters at least 4" high with the type and/or grade of fuel in the container.

   c. 55-Gallon Barrels. The top head or sides of a 55-gallon barrel shall be marked in letters no smaller than 3/4" with the type and/or grade of fuel, filling date, vendor, and any other pertinent information.

REMINDER: Agency authorization is required for use of 55-gallon fuel barrels.

d. 5-Gallon and Smaller Containers. All containers shall be marked with the type and/or grade of fuel contained in the container. In many cases the 5-gallon containers are marked by the fuel manufacturer.

➔ CAUTION: Portable plastic containers should be used only when refueling is necessary and no alternative exists. If using portable plastic containers, an approved funnel capable of separating water and contaminates, along with bonding capabilities is required.

5. Aircraft. Various FAR's require that aircraft fuel filler openings be marked to show the word "FUEL," the minimum fuel grade or designation for the engine(s), and the tank capacity. In order that these markings retain their effectiveness, they should be kept fresh and clean.

VI. Contamination Testing.

The "Clear and Bright" (Dry) Sampling Test should be utilized by either the vendor or, if government-operated fueling operation, by trained government personnel. This test involves the following steps, in order:

- Collect fuel sample in a clean clear 1-quart glass jar and swirl. Samples are collected from tank and nozzle.
- Check color against the background of the sky. If water is present, free water (water not in solution) will separate and lay in the bottom of the jar.
- Swirl the contents of the jar. Any free water and/or water in solution will cause the color to become cloudy.

IMPORTANT NOTE: If fuel is found or suspected to be contaminated, suspend all operations immediately (including those of other aircraft that may have been fueled from the same source) and contact agency aviation safety representatives.

- If water is detected in the tank sample, sump and continue to test until no more water is detected in sample jar. Do not allow helicopter fueling until the sample is free of contamination.
- If water is detected in the nozzle sample, suspend the operation immediately.
- Particles in the sample can also be visually identified.
- If particles appear in the tank sample, sump tank until sample is clean.

- Do not use fuel if any nozzle sample indicates:
  - Wrong color, not clear or bright
  - Particulates are present
  - Water is present

VII. Fueling Hazards.

➔ When service personnel fuel a helicopter, they transfer extremely combustible liquids from a storage or transportation vessel to the fuel tank(s) of a helicopter. Such operations are hazardous if the proper procedures are not followed.

Servicing personnel should follow servicing instructions and use the proper equipment in accordance with established operating procedures.

While fueling aircraft is not unusually hazardous under normal conditions, certain other conditions may increase the hazard. Fueling personnel should be aware of the potential problems caused by fuel vapors in the presence of ignition sources such as static electricity, certain weather conditions, electromagnetic energy, and open flames.

They should also be aware of other conditions that introduce additional sources of ignition and/or increase the likelihood of fuel or fuel vapors escaping.

A. Fuel Vapors.

Fuel vapors create potentially hazardous situations, so fuelers must be sure to follow prescribed procedures.

When fuel is transferred into an aircraft tank, the incoming fuel forces fuel vapors out through tank vents, with an explosive vapor-air mixture formed in the vicinity of the operation. At some point, the escaping fuel vapors will be within explosive limits, depending upon atmospheric conditions and the type of fuel involved.

> WARNING: Because AVGAS has a flash point of about -50° F, sufficient vapors are liberated to produce a flammable vapor-air mixture under almost all conceivable atmospheric conditions. All that is needed to cause a fire or explosion is a source of ignition.

Additionally, because the rate of vapor generation increases as the temperature of the fuel increases, the risk of fire or explosion increases when atmospheric temperatures rise. Because fuel vapors are heavier than air, they will settle to the ground and accumulate in ditches, pits, or other depressions and may travel great distances before coming into contact with an ignition source.

B. Ignition Sources.

In any area in which aircraft are parked or operating, there are numerous ignition sources that may ignite fuel vapors. These sources include static electricity (such as that caused

by low-conductivity liquids, refueling vehicles, and clothing), adverse weather conditions (lightning), electromagnetic energy (radar), and open flames.

1. Static Electricity. Static electricity is more difficult to control than any other ignition source. The mechanism responsible for this phenomenon is complex, and there are many variables that may increase and decrease the amount of energy generated. Static charges may exceed 50,000 volts and may produce sufficient energy to cause an explosion above the liquid surface fuel.

   When low-conductivity liquids, such as hydrocarbon fuels, flow through a piping system, they tend to become electrostatically charged. Refueling vehicles have developed measurable electrostatic charges exceeding 50,000 volts during filling operations. This high voltage is partially a result of the insulating effect of the vehicle's rubber tires. To eliminate this insulating effect, the refueling vehicle must be properly bonded to the helicopter during these operations.

   During windy conditions, the movement of dust particles and air currents may cause parked helicopter and refueling vehicles to develop larger-than-usual charges of static electricity.

   CAUTION: Personnel should exercise caution when there are thunderstorms or electrical storms in the vicinity. The energy generated by these natural phenomena may ignite flammable fuel vapors.

   When the atmosphere is unusually dry, certain fabrics are notorious for accumulating a static charge. Therefore, personnel who operate refueling vehicles should avoid wearing materials made of polyester, nylon, rayon, silk, or wool when working in cold, windy weather.

2. Electromagnetic Energy. Transferring fuels is hazardous within 300 feet of the source of electromagnetic energy such as that created when high-powered radar operates. However, portable and mobile radio equipment may be used safely beyond 10 feet from fuel filler openings and/or vents.

3. Open Flames. Open flames should be strictly controlled or prohibited in aviation operations areas or within 50 feet of any aircraft fueling operation. Open-flame devices include:

   - Lighted smoking materials of any type.

   NOTE: "No Smoking" signs should be posted at all entrances to fueling areas. At remote sites (off-airport), pennant-type flagging or other barrier should be utilized when a single-use fueling area is established.

   - Exposed-flame heaters whether liquid, solid, or gas-fired devices, including portable and wheeled gasoline or kerosene heaters and open-element electric heaters.

- Welding and cutting torches and blowtorches.
- Grinding equipment, either portable or stationary.
- Flare pots or other open-flame lights.

4. Other Conditions. There are other normal and accepted fueling operations that are hazardous and may require additional safety precautions. Some of these operations are:

   - Defueling an aircraft that requires fuel to be drained into open drums or containers.
   - Defueling an aircraft that requires an auxiliary power unit or the aircraft engine(s) to be operating during the defueling.
   - Servicing an aircraft fuel system that has undergone maintenance but has not been functionally tested before being serviced.
   - Fueling an aircraft or using systems with which servicing personnel are not thoroughly familiar.
   - Performing other potentially hazardous operations, such as maintenance, power plant operation, and energizing the aircraft electrical system, while the aircraft is being fueled/defueled.

VIII. Safety Precautions.

Aircraft batteries, battery chargers, or other electrical equipment should not be connected, disconnected, or operated during fuel servicing. Radios and electronic flash equipment should not be operated with 10 feet of fueling equipment or of the fill or vent points of the aircraft.

A. Grounding Requirements.

The National Fire Protection Association (NFPA) no longer recommends grounding aircraft during refueling operations. Due to the particular difficulty involved in grounding helicopters at off-airport sites, the recommendation of NFPA (not to require grounding) should be followed by participating agencies.

Grounding may still be required procedure at military or civilian airports or by military helicopter crews. Therefore, grounding should be accomplished when required by local regulation.

B. Bonding Requirements and Procedures.

(See Figure 13-1) Bonding involves connecting two or more metallic objects together by means of a conductor that equalizes the electrostatic potential between the objects. Although some fuels being used in aircraft have additives that inhibit static electricity generation, bonding aircraft to the fuel nozzle is required safe practice.

1. Pre-Bonding Inspection. Check condition of the bonding cable and plug. Procurement document language will usually state required bonding equipment condition.

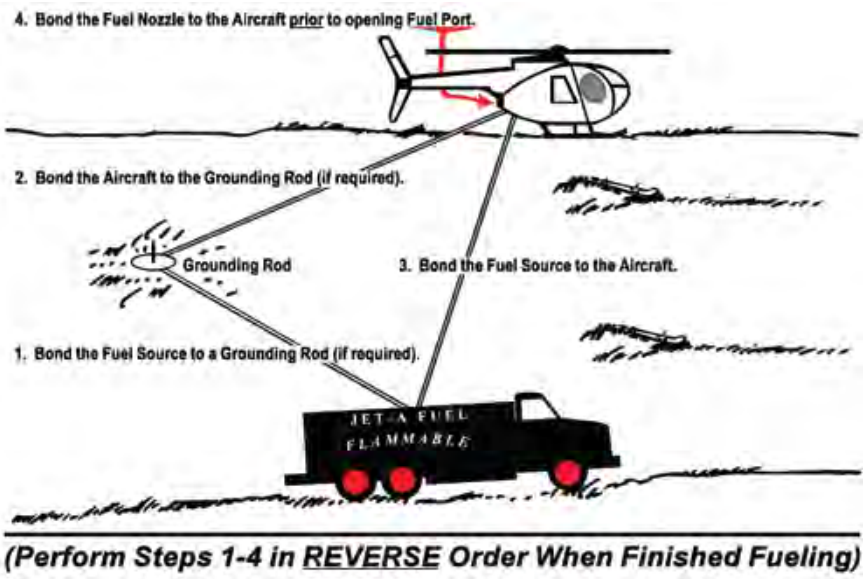
2. Connecting the Bond. Refer to Exhibit 13-1. Bonding must be performed as follows, in order (omit grounding steps if not required):

    - Bond the fuel source to a grounding rod (if available and required).
    - Bond the helicopter to the grounding rod (if available and required).
    - Bond the fuel source to the helicopter.
    - Bond the fuel nozzle to the helicopter prior to opening the fuel port.

3. Disconnecting the Bond. Disconnect the bond in reverse order (omit grounding steps if not required):

    - Disconnect the fuel nozzle bond from the helicopter after closing the fuel port.
    - Disconnect the fuel source bond from the helicopter.
    - Disconnect the helicopter from the grounding rod (if used).
    - Disconnect the fuel source from the grounding rod (if used).

Exhibit 13-1: Correct Bonding Procedure



NOTE: Bonding to grounding rod may not be required.

C. Rapid Refueling.
Hot refueling of helicopters is permitted if requested by the Government.

Review the procurement document for requirements prior to any hot refueling operations.

Government personnel shall not refuel Contract aircraft unless the pilot requests Government assistance due to an emergency situation; or when the Government provides the fuel servicing system and dispensing personnel.

IX. Vendor Fueling Operations.

A. Vendor Responsibility.
Vendors are responsible for maintaining equipment and conducting refueling operations in accordance with the procurement document and, when appropriate and when not in conflict with the procurement document, in accordance with the safety procedures stated in this guide.

B. Government Responsibility.
The government representative (for example, the Helicopter Manager, Helibase Manager) is responsible for ensuring that:

- Vendor equipment meets specifications and is correctly maintained in accordance with the procurement document; and

- Fueling operations are conducted in accordance with the procurement document and, when appropriate and when not in conflict with the procurement document, in accordance with the safety procedures stated in this guide.

C. Government Participation.
The government shall not participate in vendor fueling operations. Personnel shall maintain a distance of at least 50 feet from the fueling site until such time as the operation is completed. A “fire guard” (for example, a Parking Tender with fire extinguisher) may be posted at the edge of this 50-foot safety circle.

D. Vendor Service Truck Requirements and Specifications.
It is essential that the government representative ensures that all fueling operations involving a service truck are conducted in accordance with the procurement document. The following is provided as a guide only. For specific requirements, each individual procurement document must be consulted. Procurement documents usually contain the following requirements.

- An approved service truck is provided with each helicopter.

- The service truck is suitable for and capable of handling the terrain encountered (e.g. mountainous roads).

- The service truck meets the licensing criteria of each individual state in which they travel. This requirement can result in delays in arrival of the service truck if not anticipated in advance.

- For fire, the service truck tank capacity is usually required to be able to sustain 8 hours of flight (14 hours when a two or more Pilot crew is required). For projects, this requirement may be adjusted according to local need.

- The service truck is properly maintained, clean and reliable. Tanks, plumbing, filters, and other required equipment should be free of rust, scale, dirt, and other contaminants. A trailer used for storage and transport of fuel is usually required to have an effective wheel braking system.

- Spare filters, seals, and other components of the service truck filtering system are stored in a clean dry area. (A minimum of one set is usually required.)

- All tanks are securely fastened to the truck bed and has a sump or sediment settling area of adequate capacity to provide uncontaminated fuel to the filter.

- A 10-gallon-per-minute filter and pump is usually the minimum size acceptable. Filter and pump systems sizes should be compatible with the helicopter being serviced.

- The filter manufacturer's Operating, Installation and Service Manual is available with the service truck.

- Gasoline engine driven pumps have a shielded ignition system and a spark arrestor.

- Tanks erected for above-ground storage and tanks mounted on trucks are equipped with a sump drain valve at the lowest point.

- Only hoses designed for dispensing of fuel should be used. Hoses should be kept in good repair.

- The fuel nozzle should include a 100-micron or finer screen, a dust protective device and a bonding clip or plug. Except for Wiggin closed-circuit nozzles, no hold-open devices be permitted.

- An accurate fuel metering device for registering quantities in U.S. gallons of fuel pumped is provided. The meter shall be positioned in full view of the fuel handler while fueling the helicopter.

- The service truck has bonding cables, and, when required, grounding cables.

- Fire extinguisher is mounted in a manner to make it readily available at all times.

- Fire extinguishers should be provided as specified in the procurement document and in accordance with NFPA 10, Standards for Portable Fire Extinguishers.

- Each fuel servicing vehicle should have "NO SMOKING" signs with 3-inch minimum letters visible from both sides and rear of truck.

- Each vehicle be conspicuously and legibly placarded and marked according to the requirements in Section V.B to indicate the nature of the fuel.

- The first and third stage elements of a three-stage system and the elements of a single-stage system should be new and installed by the contract start or during the annual inspection; the separator element (teflon screen) of the three-stage system should be inspected and tested as prescribed by the manufacturer during the inspection; and the filter assembly must be placarded with that data.

- For three-stage filters, the bottom of the filter assembly should be mounted to allow room for at least a quart size jar to be inserted under the drain for draining and pressure flushing of the unit or may be drained overboard clear of the truck wheels and exhaust system; water sight gauge balls be visible.

- Depending on whether the system is a single- or three-stage (coalescer, water separator, monitor) systems, specific pumps and monitor systems are usually specified.

E. Fuel Servicing Vehicle Driver Qualifications:
Fuel servicing vehicle drivers shall comply with Department of Transportation Safety Regulation Part 390-399, and any duty limitations imposed by the helicopter procurement document (contract). Refer to the appropriate procurement document for specific requirements.

X. Government Fueling Operations.

There are situations, especially in Alaska, where the government is responsible for supplying fuel and a government-operated fueling operation must be set up to accommodate refueling needs. There may be other situations where the government, though not responsible for supplying fuel, must do so. An example would be an incident so remote, or where helibases have no road access, that the government is supplying fuel via aerial delivery.

A. General Guidance and Requirements.

- Prior to the start of operations, the manager of the refueling site (for example, Fueling Specialist) may utilize the Remote Fuel Site Reminders List in Appendix I to ensure that operations are set up and are being conducted correctly. Parts of the Reminders List may also be used by Helibase Managers to correctly locate fueling pads and to monitor vendor refueling operations.

- Minimizing ground time of both the helicopter and of the service truck in close proximity to other helicopters in the refueling area or on the helibase is important to minimize exposure and risk.

- Refer to Aviation Fuel Management Handbook for additional information.

B. Personnel Requirements at a Government-Operated Fueling Site.

The following personnel are required on a government operated fueling site:

- Two people are required to conduct the actual refueling of the aircraft (one may be the Fueling Specialist). One person operates the fuel nozzle; the other is required to be near the emergency fuel shutoff valve.

- Depending on the size of the operation, the fueling operation may also require the following:

- An Aircraft Base Radio Operator

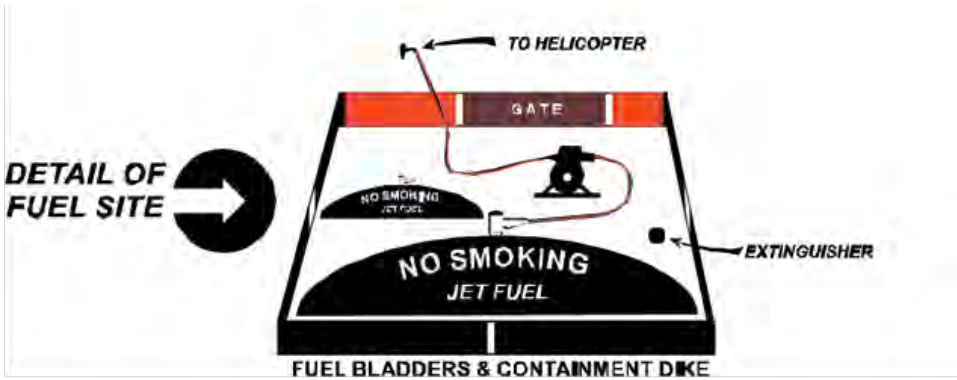
- A Parking Tender

C. Personal Protective Equipment.
Government fuelers shall wear protective clothing as required in Chapter 9.

D. Fueling Site Layout.
Fueling sites should be laid out according to the following general guidelines: (See Aviation Fuel Management Handbook for additional information)

- The fueling site should be separate from the main area of helicopter operations.
- There should be a minimum of 140 ft separation between Type 1 helicopters if the aircraft are parked nose to tail and 200 ft of separation if parked side by side.
- There should be a minimum of 90 feet of separation between aircraft for Type 2 or 3 helicopters.
- The fueling equipment at a fixed fueling site (pump, fuel source) should be at least 25 feet outside the rotor disk of the nearest helicopter.
- The wind direction must be considered when setting up refueling points. Landing and takeoff directions must be selected to provide a direct or quartering head wind.
- Fueling activities generate a considerable amount of vapor. Because the vapor is an explosive hazard, the fueling activity should be situated to allow vapors to be dispersed by the prevailing wind.

Exhibit 13-2: Government Fueling Site Layout



E. Equipment Required.

Equipment at the typical fueling site consists of the following:

- A fuel source, which may consist of 55-gallon drum(s), three 500-gallon collapsible fuel bladders, permanent or temporary tanks, or a fuel tanker.
- Pump Assembly.
- Filter and separator unit. The filter and the separator must be compatible with the pump assembly.
- Hoses, fittings, valves and nozzles. Enough equipment must be available to support the refueling setup that is envisioned; for example a one-point, two-point, three-point or four point set-up.
- Support equipment. This equipment will include items such as fire extinguishers, grounding rods, waste pans, five gallon containers of water, and absorbent material.
- Fuel sampling kit.
- Fire extinguishers should be located at each refueling nozzle and at the pump and filter assembly.
- A waste fuel pan should be located at each refueling point to wash dirt off the nozzles. The waste fuel pan or barrel is required to limit fuel spillage. Fuel spills should be handled according to the procedures outlined later in this chapter.

F. Equipment Setup.

1. Distances.
   - As stated, the fueling equipment (pump, fuel source) should be at least 25 feet outside the rotor disk of the nearest helicopter.
   - The fuel source should be downwind of the aircraft exhaust to reduce the explosion hazard.
2. Pump Assembly
   - The pump assembly and filter separator must be properly grounded and checked for leaks before operation.
   - Fittings should be properly sealed and free of cracks.
   - Sandbags should be used to elevate the fittings to facilitate pre-operational checks and detection of fuel leaks.
   - Hose clamps should be checked for proper fit.

- All shutoff valves should be serviceable and properly in place.

G. Equipment Checks.

These checks should be made for fueling operations conducted by the government. Some, but not all, may be applicable per the procurement document for vendor fueling operations.

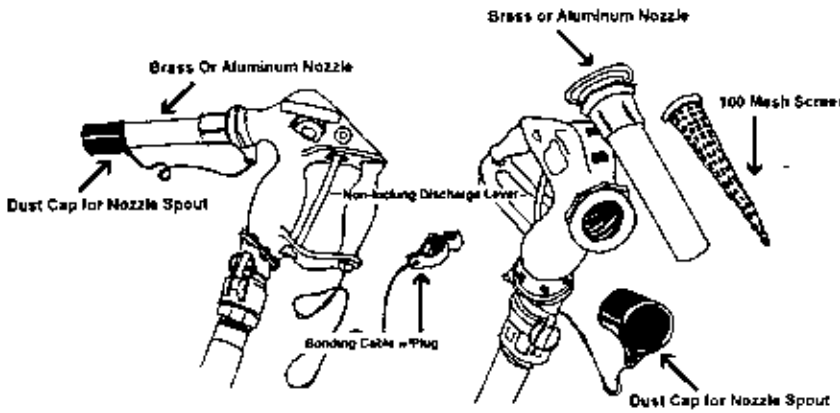
1. Aviation Fuel Nozzle Requirements. (See Exhibit 13-3.) If all of these items are not present and in good condition, discontinue the operation until corrected:

   - A non-locking discharge lever
   - A bonding cable with plug
   - A brass or aluminum nozzle
   - A 100-micron screen in nozzle
   - A serviceable dust cap for nozzle spout
   - For government-operated fueling operations, it is advantageous if each nozzle has all fittings needed to conduct both closed-circuit and open-port fueling.

   WARNING: Static electricity builds up on an aircraft as the aircraft moves through the air. Static electricity also builds up on the refueling equipment when the fuel is pumped through the hoses. The aircraft, fuel nozzle, and pump assembly must be bonded to prevent sparks and explosions. Additionally, static electricity buildup is greater in cold, dry air than in warm, moist air.

   - Each nozzle has two ground wires (not a procurement document requirement). One wire has an alligator clip on the end of it; the other wire should have a plug. These wires are used to bond the aircraft to a grounded 5-foot grounding rod (if available; not mandatory). The nozzle can be kept off the ground by hanging it on the grounding rod.

Exhibit 13-3: Fuel Nozzle Requirements



2. Nozzle Spout Screen. Check for cleanliness by:

    - Unscrewing nozzle spout and remove screen
    - Tapping screen and collecting contents (if any) for indication of filter by-pass debris or hose deterioration.

3. Portable Fueling Equipment Pressure Differential Gauge(s). When this gauge is installed, check the pressure difference between the inlet side of filter (high psi) and the outlet side (low psi). Perform the following test:

    - Recirculate fuel through the nozzle into the tank at maximum flow rate and note the difference. Some use two gauges, which requires that the operator perform mathematical calculations. Others use a single gauge, allowing a direct differential reading.
    - When pressure differentials are at, or exceeding the manufacturer's recommendations, there is cause for concern. It is a very good indication the filter is holding back water and/or particles. The following should be performed:
        - Sample fuel in tank
        - Replace the element
        - Recheck the pressure differential with new element in place.

4. Flow Rate. Per specification on pump rating, determine flow rate in gallons per minute (GPM):

    - Recirculate fuel through the nozzle and into the tank, and time the GPM.

    - Substantially reduced flow rates from the minimum specified may be a good indication of a restriction in the element caused by particulate or water contamination. The following should be considered:

        - The filter may need to be changed.

        - The pump may not meet specifications.

    - Remove filter element in the single cartridge Velcon or the monitor 3rd stage (inside the Teflon screen) and replace with new element.

> CAUTION: When changing elements, do not touch elements with dirty hands or gloves. Use clean gloves. Leave new element in package until the last step of placing element in canister.

    - Re-check the GPM flow.

    - While recirculating check total system for leaks.

H. ➔ Inspections and Quality Control.

Every possible precaution must be taken to maintain quality assurance for fuel. Items which must be checked and maintained on a daily, weekly, monthly, annual, or as-needed basis are covered in the discussion of Form HCM-3, Aircraft Fuel Facility Inspection Log (in Appendix A). Inspections must be performed on the required basis, unless this is not feasible due to the remote location and infrequent use of a fueling site. In that case, a combination daily, weekly, and monthly inspection shall be performed prior to each use of the fueling site.

1. Daily Inspections. Fuel site and equipment must be visually checked daily for leaks. If found, local procedures for hazardous materials spills should be followed. In addition, check for water or particulate contamination in the fuel source by:

    - Checking the bottom of storage facilities tanks for water, using water draw-off connections (sumps) and a visual test on a water-finding paste (allow the paste to remain in contact with the fuel for 30 seconds). Look for paste to change colors.

    - Checking for and removing any water from fueler tanks. A water check should also be performed after every reloading of the fuel container, washing of equipment, and after a heavy rain or snowstorm. Utilize the “clear and bright” test explained earlier in this chapter.

- Visually checking for particulates as explained earlier in this chapter.
- Checking all three-stage and Velcon filter/separator manual water drains for water and other contaminants after each receipt of fuel, as well as on a daily basis. Draw off any accumulation of water.
- Checking and recording all fueler and fixed filter and filter/separator differential pressures while under full flow conditions. A graph-type log may be used in plotting differential pressure daily. Any sudden change or decrease in pressure differential may indicate a ruptured filter.
- Visually inspecting fueler and storage facilities, pumps, valves, and pipelines for leaks.
- Checking and cleaning hose nozzle screens, and if breaks are found, replacing the screens.
- Inspect all hoses for abrasions, separations, or soft spots. Weak hoses should be replaced.
- Drawing off a sample daily from the downstream side of the filter. Sample should be collected in a clean, clear glass bottle and examined visually. Any visual water, dirt or filter fibers is not acceptable.
- Checking that dust caps are in place.

2. Weekly Inspections. All of the daily inspections, plus:
   - Inspect all fire extinguishers for broken seals, proper pressure, and recharge date. Recharge as necessary.
   - Check fuel flow rate GPM to nearest 1/10 gallon.
3. Monthly Inspections. All of the daily and weekly inspections, plus:
   - Check the condition of bonding and grounding wires, grounding clips, jacks and bonds.
   - Check condition of pumps, motors, and valves.
   - Check fuel source and fueling facilities for general condition, safety and appearance.
4. Annual Inspections. All of the daily, weekly, and monthly inspections, plus:
   - Check electrical continuity with an ohmmeter

I. Record Keeping.

See Appendix A, Form HCM-3, Aircraft Fuel Facility Inspection Log, for required record-keeping. The individual responsible for fueling and/or the fuel source will keep a record containing the following information:

- Condition (clean, clear, bright, etc.) of:
  - Tank sump sample
  - Filter sump sample
  - Nozzle sample
  - Flow rate in gallons per minute to the nearest 1/10 gallon
  - Filter change, reason and date

XI. Fuel Spills.

The information in this section is consistent with National Fire Protection Association (NFPA) Publication 407-90, “Standard For Aircraft Fuel Servicing,” and should be utilized for both Vendor and government fueling operations.

Fuel spills are often the result of improper or careless operation of fueling equipment and lack of preventive maintenance of the fueling equipment. Close attention on the part of every person responsible for fueling is required to prevent fuel spillage. Personnel shall follow the guidelines listed below. See Chapter 12 for crash-rescue and firefighting procedures regarding fuel spills.

CAUTION: All fuel spills, regardless of size, should be considered a fire hazard.

Procedures for handling fuel spills are subject to the regulations and procedures established by the authority having jurisdiction.

WARNING: Report all spills immediately; do not attempt to hide the fact that a spill occurred. There are severe civil and criminal penalties if a spill is not reported promptly.

Each incident is somewhat unique, but certain general principles apply in all cases. Every fuel spill involves several variables:

- Size of the spill
- Terrain on which the spill occurred
- Equipment
- Weather conditions
- Type of fuel and its flammability

- Proximity to aircraft or personnel
- Aircraft accident involved
- Emergency equipment and personnel available.

A. Prevention.

Following good spill prevention practices will significantly reduce the chances of one occurring:

- Devote full attention to the fueling operation.
- Never leave any fuel nozzle unattended.
- Never tie or wedge the nozzle trigger in an open position.
- Frequently check the amount of fuel in the tank to prevent overfilling.
- Pumps, hand- or power-operated, shall be used when aircraft are fueled from drums Pouring or gravity flow shall not be permitted.
- Kinks and short loops in fueling hose should be avoided.
- At remote fueling locations using portable fueling equipment, sandbags should be used to elevate the fittings to facilitate pre-operational checks and detection of fuel leaks.
- At remote fueling locations using portable fueling equipment, construct a berm around the fuel bladder to contain fuel in case of rupture for both temporary and semi-permanent systems.

B. Mitigation Procedures in the Event of a Spill.

If a fuel leak develops or a fuel spill occurs during aircraft servicing, initiate the following emergency procedures without delay:

> WARNING: During any spill or leak, extreme caution must be exercised to avoid actions that could provide ignition sources for the fuel vapors. See Chapter 12, Fire Protection And Crash-Rescue, for procedures to follow to avoid ignition of a fuel spill resulting from a crashed aircraft.

- Maintain, keep current, and post a spill contingency plan (the procedures outlined below, with the addition of local, specific material, will suffice).
- Have absorbent material at the helibase or fueling location.

- If the leak continues, or the spill is a large one, all non-essential personnel should leave the area immediately until the hazard is neutralized, repairs are made, and the area is safe.

- Alert the airport fire crews or follow established emergency procedures applicable to a remote fueling operation, as outlined below.

- Stop the flow of fuel and the fueling operation immediately upon discovering leakage or spillage:

    - If fuel is leaking or spilling from a fuel servicing hose or equipment, the emergency fuel shutoff valve must be actuated immediately.

    - If the fuel is leaking or spilling from the helicopter at the filler opening, vent line, or tank seam, fuel delivery must be stopped immediately.

- If the spill occurs during open port (“hot) refueling operations, the Pilot will make the decision on moving or keeping the helicopter in place. If the latter, then all electrical power must be shut down and the helicopter evacuated.

- Before the helicopter is put back into service, it must be thoroughly checked for damage and for flammable vapors that may have entered fuselage areas.

- Small spills involving an area less than 18” in any plane dimension normally involve minor danger. However, personnel manning fire extinguishers during start-up procedures should stand by until the helicopter departs the area of the spill because engine exhaust could ignite the spill. These spills contain such a small amount of fuel that they may be absorbed, picked up, and placed in an approved container.

NOTE: New products to absorb fuel spills are available that will reduce or eliminate the need for hazardous material containers. These new products should be considered for most fuel spills.

- A fire guard should be posted for other small or medium static spills - not over 10 feet in any dimension nor over 50 square feet in area. The fire guard should have one or more fire extinguishers with at least a 20 B rating. Local regulations and procedures must be followed, but in most cases absorbent materials or emulsion compounds should be used to absorb the spilled fuel, especially if aviation gasoline (AvGas) or low flash point fuels are involved. The contaminated absorbent should be picked up and placed in an approved container to await disposal.

- Large spills - over 10 feet in any dimension or over 50 square feet in area - or smaller spills continuing to enlarge (non-static) should be handled by the fire department, or if in a remote location, by a ground engine. Anyone in the area of a large spill should move upwind of the spill at once.

NOTE: Aircraft fuels will damage some types of ramp surfaces. Spilled fuel should be picked up as quickly as possible if operating from a hard-surfaced ramp.

- All fuel spills occurring as a result of a aircraft crash or ground collision should be blanketed with foam, if available, to prevent ignition, and to prevent further damage to the equipment. See Chapter 12 for further information.

CAUTION: Wildland fire foams are not adequate suppressants for fuel spills. Foams must be approved for hydrocarbon fuels.

C. Fuel Spillage on Personnel.

If the fuel handler's clothing becomes soaked with fuel, the individual should:

- Avoid ignition sources;
- Leave the fueling area immediately.
- The act of removing clothing creates static electricity. Wet the clothes with water before removing. If water is not available, the person should be grounded to prevent sparks when they remove their clothes.
- Wash fuel off skin with soap and water as soon as possible.
- Seek medical attention.

WARNING: Entering a warm room wearing fuel-soaked clothing can be dangerous. Chances of a fire starting because of static electricity are increased.

Attachment 6
San Diego Gas & Electric
Electric Standard Practice ESP 113.1
July 5, 2012

ESP – 113.1 (Revised)

Electric Standard Practice – 113.1
'Wildland Fire Prevention & Fire Safety'

Electric Distribution Engineering is publishing this standard after being revised by the SDG&E Fire Coordinator.

- Various changes and revisions throughout this standard

If you have any questions regarding this Standard Practice, please contact:

- Hal Mortier at (858) 654-8683 or **HMortier@semprautilities.com**
- Gaspare Ciaravino §Vino at (858) 654-8250 or **GCiaravino@semprautilities.com**

PROJECT CHECKLIST

Use 'Tab Key' to navigate form

Date: July 5, 2012

Originator: Hal Mortier

Project Title:
WILDLAND FIRE PREVENTION & FIRE SAFETY

The attached document pertains to: (Select one of the following from the drop-down menu)

Standard Practice Number: 113.1

Synopsis of change (for distribution cover sheet)

☒ See attached '**NEW / REVISED**' cover sheet.

Sponsoring Department:

Other (Select one of the following from the drop-down menu)

If Other, Describe: SDG&E Fire Coordinator

Individuals Involved in Development and/or Revision:

Hal Mortier

Training Requirements: (Describe how the training will be conducted)

All Districts, please review this revised Electric Standard Practice with all district field personnel at your next Safety Meeting. To be completed within 30 days of Effective Date.

Reviewed By: _____ **Approved By:** _____

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION
GENERAL PRACTICES

SUBJECT TITLE
WILDLAND FIRE PREVENTION & FIRE SAFETY

REVISION HISTORY

This Electric Standard Practice has been revised by the SDG&E Fire Program Manager.

1.0 PURPOSE

1.1 Southern California presents one of the most dangerous natural wildland fuel scenarios and explosive fire weather potential in the world. The period for active fire conditions can exist all year long depending on rainfall totals and other dynamic weather factors. The fall months and at times extending into early winter historically host the region's largest fires. Extended dry periods can bring us into or back into critical fire conditions essentially any time of the year. SDG&E facilities, equipment, and activities can present a potential wildland fire ignition risk which must be minimized to the extent reasonably possible. In the event a fire occurs, we must also be equipped to suppress small fires, thus potentially preventing a major fire. Most importantly, we must provide the resources and training necessary to keep our employees safe while working in the wildland areas. This plan is for all system Operations & Maintenance work and can be used for low complexity Construction projects when additional mitigation is not required (see 4.7 SDG&E PROJECT SPECIFIC FIRE PLANS). The intent of this document is to formalize procedures and routine practices that will:

1.1.1 Assist SDG&E employees in their understanding of fire prevention and to improve their ability to prevent the start of any fire. The emphasis will be on wildland fires, especially during the critical times of the year when the fire risk is high.

1.1.2 Set standards for certain tools and equipment to be present in our vehicles and on our work sites, when performing identified high risk work activities. This will assist with rapid response to small fires in the event one should occur.

1.1.3 Incorporate State, Federal, and local requirements into our standard way of doing business to provide compliance with rules and regulations on a daily basis no matter where our work is taking place. This would include, but not be limited to: pertinent laws, Forest Standard Practice Regulations, and "Special Use Permit" or "Right of Way" fire related requirements.

1.1.4 Define or reference restrictions mandated by "Red Flag Warnings", "Project Activity Levels", or other unique fire danger scenarios. Provide the means for determining when these restrictions are in effect, what activities they prohibit, the precise locations to which they apply; and identify the notification procedures for all affected employees and contractors. (See TMC 1320)

1.1.5 Establish communication requirements when working in the wildland areas.

1.1.6 Discuss procedure to identify when a Construction project specific "Fire Plan" is required and the process for developing the document. (See 4.7)

1.1.7 Share some common sense practices, with regards to fire safety, that should be used in all activities to reduce the risk of fires and to prevent injury to employees as a result of fire.

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION
GENERAL PRACTICES

SUBJECT TITLE
WILDLAND FIRE PREVENTION & FIRE SAFETY

2.0 APPLICABILITY

2.1 This applies to SDG&E field personnel who will work in the wildland areas of the service territory during the periods described that are conducive to wildland fire occurrence. This also includes Distribution and Transmission operating personnel who will be involved with field personnel in regards to safety, system reliability and/or restoration. Contractors performing work for SDG&E will be expected to comply with this Standard Practice as it relates to their activities as well.

3.0 DEFINITIONS

Wildland Areas: This term refers to any area within the SDG&E service territory that has wildland fuels available for ignition.

3.1 **Fire Threat Zone (FTZ):** This is a CALFIRE developed rating of wildland threat based on a combination of potential fire behavior (fuel rank) and expected fire frequency. SDG&E has established practices within the FTZ on how SDG&E constructs facilities and also determines certain construction practices to be used within the FTZ. See attachment 1.

3.2 **SDG&E High Risk Fire Areas (HRFA):** This area will be an assortment of GIS polygons that represent the zones of greatest concern within the SDG&E service territory, blending fuels, topography, wind, and system information. (The areas can change annually and the map will be labeled with the appropriate year, “SDG&E 20XX Highest Risk Fire Area” and is always a subset of the Fire Threat Zone). The HRFA helps to determine how SDG&E operates the electric system, as a function of weather conditions. See attachment 1.

3.3 **Fire Season:** Fire season is no longer officially designated by the wildland fire agencies. California is considered to be in fire season on a year long basis. CAL FIRE adjusts their staffing patterns as fire conditions moderate or escalate and this can be used as an indicator of potential fire activity.

3.4 **Elevated Fire Condition:** The SDG&E Fire Preparedness Plan uses a combination of live fuel moisture content information, other fuel condition data and input from Fire Coordination and SDG&E Meteorology to enter into what is termed “Elevated Fire Condition”. This condition is usually achieved during the month of August or September and is curtailed later the same year, or early the next year, with the arrival of substantial rain.

3.5 **Elevated Wind Condition**: This condition occurs when the combination of high wind and lower Relative Humidity’s necessitate an increase staffing or staging, but not to the level of a Red Flag Warning.

Red Flag Warning Condition (RFW): The National Weather Service will declare a RFW for;

- Wind- if the relative humidity is 15% or less with sustained winds equal to or greater than 25 mph, or frequent gusts equal to or greater than 35 mph for a period of 6 hours or more.
- Dry Lightning- for a lightning event that is not accompanied by enough precipitation to significantly wet fuels that have been identified as critically dry. This is common within the inland and mountain zones.

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

Project Activity Levels: This is a federal program designed to reduce the risk of fire starts during forest related work on high fire danger days and only applies to work on the Cleveland National Forest. (See 4.8)

3.6 **Pulaski:** The Pulaski is an axe-like fire hand tool used primarily for cutting or grubbing forest fuels. See Section 4.3.1.

3.7 **McLeod:** The McLeod is a fire hand tool used for raking and scraping forest fuels. See Section

3.8 **Backpack Pump:** A backpack pump is a portable 5 gallon water pack with hose and nozzle used for extinguishing Class A fire and particularly wildland fires. They can be rubber collapsible packs or stainless steel canisters.

3.9 **Major Operations Work Area:** It will be considered a Major Operations Work Area when work activities or staging of resources will be concentrated in and out of a staging facility or site, conducted over multiple days and generally involves multiple crews and resources.

3.10 **SDG&E Incident Commander (IC):** The SDG&E IC will be the positively identified single point of contact for all SDG&E resources (people and equipment) on an emergency incident. The appropriate line authority will identify who the IC will be on moderate or complex incidents. "First-in" supervisor will generally be the IC on low complexity incidents. The IC will be responsible for integrating SDG&E resources into the larger incident structure by serving as the single point of contact for SDG&E to the overall incident.

3.11 **SDG&E EOC:** The Emergency Operations Center (EOC) is activated to varying degrees, depending on the complexity of the incident. It is intended to be a support to the emergency management personnel and houses the Officer in Charge (OIC) in major incidents.

3.12 **Operations & Maintenance (O&M):** O&M refers to post construction care and maintenance of SDG&E facilities.

3.13 **Low Complexity:** This refers to projects that are routine in nature, involve few resources, and have no extraordinary fire risk present.

3.14 **Fire Box:** A fire box can be placed in a staging area or worksite to supplement available fire suppression equipment when necessary due to excessive work activity. It generally contains additional handtools and/or backpack pumps as deemed appropriate.

3.15 **Fire Patrol:** Also referred to as Fire Watch or Guard; is a designated person assigned specifically to assess and mitigate fire risk, observe for immediate detection of fire starts, have fire equipment readily available, and insure rapid extinguishment of fires. No special qualifications required.

3.16 **SDG&E Fire Coordinator (FC):** The SDG&E Fire Coordinator serves as a conduit or liaison to the emergency service agencies, including fire and law enforcement, for the utilities on emergency incidents. The FC will help the emergency service agencies obtain their needs related to the utility and represent the utility needs to the emergency service agencies.

3.17 **Grass Cured:** This is grass that is dry (generally yellow or light brown in color) and is at its highest danger for fire ignition and spread.

3.18 **Hazardous Areas:** Any "wildland" or unincorporated area within SDG&E service territory identified by the State Division of Forestry as being particularly susceptible to the danger of fire during certain seasons of the year.

4.0 PROCEDURE

4.1 EQUIPMENT & FACILITY RISK:

4.1.1 The nature of utility equipment operations and facilities can pose a fire risk. As a result there are laws and regulations governing utilities in this regard. The following Public Resource Code (PRC) sections exist to reduce utility specific risks involved with wildland fire. SDG&E is proactive, insuring compliance with each of these on a continual basis.

- PRC Section 4290 - Regulations Implementing Minimum Fire Safety Standards Related to Defensible Space Applicable to State Responsibility Lands.
- PRC Section 4291 – Reduction of Fire Hazards Around Buildings.
- PRC Section 4292 – Power Line Hazard Reduction, 10' ground clearance around power poles with non-exempt hardware.
- PRC Section 4293 – Power Line Radial Clearance Required, between vegetation and conductors, 4' for 2,400-71,999 volts, 6' for 72,000-109,999 volts, and 10' for 110,000 and above.

4.1.2 Some departments are assigned the responsibility for compliance with these regulations. The SDG&E Vegetation Management Program, in the Construction Services Department, has an extensive tree pruning and removal program to provide adequate line clearance. They also treat all non-exempt power poles in the specified area to maintain the 10' clearance required by PRC 4292. Personnel from Land Services, Facilities, and Fire Coordination work together to meet defensible space requirements, as well as other fuel hazard reduction measures where applicable. **However, it is the responsibility of all SDG&E employees and contractors to support the company's efforts to comply with these regulations.**

4.2 ACTIVITIES THAT POSE A FIRE RISK:

4.2.1 The Control Centers, Dispatch Center, and Fire Coordinator will provide general information to SDG&E employees regarding general fire condition status. When working in the SDG&E FTZ on any warm and dry day and in particular during the "Elevated Operating Condition", the following SDG&E related activities present a risk of fire ignition. Although not prohibited, extra caution is critical during the performance of any of these activities.

4.2.1.1 Working on energized electrical equipment or facilities located within the SDG&E Wildland Fire Area.

4.2.1.2 Any off-pavement vehicle use.

4.2.1.3 On-highway work activities that are located adjacent to particularly hazardous wildland fuel conditions.

4.2.1.4 Chain saw use of any kind.

4.2.1.5 Operation of generators, pumps, augers, compressors, two-cycle motors, or other equipment capable of producing sparks or ample exhaust heat to cause ignition.

4.2.1.6 Other tree removal equipment including but not limited to grinders, chippers, skidders, excavators, etc.

4.2.1.7 Grinding and welding

4.2.1.8 Blasting or other explosive work

4.2.1.9 Smoking

4.3 TOOLS AND EQUIPMENT:

4.3.1 When working in the FTZ identified on the attachment 1; the following tools and equipment will be carried on the vehicles described, when engaged in any of the work activities discussed above. If other fire risks are identified specific to your work project in these same areas, these standards should be applied as well. This does not apply to transient traffic driving on primary road beds through the wildland areas. These items will meet the California Forest Practice Rules; Public Resource Code Division 4, Chapter 6. Making this equipment available at your work sites will also meet the majority of the requirements mandated by the wildland fire agencies within the company service territory. Some additional project specific or weather specific requirements may be necessary and will be discussed later in this plan. Please note that if work project is over 50' from the vehicle location, the mandated equipment should be removed from the vehicle and staged at the work site.

Shovel

Pulaski

MCleod

Indian Pump

Stainless Steel Pump

4.3.2 Passenger Vehicles (performing work in the wildland areas);

- 1 round point shovel with overall length of at least 46”
- 1 serviceable fire extinguisher, minimum U.L. rated “2 BC”; rating found on fire extinguisher label (a “2” rated extinguisher will put out apprx. 2 sq. ft. of combustible material and BC indicates it will work on flammable liquids and is non-conductive for electrical fires)

4.3.3 Trucks & 4 Wheel Drive Vehicles;

- 1 round point shovel with overall length of at least 46”
- 1 axe or “Pulaski” (see picture above)
- 1 (5) gallon backpack pump (see pictures above) or a “2 BC” rated extinguisher; rating found on fire extinguisher label (a “2” rated extinguisher will put out apprx. 2 sq. ft. of combustible material and “BC” indicates it will work on flammable liquids and is non- conductive for electrical fires)

4.3.4 Heavy Machinery or Equipment (including tub grinders, whole tree chippers, drilling rigs, tractors, etc.);

- 1 round point shovel with overall length of at least 46”
- 1 axe or “Pulaski” (see picture above)
- 1 (5) gallon backpack pump (see picture above) or fully charged U.L. rated “4 BC” or larger fire extinguisher; rating found on fire extinguisher label (a “4” rated extinguisher will put out apprx. 4 sq. ft. of combustible material and “BC” indicates it will work on flammable liquids and is non-conductive for electrical fires)

4.3.5 Chain Saw Use;

- 1 shovel within 25 feet of the chainsaw operation with unrestricted access to the tool.
- or 1 serviceable UL rated 2BC fire extinguisher in their immediate possession.

4.3.6 Major Operations Work Area (fire toolbox should be located on site, accessible to all, sealed, labeled, and in addition to vehicle equipment requirements);

- 1 (5) gallon backpack pump (see picture above)
- 2 axes or “Pulaskis” (see picture above)
- 2 “McLeod “ fire tools (see picture above)
- Round point shovels 46” for each employee assigned to work site

4.3.7 Optional Considerations for particularly Hazardous Areas where additional measures are warranted (discuss with Fire Coordinator if applicable);

- Water Supply, recommended 1500 gal. minimum (Tank, truck, or hydrant)
- Fire Hose (and associated fire accessories)
- Dozer or Tractor (capable of producing fire line in an emergency situation if safe to do so.)
- Small Fire Engine or Patrol with 1 or 2 personnel equipped with pump, accessories and a Minimum of 150 gallons of water

4.3.8 Helicopter Operations; Primary helicopter staging areas will be treated similar to other staging areas as far as fire equipment. When working with Temporary Staging Access Pads (TSAP) adequate firefighting equipment shall be carried on the helicopter and made available to personnel working on the ground at those sites.

4.4 FIRE PREVENTION & FIRE SAFETY CONSIDERATIONS:

NOTE: The following Safety considerations will help to reduce the risk of fire start (Fire Prevention), as well as provide for the safety of company employees while working in the wildland areas (Fire Safety).

4.4.1 **Fire Prevention**

4.4.1.1 On projects in the SDG&E FTZ, conduct and document a formal “Tailgate Meeting” addressing the fire concerns as part of the “Tailgate Meeting”. Have regular tailgate meetings for the duration of the project to include fire safety discussions. As usual, these documents must be retained at the district for three years, including formal **Fire Plans** when required.

4.4.1.2 Smoke only in designated smoking areas or in a 10’ clearing void of all grass and other vegetation.

4.4.1.3 Idling or parking in areas of brush, grass, or vegetation litter is prohibited.

4.4.1.4 Consider work hour restrictions where applicable, limiting exposure during the heat of the day and taking forecasted wind conditions into account as well.

4.4.1.5 Use a “Fire Patrol” (person specifically dedicated to mitigate fire hazards, observe for immediate detection of fire starts, and coordinate rapid response for extinguishment) on high fire danger days (days that are warm, dry, and/or windy and present a likelihood for wildfire). Their duties would include: verification of compliance with the **fire plan**, observation of activities for fire prevention & safety, and checking the work area after the day’s activities have been completed.

4.4.1.6 Provide vegetation clearance or reduction around particularly hazardous work activities or work areas. Use special mitigation, as appropriate, to reduce the hazard, following all environmental protocols. Clear 10' circle to mineral soil around compressors, generators, and other equipment when required to use them in the FTZ or provide a non-combustible ground cover 10' diameter minimum.

4.4.1.7 Follow all special requirements associated with Red Flag Warnings (section 4.5), Project Activity Levels (section 4.6), and site specific Project Specific **Fire Plans**.

4.4.1.8 Have all required tools & equipment off the vehicle and on-site or within 50' of the work location, readily available for use when vehicle is 50' or more from actual work site.

4.4.1.9 Ensure exhaust systems are clear of vegetation and other combustible debris before operation of portable equipment.

4.4.1.10 When it is possible, wet down adjacent vegetation when performing at risk work.

CAUTION: DO NOT UNDER ESTIMATE THE ABILITY OF A FIRE TO QUICKLY SPREAD TO AN UNMANAGEABLE SIZE.

4.4.2 **Fire Safety**

4.4.2.1 Use proper Personal Protective Equipment (P.P.E); standard SDG&E requirements apply. When working within or adjacent to uncontrolled fire perimeter company issued fire resistant clothing should be worn. Respiratory protection (painter's mask or bandana) is recommended as well.

4.4.2.2 When working on or adjacent to a wildland fire, positive communications must be maintained internally using SDG&E work protocols. It is critical that employees have the ability to communicate with fire agencies as well, both for reporting fires and for the exchange of critical information for the duration of an incident. Cross communication with the fire agencies is the responsibility of the SDG&E Incident Commander (single point of contact assigned to manage all SDG&E resources), the Fire Coordinator (FC), or the On-Site (pre-designated work supervisor for affected area) Supervisor in the absence of a Fire Coordinator or SDG&E Incident Commander.

4.4.2.3 Know what the fire is doing at all times, observe personally or be in direct communication with a competent person (IC, FC, or On-Site Supervisor) who is monitoring fire activity.

4.4.2.4 Work within the Incident Command System (ICS) while assigned to a fire incident. Understand the chain of command for the incident and who you are accountable to. Check in and check out when entering an uncontrolled fire perimeter after it is determined to be safe by the IC, FC, or On-Site Supervisor.

4.4.2.5 Pre evaluate/designate safety zones (areas large enough to provide a safe retreat) and escape routes (safe access to these safety zones) when working in the wildland areas during high fire danger days.

4.4.2.6 Get proper rest and adequate water during extended fire activity to avoid fatigue and help prevent accidents and/or injuries. It is recommended that you receive an average of 1 hour rest for every 2 hours worked. An individual in hot, dry weather may require up to 1 to 2 gallons of water per day.

4.4.2.7 Exercise extreme caution when driving within a fire area and/or in smoky conditions. Be aware of falling rocks, trees, and other debris as well as road obstructions and other traffic. Keep driving speeds down when visibility is limited.

4.5 **RED FLAG WARNINGS:**

4.5.1 Red Flag Warnings (RFW); a joint effort between state, federal and local fire agencies, was brought about after a very catastrophic 1970 Southern California fire season. The intent is to pass along critical fire weather information to users and occupants in the wildland areas to bring about more prudent actions in all their wildland related activities. The National Weather Service (NWS) is responsible for declaring RFW and identifying the period of time to which they apply. There are currently two criteria established for RFW by the NWS (see definitions). The SDG&E service territory falls into multiple weather zones identified by the NWS and RFW requirements of this document will apply to each zone identified in a declared RFW including Imperial Valley when applicable. Currently SDG&E is operating under the direction of TMC1320 (aka DOP3013, ESP109), SDG&E Fire Preparedness, which addresses specifically the actions SDG&E will take with regard to Red Flag Warnings. The Operations Shift Supervisor (OSS) at Grid Operations will make notifications to company personnel; the following are field related considerations during a declared RFW.

4.5.1.1 All transmission and distribution lines within the SDG&E Wildland Fire Area will not be tested without patrol for the duration of the RFW.

4.5.1.2 A fireguard *(fire patrol)* will be assigned to any operation that could cause a fire. See Section 4.4.1.5.

4.5.1.3 All non-critical line clearance tree pruning and removal activities will cease. (Hand pruning activities are permissible)

4.5.1.4 All Blasting will be discontinued.

4.5.1.5 All grinding and welding will discontinue, except in enclosed buildings or within areas cleared of all flammable material for a radius of 15 feet.

4.5.1.6 Vehicular travel will be restricted to cleared roads except in case of an emergency. In no case will vehicles with hot exhaust systems be driven over or parked in grassy areas.

4.5.1.7 Smoking will not be permitted.

4.5.2 **In addition to these requirements a good rule is; all non-critical "at risk" work should not be done during a RFW except for that work which creates a greater hazard if not accomplished.**

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SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

4.6 **PROJECT ACTIVITY LEVELS:**

4.6.1 The United States Forest Service has a program it utilizes to reduce the risk of fire on National Forest land, particularly in the timber or mountain areas. It is referred to as Project Activity Levels *(PAL's).* Each day, at 4:00 p.m., the PAL level will be determined for the following day. It may be a different level for different geographic areas of the county. This information will be available by calling (619) 557-5262 *(U.S. Forest Service Dispatch)*. Although the intent of the PAL system is to reduce the risk of fire start from timber harvesting activities, restrictions should apply to any potential fire starting activities. The Cleveland National Forest is collaborating with SDG&E to establish Project Activity Levels specific to utility Operation & Maintenance activities and the restrictions and/or appropriate mitigation for each level are detailed in Attachment 2. SDG&E work activities must comply with the guidance of this document or exceptions approved by an appropriate Forest Service Line Officer. The On-duty Fire Coordinator can be used to help discern PAL requirements on a case by case basis.

4.7 **SDG&E PROJECT SPECIFIC FIRE PLANS:**

NOTE: This fire prevention and fire safety standard practice will be sufficient for most routine work conducted by company employees and contractors performing work for SDG&E. On larger more complex work projects and major construction activities in the **Fire Threat Zone**, a project specific "Fire Plan" may be recommended. The Fire Coordinator should be consulted to review the magnitude of your project and determine if a fire plan is needed. A standard template is available from the Fire Coordinator that can be used to help determine;

4.7.1 If a Project Specific **Fire Plan** is required for your particular work activity.

4.7.2 What work activity restrictions will be necessary over and above those required of this plan

4.7.3 What mitigations will be necessary to reduce fire risk potential, specific to that project.

4.7.4 What special tools or equipment are required to be available at work site

4.7.5 What involvement the company Fire Coordinator(s) needs to have in assisting with development and implementation of your Project Specific **Fire Plan**

4.7.6 If an inspection by the jurisdictional fire department for the area of your project is required, recommended, or not necessary.

4.7.7 Any additional site specific instructions or requirements.

4.8 **OTHER CRITICAL FIRE DANGER PROCLAMATIONS:**

4.8.1 The Fire Chiefs with jurisdictional responsibility for a given area have the authority to proclaim certain restrictions in extreme fire conditions or when they are experiencing a critical shortage of resources. These cases will be very rare and it will be incumbent on them to insure we are informed of any temporary changes in fire restrictions for a particular area. Upon notification we would be required to comply as appropriate.

4.9 **RECOMMENDED FIRE RELATED TRAINING:**

4.9.1 It is recommended that all field employees have basic fire safety training and T/D Compliance Training on an annual basis. Managers should assess individually whether an employees work activities would cause this training to be mandatory using the existing ESCMP training tracking system to monitor compliance. This can be accomplished in one hour at a routine safety meeting just prior to fire season. For those employees who are likely to be asked to work within or immediately adjacent to an uncontrolled fire area, the following additional training is recommended: Two hours of Fire Safety, Incident Command System Basic Training, and Basic Fire Behavior. For supervisors, managers, and company officers, who could be assigned as the SDG&E Incident Commander or EOC "Officer in Charge" on a major incident, additional advanced Incident Command System training is recommended. The Fire Coordinator will provide this training or assist with arranging qualified instruction. The fire coordinator may bring in additional qualified instructors, or qualify additional SDG&E employees as instructors, using the "train the trainer" approach to assist with this effort. Documentation of this training shall be done by the work supervisors and recorded in the employees training records.

4.10 **EOC AND CONTROL CENTERS:**

4.10.1 Service Dispatch, Electric Distribution Operations, Electric Grid Operations, & EOC play a vital role in any fire emergency. Communications with these groups, when applicable, is critical. Provide information updates and feedback to each of these groups as their areas of responsibility become affected. This should continue through the duration of the incident.

4.10.2 Early notification to the EOC of potential activation is recommended when appropriate. Notification procedures are identified in ESP 113 FIRE COORDINATION and should be followed as prescribed.

4.11 FIRE COORDINATION:

4.11.1 SDG&E has established three permanent positions in the Fire Coordination group, (1) Fire Program Manager and (2) Fire Coordinators. They are essentially the company liaison to the fire services, both during an emergency and in the course of daily business. Back-up coordinators are available as well to cover off time for the primary coordinators and for when multiple incidents occur. Questions regarding this plan or other fire related inquiries should be made through the Fire Program Manager or Fire Coordination group. The Fire Coordination group would be a key contact for other fire related training as well.

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5.0 REFERENCES

5.1 State Forest Standard Practice Act (http://www.fire.ca.gov/resource_mgt/downloads/2009_Forest_Practice_Rules_and_Act.pdf)

5.2 TMC 1320 (aka DOP3013, ESP109 – SDG&E Fire Conditions)

5.3 ESP 113 – FIRE COORDINATION

5.4 Power Line Fire Prevention Field Guide – 2008 edition (http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fppguidepdf126.pdf)

6.0 ATTACHMENTS

6.1 Attachment 1: Service Territory with SDG&E 2012 Highest Fire Risk Areas & FTZ

6.2 Attachment 2: CNF Utility specific Project Activity Level guidance matrix (Under development, to be attached in next revision)

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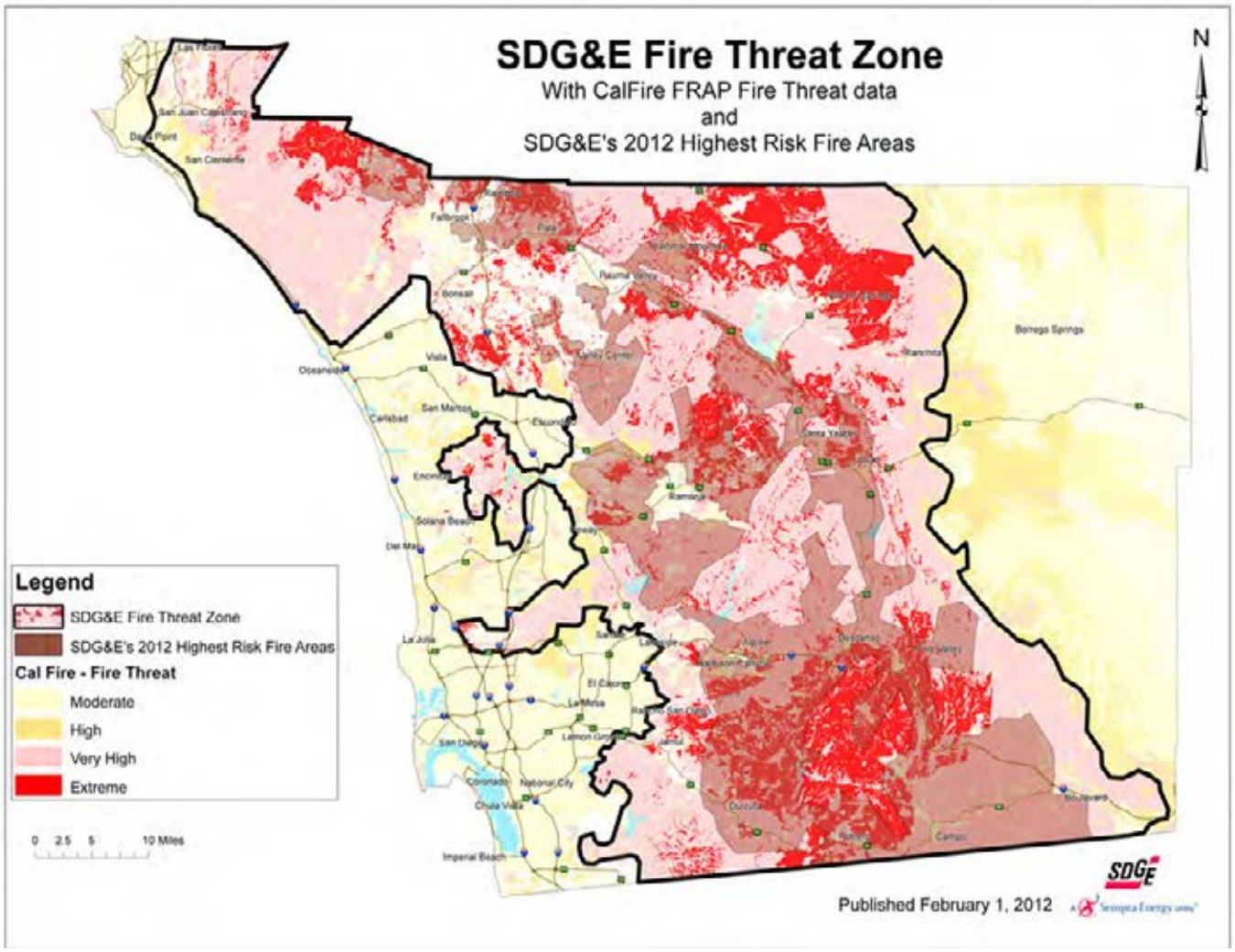
WILDLAND FIRE PREVENTION & FIRE SAFETY

ATTACHMENT 1



ISSUED BY	APPROVED BY
HAL MORTIER/GASPARE CIARAVINO, VINO	*MICHAEL J COLBURN*

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

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GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

ATTACHMENT 2

Under development, to be attached in next revision

ISSUED BY	APPROVED BY
HAL MORTIER/GASPARE CIARAVINO, VINO	*MICHAEL J COLBURN*

APPENDIX I: HELICOPTER OPERATIONS

East County Substation Project

Helicopter Flight Safety Protocol

Passenger Transport

The safe transport of personnel in helicopters is of the highest priority. Utilizing standard procedures for transport will ensure safe and efficient transportation of personnel. All passengers must take general helicopter safety training and have the appropriate authorization prior to boarding.

External Load Operations

As a general rule, only the pilot(s) shall be aboard helicopters when conducting external load operations. The only exception is when another person:

- Is a flight crewmember;
- Is a flight crewmember trainee;
- Performs an essential function in connection with the external-load operation; or
- Is necessary to accomplish the work activity directly associated with that operation.

The pilot shall ensure that all persons are briefed before takeoff on all pertinent procedures to be followed (including normal, abnormal, and emergency procedures) and equipment to be used during the external-load operation. The pilot has the final authority regarding all aspects of external load operations.

Arrival of personnel at the fly yard

The person in charge of any group of people needing helicopter transportation shall report to the assigned pilot. The person in charge should give the pilot a list of the people with accurate weights, including all personal gear and cargo to be transported. Passengers should be appropriately clothed and ready for transportation.

Passenger Safety Briefings

Prior to boarding the helicopter for the first flight of the day, the pilot will give a safety briefing to every passenger. This briefing will cover all elements included in the Helicopter Safety Briefing (Exhibit A). The pilot must:

- Ensure that instructions are clear and understood.
- Ensure in-flight emergency procedures are covered.
- Ensure all questions are answered to the satisfaction of the passengers.

Loading Procedures after Safety Briefing
After the safety briefing has been given, proceed with the following loading procedures:

- Only qualified, designated loaders are authorized to load cargo onto the aircraft;
- Explosives, flammables, firearms, or other dangerous materials are prohibited from carriage on all SDG&E contracted aircraft.
- Personal items carried on board must be adequately secured;
- Carry all materials to or from the helicopter in a horizontal position not above waist level;
- Prior to approaching the helicopter, remove items which might impede proper fastening of seatbelts/shoulder harnesses; these items must be placed and secured in an appropriate area;
- Stay in safe area prescribed by pilot or other authorized personnel until given the direction to load;
- Do not wear hats or loose clothing that can blow away;
- Do not carry any item in a vertical position;
- Approach only from the front of the helicopter and, when able, remain in sight of the pilot—NEVER go behind or under the tail boom;
- First person into the helicopter passenger compartment should move as far in as possible, or to the seat assigned by the Pilot;
- Find seat belt and fasten; if unable, advise the helicopter pilot who will assist;
- Ensure that personal protective equipment is properly worn (that is, sleeves rolled down and collars up, earplugs inserted).
- Large gear such as fire tools should be handled by the pilot or designated personnel;
- Ensure that all personnel understand the instructions given by the Pilot.

CAUTION: When opening hinged doors (not on sliding tracks) to embark/disembark passengers, keep one hand on the door at all times until the door is securely re-latched.

In-Flight Precautions:

- No smoking at any time;
- Keep clear of controls: DO NOT TOUCH controls, except in an emergency. If the pilot is incapacitated, a passenger may shut down the fuel and electrical supply;
- Secure all items, especially when flying with the door(s) off;
- Be aware of emergency exit procedures. If in doubt, ask the pilot.

Unloading Procedures.

- Only qualified, designated loaders are authorized to unload cargo from the aircraft;
- Off-loading during shutdown of helicopter should be avoided;
- Wait for the pilot to give a clear signal for offloading;
- Doors should be opened only at direction of the pilot;
- Remove seat belts, refasten, and lay them on the seat when exiting.
- Maintain tight control of all personal items. If an item is lost, **do not** go after it.
- Exit the helicopter slowly and use the departure route indicated by the Pilot.
- After leaving the helicopter, move to an area clear of the helicopter's departure flight path.

APPENDIX I-1: HELICOPTER FLIGHT SAFETY CHECKLIST

Exhibit A: Helicopter Safety Briefing Checklist

General Information

- **Pilot Certification:** Pilots are pre-qualified and have current certifications for aircraft type and mission.
- **Aircraft:** Only aircraft approved for the mission will be utilized.
- **Idle chatter:** During takeoffs and landings there should be no idle chatter that might distract the pilot.
- **Nature of Mission:** The pilot will be briefed on the nature and sequence of the mission(s).
- **Analysis of Known Hazards:** Known hazards discussed; high-level recon prior to descent to low-level.
- **Pilot-in-Command (PIC) Concept:** The pilot shall not be pressured into doing anything he/she feels is unsafe. The pilot has final say in all landing decisions.
- **Hazardous Materials:** Hazardous Materials are not allowed on any ECO project flight.
- **Smoking:** Do not smoke within 50 feet of a helicopter, fuel storage, fuel tanker or fueling operation.
- **Helicopter Passenger Briefing:** Pilot must brief all passengers prior to flight; all passengers should be briefed in a group rather than individually.

Personal Protective Equipment:

- Appropriate Clothing (long-sleeved shirt and pants, or flight suit)
- Leather work boots
- Hearing Protection
- Eye Protection (preferably goggles)

Approach and departure paths:

- Board and depart only on instruction from the pilot.
- Keep in pilot's field of vision at all times where possible.
- Always approach and leave the helicopter in plain view of the pilot—never from the rear.
- Always approach and leave the helicopter from the down slope (lower) side, as directed by the pilot—never approach or leave from higher ground than that of the helicopter.
- Do not approach or leave a helicopter while its engines are running unless the pilot signals that it is safe to do so. Do not run.
- Stay well clear of landing area when helicopter is landing or departing
- Stay away from the main and tail rotors.
- Do not wear hats, caps, or loose fitting clothing. Do not reach up for, or chase any unsecured item.
- Never go around, under, or near the tail of a helicopter.
- When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and tail rotors.

Tools and Equipment:

- Secure hand tools and equipment awaiting transport.
- Keep landing and hovering areas clear of loose and lightweight materials.
- Make assignments for carrying tools/equipment to/from helicopter.
- Carry all tools/materials parallel to the ground and never above waist level—never on your shoulder.
- All tools and equipment shall be loaded/unloaded by qualified personnel.
- Portable Radios must be turned off.
- Helicopter Doors: Be aware of location and normal operation.

In-Flight Discipline:

- Follow the instructions of the pilot.
- Loose items are not permitted inside of aircraft. All items must be secured and manageable.
- All carry-on items must be secured in aircraft or cargo compartment.
- Never throw any object from the helicopter.
- Use seat belts during take-off, flight, and landing. Unbuckle only when directed to do so by pilot.
- Remain seated the entire time you are aboard.
- Do not talk unnecessarily to the pilot.
- Watch for other airborne aircraft and navigational hazards and call them to the attention of the pilot. Communicate location by clock-hand method based on 12 o'clock as the nose of the aircraft. i.e. Do you see aircraft at 3 o'clock? If no response ask again until confirmed.
- Keep clear of the flight controls at all times.
- Leave doors closed; wait for pilot's instruction to exit aircraft.
- Know location and operation of first aid kit, survival kit, fire extinguisher, ELT (Emergency Locator Transmitter), fuel and battery shutoff switches, and radio.

In-Flight Emergency Procedures

- Follow instructions of Pilot.
- Tighten seat belt and shoulder harness; secure gear.
- Emergency Seating Position WITH SHOULDER HARNESS (four point OR single diagonal strap): sit in full upright position with head and back pressed against seat and use arms to brace in position. If time permits and so equipped, lock the inertia reel.
- Emergency Seating Position WITH LAP BELT ONLY: bend over as far as possible and hold onto your legs.
- Emergency Exits: Location and emergency operation.
- Know the escape procedure at each operational site.
- If able, assist any injured person who cannot leave the aircraft on their own.
- Move clear of the aircraft only after rotor blades stop or when instructed to do so by the pilot.
- Assess situation, follow pilot's instructions, render first aid, remove first aid kit, survival kit, radio, ELT and fire extinguisher.

Always be alert and keep safety first!

APPENDIX I-2: HELICOPTER OPERATIONS CODE OF SAFE PRACTICES

Appendix I-2 – Helicopter Operations Code of Safe Practices

Code of Safe Practices

Contractor shall strictly adhere to the minimum Code of Safe Practices involving the use of a helicopter as stipulated in Article 35, Helicopter Operations, in subchapter 4, Construction Safety Orders, provided in CAL/OSHA Title 8, and included in Appendix L.

1. Do not approach or leave a helicopter while its engines are running unless in a crouched position and the pilot or pilot's designee signals that it is safe to do so.

2. Always approach and leave the helicopter in plain view of the pilot or as directed by the pilot's designee; never from the rear.

3. Approach and leave the helicopter on a level with the craft or a lower level, never from or to higher ground than that of the helicopter.

4. Wear goggles and head protection with chin strap under the chin when in the vicinity of an operating helicopter. Loose-fitting clothing likely to flap in the downwash and possibly be snagged on the hoist line shall not be worn.

5. Load all cargo and secure it to the satisfaction of the pilot or pilot's designee.

6. Do not put tag lines on sling loads without the pilot's or pilot's designee's permission and limit their numbers, their placement, and their lengths to the pilot's satisfaction.

7. Do not place explosives, flammables, or other dangerous materials on board any aircraft without the pilot's knowledge.

8. Carry all materials to or from the helicopter in a horizontal position not above waist level.

9. Do not stand directly under a hovering helicopter longer than necessary to hook-up or unhook the load.

10. Always watch the helicopter, sling load, hook, or bottom end of the cable to avoid being hit.

11. Know the escape procedure at each operation site.

12. Keep landing and hovering areas clear of loose and lightweight materials.

13. Notify the person in charge of the project when erecting a suspended line, tower or other navigational hazard.

14. Turn off radio transmitter when in vicinity of explosives or explosive loading operations.

15. Passengers transported by helicopter shall be instructed to:

(A) Board and depart only on instruction from the pilot.

(B) Use seat belts during take off, flight, and landing.

(C) Do not talk unnecessarily to the pilot.

(D) Remain seated during the time you are aboard.

(E) Watch for other airborne aircraft and navigational hazards and call them to the attention of the pilot.

(F) Do not smoke unless permitted by the pilot.

16. When performing as a crew member in external operations, listen to and be familiar with the normal sounds emitted by the helicopter in flight so that you will have the earliest notice of trouble and can avoid dangerous exposure.

17. When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and stabilizing rotors.

APPENDIX J: SAFETY TAILGATE CHECKLIST

Tailgate Guide Checklist

Crew Leader:_____ Date:_____
Street/Descriptive Address:_____
_____
Lat/Long Coordinates:_____
Expected job flow:_____
_____
Crew member assignments:_____
_____
Assisting Crews:_____
Traffic Control:_____
Purpose of Job:_____
_____
Hazards and potential hazards-how will risk be eliminated/reduced:_____
_____
Compliance issues and how they'll be mitigated:_____
_____
Base Radio Procedures: Radio Check in _____
Base phone # **619-717-8118**_____
Verify Materials, tools first aid kits, fire extinguishers, cups & water for hydration, etc.
Vehicle Inspections: Circle of Safety_____Environmental Cleanliness_____
Verify everyone has/is wearing appropriate Personal Protective Equipment (PPE)
Approved head, eye, foot ear, and hand protection_____
Appropriate clothing and shoes (Long Sleeve Shirt and Steel Toe Shoes on or around construction zones)
Traffic Vest (Main and access roads and in equipment operation areas)
Q&A Encourage participation_____
_____
Insure everyone understands what was communicated_____
Verify everyone understands what is expected of them_____
Safety Reminder: Refer to list on back for suggested topics_____
_____

Re-Tailgate: If anything changes on this job that impacts the work or crew you must re-tailgate ensure everyone knows what has changed and document below

Time Conducted	What Changed	Initials of Crew Leader

Tailgate Conducted By:_____Date:_____

Tailgate Reviewed By:_____Date:_____

Tailgate Guide Checklist

Attendees

NAME	SIGNATURE	COMPANY

SAFETY TOPICS

Bee Awareness	Heat Illness Prevention	Inclement Weather
Snakes, Spiders, Scorpions	Extreme Cold	Lightning
Fire safety/prevention	Circle of Safety	Flashflood
Fall Protection	Enclosed Space Protection	Trench Awareness
Helicopter Operations	Customer Communications	Heavy Equipment Operations
Safe Working Distances	Emergency Response Procedures	Spill Clean Up

APPENDIX K: HEAT ILLNESS PREVENTION (SDG&E SAFETY STANDARD G8366)

APPENDIX K – HEAT ILLNESS PREVENTION

SDG&E SAFETY STANDARD G-8366

PURPOSE Prevent employee heat illnesses during outdoor work

1. POLICY AND SCOPE

1.1. The purpose of this policy is to protect employees from heat illnesses while performing outdoor work by providing heat illness training, specifying drinking water and shade requirements, and providing emergency procedures as needed.

1.2. The standard applies to all employees who work outdoors such as but not limited to field crews, meter readers, and customer service representatives.

2. PROGRAM

2.1. Heat Illness Training

2.1.1. All employees, who work outdoors, must attend an initial training class. All new employees must attend an initial training class prior to field assignments. The training must cover:

- Environmental factors and personal risk factors of heat illness;
- Different types of heat illness;
- Common signs and symptoms of heat illness and the importance immediately reporting symptoms or signs of heat illness in themselves, or in co-workers;
- The importance of acclimatization;
- The importance of frequent consumption of water;
- Control and emergency provisions;
- The requirements of this standard.

2.1.2. Each supervisor (including crew leads and working foremen) with outdoor employees must have the same initial heat illnesses training as well as emergency response training.

2.2. Drinking Water Requirement

2.2.1. One quart of drinking water per employee per hour for the entire shift must be provided unless water is plumbed or continuously supplied.

NOTE: Employees may begin the shift with smaller quantities of water if they can replenish their water supplies during the shift as needed to allow them to drink one quart or more per hour.

2.2.2. The frequent drinking of water shall be encouraged.

2.3. Shade Requirement

2.3.1. Shade area shall be provided that is either open to the air or provided with ventilation or cooling for a period of no less then five minutes to recover from heat. Employee may be provided with vehicles capable of providing air conditioning or must have provisions for shade.

2.3.2. Access to shade shall be permitted at all times and especially for employees suffering from heat illness or require a break from the heat exposure.

2.4. Heat Illness Emergency Procedure

2.4.1. Heat illness is a potentially serious medical condition and must be responded to with the same procedures as other serious health and safety conditions using the respective departmental current emergency response procedures. It is important to be able to provide clear and precise directions to the work site.

3. RESPONSIBILITIES

3.1. Employees

3.1.1. Attend initial heat illness training.

3.1.2. Follow heat illness precautions when working outdoors.

3.1.3. Immediately reporting to their supervisor any symptoms or signs of heat illness in themselves, or in co-workers.

3.2. Supervisors (including crew leads and working foremen)

3.2.1. Ensure new or transferred employees receive initial employee heat illness training before working outdoors.

3.2.2. Attend initial employee and emergency response heat stress training.

3.2.3. Provide adequate water supplies, shade, other engineering controls and best management practices to reduce the potential for heat illness, i.e. mechanical ventilation, rotate crews and workers, air-conditioned vehicles, etc.

3.2.4. Ensure that heat illnesses precautions are used. This includes ensuring adequate water supply and shade is provided as well as encouraging frequent employee water drinking.

3.2.5. Be alert to any employee symptoms or signs of heat illness and take precautions as needed.

3.2.6. Prepare, maintain, and follow emergency response plans in the event of an employee heat illness.

3.3. Safety and Health Department

3.3.1. Develop heat illness training and provide program assistance as needed or requested.

4. DEFINITIONS

4.1. Environmental risk factors for heat illness- are those working conditions that create the possibility that heat illness could occur. This includes: air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

4.2. Heat Illness- means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

4.3. Personal risk factors for heat illness - are those individual factors that could place an employee at higher risk of heat illness such as an individual’s age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body’s water retention or other physiological responses to heat.

4.4. Shade- the blockage of direct sunlight to allow the body to cool. Canopies, umbrellas and other temporary structures or devices may be used to provide shade. Sitting in a vehicle without air conditioning is not adequate.

5. REFERENCES

5.1. California Code of Regulations, Title 8, Section 3395, General Safety Orders, Heat Illness Prevention

5.2. Heat Illness Prevention, Safety Department Lesson Plan

6. SAFETY REVIEW PROCESS

This safety standard was reviewed and approved by members of the Safety Action Committee, Safety Action Team, and the Field Operations Council.

■

SUMMARY OF DOCUMENT CHANGES & FILING INSTRUCTIONS	
Brief: New safety program for SCG and revised SDG&E program.	
Circulation Code	**Filing Instructions**
SAFE	File numerically behind Operational/Field Safety tab.
SAFESD	File numerically behind Operational/Field Safety tab.

DOCUMENT PROFILE SUMMARY NOTE: Do not make any changes to this table. Data in this table is automatically posted during publication.	
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Current Revision Date:	**8/9/2006**
Prior SoCalGas Numbers:	
Prior SDG&E Numbers:	
Company:	**SoCalGas/SDG&E**
Referenced Documents - SoCalGas:	
Referenced Documents - SDGE:	
Part of SoCalGas O&M Plan (reviewed annually):	**No**
Part of SDG&E O&M Plan (reviewed annually):	**No**
O&M Plan 49 CFR Code(s):	
Other 49 CFR Codes(s):	
Impacts the Integrity Management Program:	**No**
Contains OPQUAL Covered Task:	**No**
Common Document (if applicable):	
Incoming Materials Inspection Required (MSP only):	
Contact Person:	**Terry Thedell**

APPENDIX L: RULE 1800 – INCIDENT AND INJURY REPORTING

APPENDIX L – RULE 1800

RULE 1800

INCIDENT AND INJURY REPORTING

1800. SCOPE

This applies to all employees involved in an incident or injury, on the scene of an incident, or reporting an incident or injury.

1801. EMPLOYEES ON THE SCENE OF A SERIOUS INCIDENT

A. In case of injury, immediately obtain medical assistance (call 911 or request Dispatch – SD (Trouble) to do so) and provide first aid to the injured. Dispatch – SD (Trouble) can be reached @ (619) 725-5199.

B. Notify Dispatch – SD (Trouble) of all items on the Scene Assessment Checklist. (see Attachment A). Dispatch – SD (Trouble) will notify the employee's department head or delegate, Safety & Health Department, SEU Communications Department, SEU Claims Department and Corporate Security as needed.

C. Secure the incident scene. Perform only that work that can safely be done to mitigate any immediate hazards. Do not allow any crew members, any member of the public, or any emergency response personnel to take any action involving our facilities that will compromise their safety.

D. With the exception of that work necessary to mitigate immediate hazards, ensure that nothing is moved before the scene has been thoroughly inspected and released by Safety or SEU Claims Department. All evidence must be tagged and preserved until released in writing by the manager of Safety or the manager of SEU Claims Department.

E. Do not discuss the incident with any member of the public.

F. Obtain names, addresses and phone numbers of all parties involved and any witnesses of the incident.

G. Request the presence of a safety representative during any interview involving Cal-OSHA.

H. Provide a detailed description of all activities leading up to the incident to the Safety & Health Department or SEU Claims Department.

1802. INJURIES REQUIRING MEDICAL TREATMENT

A. In case of a life-threatening emergency:
   1. Call 911.
   2. Contact area dispatcher.
   3. If a telephone is not available, radio the area dispatcher and request that they call 911 immediately.
   4. Notify the area supervisor and the Safety & Health Department, (858) 650-4002 during normal business hours and (619) 725-5199 after hours, weekends and holidays.

B. All other injuries or illnesses requiring a physician:
Contact one of the Occupational Health Nurses. During regular work hours in North County call (760) 480-7684, or in San Diego call (858) 654-8758 for a physician referral. This will ensure that proper medical treatment is provided.

C. FORM TO BE COMPLETED: The report of injuries requiring medical treatment is completed electronically by the supervisor in the Safety Incident Management System (SIMS) from the Safety Website *http://utilinet.sempra.com/departments/safety/SIMSLanding.cfm*

1803. MINOR INJURIES

A. Steps to be taken are:
   1. Administer first aid if trained.
   2. If not trained, or if additional services are needed, contact an Occupational Health Nurse for assistance.

B. FORM TO BE COMPLETED: The report of Minor Injury is completed electronically by the supervisor in the Safety Incident Management System (SIMS) from the Safety Web site http://utilinet.sempra.com/departments/safety/SIMSLanding.cfm

1804. INJURIES AFTER HOURS (WEEKDAYS 5 P.M. THROUGH 7 A.M., WEEKENDS AND HOLIDAYS)

A. Call Service Dispatch - SD (Trouble) at (619) 725-5199.
B. Relay the nature, condition, and exact location of the injured employee. Service Dispatch will contact the Safety Department and others if necessary.

C. If assistance is needed, an Occupational Health Nurse will make the necessary arrangements.

1805. VEHICLE INCIDENTS

A. Ensure you are safe and able to discuss the incident with other involved drivers or persons. Exchange names, drivers' license information, address, phone number at home and work, auto insurance company and policy number (Sempra Energy is self insured).

B. Contact SEU Claims Department immediately to relay information about the incident if a member of the public is injured or there is damage to property or a vehicle.

C. Vehicle Incident Reports are made electronically by the supervisor in the Safety Incident Management System (SIMS) from the Safety Web site within three (3) working days.
http://utilinet.sempra.com/departments/safety/SIMSLanding.cfm

Attachment A

SCENE ASSESSMENT CHECKLIST

- ☑ Has 911 been called?
- ☑ Who's in charge?
- ☑ What is their phone number?
- ☑ What is the location of the incident?
- ☑ How many people are injured?
- ☑ What is the extent of the injuries?
- ☑ Where are they being transported?
- ☑ What additional assistance is required at the site to mitigate immediate hazards? (specific crews, equipment, emergency response etc.)
- ☑ What was the employee/crew doing when injured?

☑ Are any customers effected?

☑ Who has been notified?

☑ Secure and preserve the scene for investigation purposes.

NOTE: <u>Do not state the name of any injured employee over the radio</u>.

APPENDIX M: EMERGENCY ACTION AND FIRE PREVENTION PLANS

ALPINE FIELD OFFICE
1010 TAVERN ROAD, ALPINE, CA 91901

1. **PURPOSE AND SCOPE:**

1.1. The primary goal of this Emergency Action Plan (EAP) is the safety of all employees during a workplace emergency. It should be followed whenever possible; however, it does not replace the use of common sense by an individual employee. During any workplace emergency, when elements of this plan cannot be carried out, or if personal safety would be compromised, each employee should conduct themselves in a manner that provides for their own safety and the safety of other employees.

1.2. This document describes responsibilities of the Facility Responsible Official, Supervisors, Employees, and Emergency Response Teams (ERT) of each facility during emergencies in the workplace.

2. **ROLES AND RESPONSIBILITIES**: Ref. OSHA, CFR 29, 1910.38(c)(6) & 1910.38(e)

2.1. **Facility Responsible Official:** It is the responsibility of the Facility Responsible Official to:

2.1.1. Develop, implement, and update the EAP.

2.1.2. Appoint a Building Leader who will facilitate the development of the ERT.

2.1.3. Ensure that all equipment and systems are properly maintained and inspected.

2.1.4. Ensure that a copy of this plan is on site and made available for employees to review.

2.1.5. Ensure that the plan is reviewed with each employee as outlined in this plan.

2.2. **Emergency Response Team**

2.2.1. The ERT is comprised of trained employees who assist the Building Leader in responding to a workplace emergency. At a minimum their responsibility includes reporting of emergencies, coordinating evacuations and employee accountability procedures.

2.2.2. In addition, the ERT may elect to train employees to be able to render first aid, CPR, AED, or implement fire fighting measures. If a team elects to have employees trained in these areas, those employees must maintain current training and certification in the corresponding areas.

2.2.3. The ERT members are the Building Leader, Floor Leader(s), Assistant Floor Leader(s) and other employees trained to respond in an emergency; however, any employee may be assigned responsibilities during an emergency.

2.3. **Building Leader's** primary duties are to:

2.3.1. Form the ERT comprised of volunteer employees at his/her designated facility. Ensure that the ERT is trained and capable of implementing the EAP as outlined in this procedure.

2.3.2. Ensure that the ERT members obtain training to perform their duties as outlined in the plan.

2.3.3. Ensure this plan is implemented during an emergency.

2.4. **Floor Leader's** primary duties are to:

2.4.1. Report or verify that emergency has been reported as outlined in this plan.

2.4.2. Coordinate and implement the evacuation and employee accounting procedures as defined outlined in this plan.

2.4.3. Enlist the help of others as needed.

2.4.4. Assume the Building Leader's responsibilities in his/her absence.

2.5. **Assistant Floor Leader's** duties are to:

2.5.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

2.5.2. Assist with any other duties assigned.

2.5.3. Assume the Floor Leader's responsibility in his/her absence.

2.5.4. **In the absence of the Building Leader, Floor Leader(s) and Assistant Floor Leader(s), other employees should assume the responsibilities outlined in this plan.**

2.6. **Supervision:** It is the responsibility of each Supervisor to:

2.6.1. Ensure that each employee under his/her supervision is adequately trained on how to respond to emergency situations in the workplace.

2.7. **Employee:** It is the responsibility of each employee to

2.7.1. Understand his/her responsibilities as outlined in this plan.

2.7.2. Become familiar with this Emergency Action and Fire Prevention Plan or the employee ***Emergency Procedures*** brochure. Copies of the Brochure can be obtained from Emergency Services.

2.7.3. Notify his/her supervisor or any member of the ERT immediately of any potential fire hazard or emergency.

3. REPORTING PROCEDURES: Ref. OSHA, CFR 29, 1910.38(c)(1)

3.1. **During an emergency**:

3.1.1. Assess the situation and call 911 if appropriate. If you are unsure about the seriousness of the emergency, call 911

3.1.2. Notify your supervisor or any member of the ERT as soon as practical.

3.2. **When reporting an emergency**

3.2.1. Describe the nature of the emergency.

3.2.2. Provide the exact address, including the nearest cross street and actual location of emergency.

3.2.3. Provide a call back telephone number (yours, your Supervisor's or the Security desk).

3.2.4. Give them your full name.

3.2.5. Provide the building, Floor number, office or cubicle number or general area where the emergency is taking place.

3.2.6. Do not hang up until instructed to do so as emergency personnel might need more information from you, unless doing so poses a greater threat to you or anyone else.

3.2.7. If possible, send someone outside to flag down emergency personnel and guide them to the location of the emergency.

3.3. **Emergency Response Team Members**:

3.3.1. Report or ensure the emergency has been reported and call 911 if necessary.

3.3.1.1. Notify Building Security, Building or Floor Leader.

3.3.1.2. Notify Department or Facility Manager as soon as practical.

4. EMERGENCY COMMUNICATION STRATEGY / ALARM SYSTEM: Ref OSHA, CFR 29, 1910.38(d)

4.1. The Alpine Field Office is equipped with a wet pipe fire suppression sprinkler system. In addition, there is an audible fire alarm system including fire alarm panel, battery cabinet and remote annunciator; devices such as smoke detectors, pull stations, audible/visual alarms, and interface modules to wet sprinkler system. The emergency is also communicated by ERT staff members and other employees sweeping the area and making voice announcements to evacuate.

4.2. The alarm system is inspected and tested semi-annually by an outside company.

4.3. The inspection, maintenance and testing records are maintained by Real Estate and Facilities department.

5. **FIRE PREVENTION AND SUPPRESSION EQUIPMENT:** Ref OSHA, CFR 29, 1910.39(c)

5.1. **Hazardous Materials** Ref OSHA, CFR 29, 1910.39(c)(1) & 1910.39(c)(5)

- There are no flammable materials of concern found in this site other than the normal office products such as paper, toner, etc.

5.2. **Housekeeping Policy** Ref OSHA, CFR 29, 1910.39(c)(2)

5.2.1. Office areas are to be kept free of paper clutter that could create a fire hazard. Every employee should see that un-needed paper is placed in the recycle receptacles. Cubicles are to be kept free of paper clutter that could create a fire hazard

5.2.2. The Facility Manager, with support of the ERT, are responsible for ensuring that routine checks of the entire workplace are performed to remove any possible fire hazards.

5.2.3. Employees should immediately report any suspected workplace fire hazard to the Facility Manager or any member of the ERT for corrective action..

5.3. **Installation, Inspection, Maintenance and Testing of Safeguard Equipment** Ref OSHA, CFR 29, 1910.39(c)(3) & (4)

5.3.1. The Alpine Field Office facility is equipped with fire extinguishers and a sprinkler system. The fire extinguishers are inspected internally and the sprinkler system is maintained and tested by an outside agency contracted and managed by Sempra Real Estate and Facilities department.

5.3.2. Sempra Real Estate and Facilities department maintains the inspection, maintenance and testing records.

6. **EVACUATION PROCEDURES:** Ref. OSHA, CFR 29, 1910.38(c)(2) & 1910.38(c)(3)

6.1. There could be a number of reasons to evacuate the building. In some situations, evacuating may not be the best alternative. In an emergency, follow the instructions from the ERT, the Facility Manager or Security personnel unless doing so poses a greater threat of injury to you or anyone else.

6.2. Once the decision to evacuate has been made, ERT members will announce and initiate evacuation procedures.

6.3. Assigned members of the ERT will sweep meeting rooms, restrooms, and work areas to verify that everyone has been notified of the emergency and evacuated. PA systems can be used to announce the evacuation where they are available.

6.4. The ERT will enlist the help of others as needed to make the announcement.

6.5. **Evacuation Exits and Routes** Ref. OSHA, CFR 29, 1910.38(c)(2)

6.5.1. Employees should know the nearest exit from their work area and the route they'll take to reach that exit in an emergency. Employees should request a copy of their facility floor map from their Floor Leader and mark the exits and two evacuation routes specific to their individual location.

6.5.2. When instructed by the ERT, proceed to the nearest exit. As people are exiting the building it is important to follow the instructions of the ERT. Some basic guidelines for safe evacuation are:

6.5.2.1. Know the exits available to you at any point on the floor. AT THE TIME OF EVACUATION, USE THE NEAREST SAFE EXIT.

6.5.2.2. Take your personal belongings with you (such as keys, purse or briefcase, and personal emergency supplies) as you exit.

6.5.2.3. Walk, don't run and keep noise to a minimum so evacuation and safety instructions can be heard.

6.5.2.4. **Do not use elevators**.

6.5.2.5. In stairwell, use the inside handrail. Remove high heels to avoid tripping.

6.5.2.6. Yield to emergency response personnel.

6.5.2.7. Don't push or crowd others.

6.5.2.8. As you walk out, inform those around you of the need to evacuate the building.

6.5.2.9. If you encounter someone who needs help evacuating, assist them if you can do so without risk to your own safety.

6.5.2.10. Proceed to the assembly area and check in with the Floor Leader or designee.

6.5.2.11. Report any employee left behind or injured, as well as anyone missing that you are aware of.

6.6. **Assembly Area** - Ref OSHA, CFR 29, 1910.38(c)(4)

6.6.1. All employees need to report to the assembly area: Ask your Floor Leader for a copy of the latest floor plan and assembly area map or location.

6.6.2. Each employee is responsible for checking in with the Floor Leader or their designee at the assembly location.

6.6.3. Each employee should report the whereabouts, if known, of any employee not present at the assembly area, as well as anyone injured or left behind.

6.6.4. Employees are to remain at the assembly area until informed by the ERT members that either it is safe to re-enter the building, report to an alternate work location, or they are released to go home.

6.7. **Elevators**

6.7.1. There are no elevators to be concerned with at this facility

6.8. **People with Special Needs**

6.8.1. Anyone with a physical disability, including temporary conditions which would limit their ability to exit safely during an emergency, shall be assigned persons to help them. The ERT should be made aware of these situations and make assignments as soon as possible. If you see anyone who has a problem exiting the building, stay with that person and, if possible, help with their evacuation. If you can't, notify any member of the ERT of the problem. If you can, stay and wait for help or instructions from the ERT, unless immediate evacuation is needed to avoid personal injury.

6.9. **Procedures for Rendering First Aid and Fire Fighting Measures** Ref OSHA, CFR 29, 1910.38(c)(5)

6.9.1. Emergencies will be reported and handled as stated in sections **3 – Reporting procedure, 7.1– Fire procedures** and **7.5 - Medical emergency procedures.**

6.10. **Procedures for Employees Performing Critical Operations Prior to Evacuation** Ref OSHA, CFR 29, 1910.38(c)(3)

6.10.1. **Not applicable.** However, if any department requires an employee to stay behind, that information must be communicated to the Building Leader and noted on the employee roster that the ERT maintains.

6.11. **ERT Responsibilities**

6.11.1. **Building Leader's duties during evacuation**:

6.11.1.1. Report or verify that emergency has been reported as defined in section 3.3.

6.11.1.2. Ensure that evacuation procedures have been initiated.

6.11.1.3. Establish a command post in the assembly area.

6.11.1.4. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

6.11.1.5. Enlist the help of others as needed.

6.11.2. **Floor Leader's duties during evacuation**:

6.11.2.1. Report or verify that emergency has been reported as defined in section 3.3.

6.11.2.2. Coordinate and implement the evacuation and employee accounting procedures.

6.11.2.3. Ensure first aid kit is taken to the assembly location and coordinate that first aid is rendered to injured employees by trained ERT members as applicable.

6.11.2.4. Assign someone to take the roster and coordinate employee check-in procedures.

6.11.2.5. Attempt to account for anyone who did not check in at the evacuation assembly area.

6.11.2.6. Report any missing or injured persons to the Building Leader or other emergency personnel.

6.11.2.7. Enlist the help of others as needed.

6.11.2.8. Assume the Building Leader's responsibilities in his/her absence.

6.11.3. **Assistant Floor Leader's duties during evacuation**:

6.11.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

6.11.3.2. Assist with any other duties assigned.

6.11.3.3. Assume the Floor Leader's responsibility in his/her absence.

7. EMERGENCY PROCEDURES (by type of emergency): Ref. Cal/OSHA, Title8, Section 3220.(d)

7.1. Fire

7.1.1. If you hear the fire alarm:

7.1.1.1. Follow the instructions from the ERT, unless immediate action is needed to avoid personal injury or injury to others.

7.1.1.2. After working hours, evacuate the building, call 911and follow instruction from Security if they are on site.

7.1.2. If you discover a fire in your work area:

7.1.2.1. Call 911 to report the location of the fire. Give building or suite number and location, including the nearest cross street.

7.1.2.2. Activate the fire alarm if applicable, alert others and move away from the area of the fire.

7.1.2.3. Notify building Security and any member of the ERT, and/or your supervisor as soon as practical.

7.1.2.4. Use a fire extinguisher only on small fires (waste-basket size) if it's safe to do so and you have been trained on how to use one.

7.1.2.5. Close doors to confine the fire but do not lock them, and evacuate to a safe area.

7.1.2.6. Follow the instructions of the ERT.

7.1.2.7. If evacuation is necessary, immediately evacuate the work area, proceed to the assembly area and check-in with the Floor Leader or designee.

7.1.3. If trapped in a room:

7.1.3.1. Place cloth material around/under the door to prevent smoke from entering.

7.1.3.2. Retreat. Close as many doors as possible between you and the fire.

7.1.3.3. Be prepared to signal from a window, but do not break the window glass unless absolutely necessary to escape, because outside smoke could be drawn inside.

7.1.4. If caught in smoke:

7.1.4.1. Drop to your hands and knees and crawl toward the exit.

7.1.4.2. Hold your breath as much as possible.

7.1.4.3. Breathe shallowly through your nose, and use a shirt or jacket as a filter.

7.1.5. If forced to advance through flames:

7.1.5.1. Cover your head and hair.

7.1.5.2. Hold your breath and move quickly

7.1.5.3. Keep your head down and close your eyes as much as possible.

7.1.6. If clothes catch on fire:

7.1.6.1. Remove burning clothes only if you can do so quickly. Otherwise, smother the flames with a heavy coat or blanket, or by dropping to the floor and rolling. (Stop, drop and roll.)

7.2. **ERT Responsibilities**

7.2.1. **Building Leader's duties during fire emergencies**:

7.2.1.1. Ensure the emergency has been reported as defined in section 3.3.

7.2.1.2. Determine if evacuation is needed and initiate evacuation procedures as applicable.

7.2.1.3. Establish a command post in the assembly area.

7.2.1.4. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.2.1.5. Enlist the help of others as needed.

7.2.2. **Floor Leader's duties during fire emergencies**:

7.2.2.1. In case of fire, initiate reporting procedures as outlined in section 3.3.

7.2.2.2. If unable to extinguish the fire, evacuate immediately and close all doors behind you - Do not lock the doors.

7.2.2.3. If notified evacuation is necessary, begin evacuation procedures as outlined in section **6**.

7.2.2.4. If notified of a fire in the building but not on your floor, give the order to prepare to evacuate. Employees should secure computers, sensitive documents, close file cabinets and prepare to leave for the day. If immediate action is required to avoid personal injury or injury to others, evacuate immediately.

7.2.3. **Assistant Floor Leader's duties during fire emergencies**:

7.2.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.2.3.2. Assist with any other duties assigned.

7.2.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.3. **Earthquake**

7.3.1. When an earthquake begins:

7.3.1.1. Stay calm and use the "Duck, Cover and Hold" drill. Get under a desk or other sturdy object and stay there until shaking stops.

7.3.1.2. Be aware of aftershocks that may equal the primary quake in magnitude.

7.3.1.3. Keep clear of windows that could break or objects that might fall, such as a bookcase or computer monitor.

7.3.1.4. If you are in an elevator that becomes stuck, be patient. Call if equipped with a phone, either "O" for operator or dial 911. Some phones automatically ring to the elevator company. Someone will contact the car as quickly as possible and advise you how rescue will occur. Do not attempt to pry open a door and escape.

7.3.1.5. Evacuation is not always needed in an earthquake. Wait for direction from the ERT, unless immediate action is needed to avoid personal injury.

7.3.1.6. If evacuation is deemed necessary, evacuate the work area, proceed to the assembly area and check in with the Floor Leader or their designee.

7.3.2. **ERT Responsibilities**

7.3.2.1. **Building Leader's duties during earthquake emergencies**:

7.3.2.1.1. After the shaking has stopped, the safety of the employees and attending to the injured are the first priorities. Unless it is unsafe to do so or immediate evacuation is required, search for injured and report them to Manager.

7.3.2.1.2. Call 911 (if appropriate).

7.3.2.1.3. Determine if evacuation is needed and initiate evacuation procedures as applicable.

7.3.2.1.4. Establish a command post in the assembly area.

7.3.2.1.5. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.3.2.1.6. Enlist the help of others as needed.

7.3.2.2. **Floor Leader's duties during earthquake emergencies**:

7.3.2.2.1. After the shaking has stopped, the safety of the employees and attending to the injured are the first priorities. Unless it is unsafe to do so or immediate evacuation is required, search for injured and report them to Manager.

7.3.2.2.2. Call 911 (if appropriate).

7.3.2.2.3. Report condition of building and employee status to Security and the Building Leader.

7.3.2.2.4. If it is appropriate or you are notified by Security or the Building Leader to do so, begin evacuation of the work area.

7.3.2.2.5. After ensuring that the work area has been evacuated, proceed to the assembly area and check with Floor Leader for reports of missing or injured employees.

7.3.2.2.6. Report injured and missing employees to the Building Leader and Department Manager.

7.3.3. **Assistant Floor Leader's duties during earthquake emergencies**:

7.3.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.3.3.2. Assist with any other duties assigned.

7.3.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.4. **Bomb Threat**

7.4.1. All bomb threats should be treated as serious. The safety of the building occupants should be the primary consideration. If you receive a note or letter, immediately contact building security, any member of the ERT and/or your supervisor.

7.4.2. If a bomb threat is received by phone, keep the person on the line and get as much information as possible.

7.4.2.1. Listen carefully, especially for identifying voice characteristics such as an accent.

7.4.2.2. Be calm and courteous, even friendly.

7.4.2.3. Do not interrupt the caller.

7.4.2.4. Obtain as much information as possible by asking questions such as:

- When is the bomb going to explode?
- Where is it right now?
- What does the bomb look like?
- What kind of bomb is it?
- What will cause it to explode?
- Did you place the bomb?
- What is your name?
- What is your address?

7.4.2.5. As soon as the call has ended, report the threat.

7.4.2.6. Don't evacuate unless told to do so, or if danger is imminent.

7.4.3. If evacuation is ordered, evacuate the threat area immediately as if leaving for the day.

7.4.4. Take briefcases, purses or other personal containers that may become "suspect" if the area is searched later.

7.4.5. Look in your immediate area for object(s) that do not belong or are out of place. If such an object is found, do not touch it. Under no circumstances should a suspect object be handled, moved or opened. Immediately notify security or any member of the ERT.

7.4.6. If the device is outside, clear an area all around the object for 300 feet. If inside, evacuate the floor the device is on as well as the floor above and below the device.

7.4.7. Evacuees should proceed to the assembly area and check in with the Floor Leader or designee. The exiting route should be away from the object and its cleared area.

7.4.8. **ERT Responsibilities**

7.4.8.1. **Building Leader's duties during bomb threat**:

7.4.8.1.1. Report or verify that emergency has been reported as defined in section 3.3

7.4.8.1.2. Communicate with security and determine if evacuation procedures are necessary.

7.4.8.1.3. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.4.8.1.4. Enlist the help of others as needed.

7.4.8.2. **Floor Leader's duties during bomb threat**:

7.4.8.2.1. Notify the Building Leader and Security and wait for instructions from them.

7.4.8.2.2. Notify the Department Manager.

7.4.8.2.3. If instructed to do so, ask employees to check their immediate area for anything unusual. INSTRUCT THEM NOT TO TOUCH ANYTHING THEY DON'T RECOGNIZE OR IS SUSPICIOUS. Report anything found to Security.

7.4.8.2.4. If you are notified by Security to evacuate, initiate evacuation procedures as defined in section **6**.

7.4.8.2.5. After ensuring that the work area has been evacuated, proceed to the assembly area.

7.4.8.2.6. Report injured and missing employees to the Building Leader and Department Manager.

7.4.8.3. **Assistant Floor Leader's duties during bomb threat**:

7.4.8.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.4.8.3.2. Assist with any other duties assigned.

7.4.8.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.5. **Medical Emergency** Ref. OSHA, CFR 29, 1910.38(c)(5)

7.5.1. If you are unsure about the seriousness of the emergency, call 911 then notify the appropriate building security, Floor Leader or Supervisor as soon as practical.

7.5.2. If the person is unresponsive and you are trained to do so, administer first aid or CPR, or use an AED unit where available.

7.5.3. If the person is responsive and can tell you what the problem is, relay that information to the 911 operator. If they have medication with them that may help the situation, assist them in administering their medication (e.g., nitroglycerin pills for heart).

7.5.4. If possible, send someone outside to escort emergency personnel into the correct area.

7.5.5. Provide any information you can to arriving emergency personnel.

7.5.6. **ERT Responsibilities**:

7.5.6.1. **Building Leader's duties during medical emergency**:

7.5.6.1.1. Report or verify that emergency has been reported as defined in section 3.3.

7.5.6.1.2. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.5.6.1.3. Enlist the help of others as needed.

7.5.6.2. **Floor Leader's duties during medical emergency**:

7.5.6.2.1. Report or verify that emergency has been reported as defined in section 3.3.

7.5.6.2.2. Notify the Department Manager.

7.5.6.2.3. Assume the duties of the Building Leader in his/her absence.

7.5.6.3. **Assistant Floor Leader's duties during medical emergency**:

7.5.6.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.5.6.3.2. Assist with any other duties assigned.

7.5.6.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.6. All Other Emergencies

7.6.1. If unsure about the seriousness of the emergency, call 911.

7.6.2. Report the emergency to any member of the ERT and wait for instructions unless delay would result in injury.

7.6.3. If evacuation is necessary, evacuate the work area and proceed to assembly area and check in with Floor Leader or his designee.

7.6.4. **ERT Responsibilities**

7.6.4.1. **Building Leader's duties for all other emergencies**:

7.6.4.1.1. Report or verify that emergency has been reported as defined in section 3.3.

7.6.4.1.2. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.6.4.1.3. Determine if evacuation is necessary and implement evacuation procedures

7.6.4.1.4. Enlist the help of others as needed.

7.6.4.2. **Floor Leader's duties for all other emergencies**:

7.6.4.2.1. Call 911 (if applicable), Security and the Building Leader.

7.6.4.2.2. Notify the Department Manager, if he/she is offsite.

7.6.4.2.3. If it is appropriate or you are notified by Security or the Building Leader to do so, begin evacuation of the work area.

7.6.4.2.4. After ensuring that the work area has been evacuated, proceed to assembly area and check with Floor Leader for reports of missing or injured employees.

7.6.4.2.5. Report injured and missing employees to the Building Leader and Department Manager.

7.6.4.3. **Assistant Floor Leader's duties for all other emergencies**:

7.6.4.3.1. Assist the Building Leader with notifications.

7.6.4.3.2. Assume duties as previously outlined.

7.6.4.3.3. Assume the duties of the Building Leader in his/her absence.

8. EMPLOYEE TRAINING: Ref. OSHA, CFR 29, 1910.38(f) & 1910.39(d)

8.1. The facility's Responsible Official and Supervisors are responsible for the training of all employees covered under this plan. As part of our Emergency and Fire Prevention Plan, we train all of our employees under the following circumstances:

8.1.1. New employees are provided with the Emergency Procedures Brochure and are asked to meet with members of their ERT to review site specific information.

8.1.2. Whenever new hazards are introduced into their work area or the employee transfers to new work areas.

8.1.3. Whenever the plan is changed.

While it is not required by the regulations, it is recommended that the plan be reviewed with all employees at least annually. A more frequent review is preferable.

8.2. Building Leaders, with support from Emergency Services and Safety, conduct training for the members of the ERT. Training topics include:

8.2.1. Initial and re-certification of CPR, First Aid and AED.

8.2.2. Potential fire hazards in their work area and the proper storage and/or handling procedures.

8.2.3. General housekeeping procedures associated with fire prevention.

8.2.4. Any specific housekeeping procedures for highly combustible or flammable materials in their work area.

9. APPENDICES AND OTHER REFERENCE DOCUMENTS:

9.1. **Appendix A** – Site Security Alarm Procedures -

9.2. **Emergency Procedures Brochure** - Copies of the Emergency Procedures brochure can be requested from the Emergency Services Department.

9.3. **Floor Map**

9.3.1. Refer to your Supervisor, Floor Leader or Building Leader for a copy of the latest version of the floor map.

9.3.2. Mark two evacuation routes relevant to your specific location.

9.3.3. Become familiar with the location of fire extinguishers.

9.3.4. Become familiar with the location of AED units where available.

9.4. **Training Records**

9.4.1. Employees are provided with the Emergency Procedures Brochure.

9.4.2. ERT members conduct training sessions as needed. Records are kept by the Responsible Official or Building Leaders at each facility.

9.4.3. Records of CPR, First Aid and/or AED training are kept in MyInfo or copies of certificates are kept by the ERT.

9.5. **ERT Roster** are generated and maintained by the ERT at each facility.

9.6. **Employee Check-In Roster**- Employee rosters, to aid in the accounting of employees during an evacuation, are generated and maintained by the ERT at each facility.

Appendix A – Site Security Alarm Procedures INTERIM

- ## Hours of Operation:

  Alpine Headquarters (HQ) will be operational between the hours of 0500 to 1900 Hours Monday through Saturday. Exceptions to this, e.g. Holidays, operational Sundays, etc, will be communicated to all employees.

- ## AM Alarm Deactivation:

  The building alarm will be deactivated by 0500 by the Securitas Guard who will call CSOC to deactivate the alarm remotely.

- ## PM Alarm Activation:

  The last employee leaving the premise after 1900 hours will make every effort to ensure the building is clear of personnel and **will** advise the Securitas Guard, upon leaving, the building is clear.

  The Securitas Guard will ensure the building is clear (after 1900 hours) and the guard will call CSOC to set the alarm remotely.

- ## Entry during Non-Operational Hours:

  Employees entering the property during non-operational hours ***must contact*** the Securitas Guard prior to entering the premises to ensure the alarm status. The Guard will deactivate the particular building alarm by calling CSOC and advise the employee that the alarm is de-activated

- ## Exit during Non-Operational Hours:

  The last employee leaving the premise during non-operational hours will make every effort to ensure the building is clear of personnel and will advise the Securitas Guard, upon leaving, the building is clear. The Securitas Guard will ensure the building is secure and contact CSOC to set the alarm remotely.

EMERGENCY ACTION PLAN (SUMMARY)

Alpine Field Office

Major Projects Base: (619) 717-8118 **Corporate Security: (858) 503-5067**

Alpine Field Office EMERGENCY TEAM

Building Leader:	**Jesse Thrush**	**Phone: (619) 717-8118**
Asst. Building Leader:	**TBD**	**Phone: (619) 717-8118**
Facility / Site Manager:	**Tim Devlin**	**Phone: (619) 441-3819**

Building 1 Floor Leaders

Melinda Michael (West)……**858-654-1526**
Renee Taylor (East)……**858-637-7959**

Building 2 Floor Leaders

Chris Mellett…….. **858-654-8778**
TBD……

Building 3 Floor Leaders

Martha Velarde…….. 858-637-7994
TBD……..

AED Trained Employees

Most Major Project site employees are trained to use an AED.

First Aid

Most Major Project site employees are trained in First Aid.

REPORTING PROCEDURES

IMMEDIATELY report all emergencies to the Building Leader, Floor Leaders and Major Projects Base.

FIRE

When appropriate, call 911 (dial **9 + 911**) and report fire, give building number and location

Address: **1010 Tavern Road, Alpine, CA 91910**
Cross Street: **Victoria Park Terrace**

EARTHQUAKE

Stay calm, "duck and cover", get under a desk or other sturdy object and stay there until shaking ends.

BOMB THREAT

Questions to ask if you receive a bomb threat call:

- What is your name?
- What does the bomb look like?
- Where is the bomb?
- What will cause it to explode?

MEDICAL EMERGENCIES

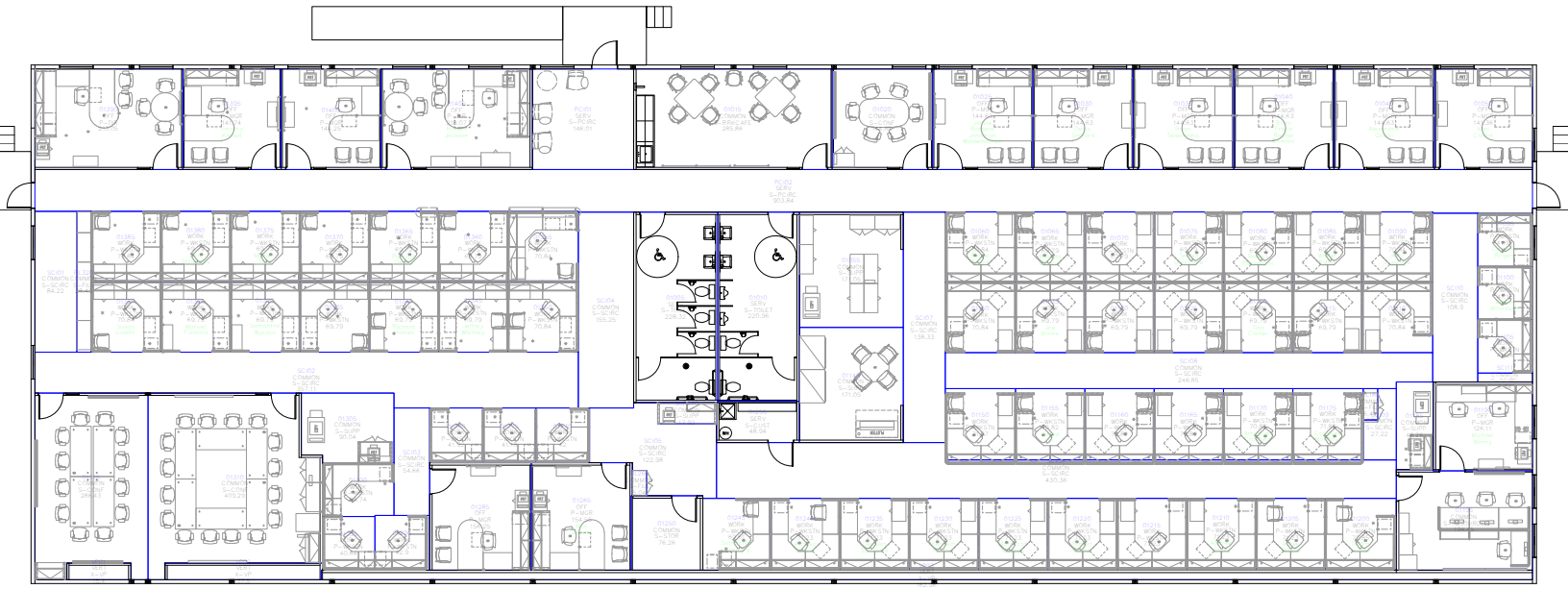
If an incident occurs where outside medical attention or intervention is needed (ambulance or paramedics) any employee may call 9-911 to summon assistance or Major Projects Base.

ALL OTHER EMERGENCIES

- **IMMEDIATELY** contact the Floor Leader(s) or Building Leader.
- Wait for directions from the Emergency Team, unless delay would result in injury.
- If evacuation is necessary, evacuate the work area and proceed to assembly area.

EVACUATION PROCEDURES

- Use the **nearest safe** exit, follow the instructions of the Emergency Team, and take your emergency preparedness cubicle kit.
- Assembly Area: **Alpine Field Office Parking Lot,** northeast corner.
- Check in with a Floor Leader when you arrive to ensure accurate head count.



SPL HEADQUARTERS (ALPINE)
1010 TAVERN ROAD
ALPINE, CA 91901
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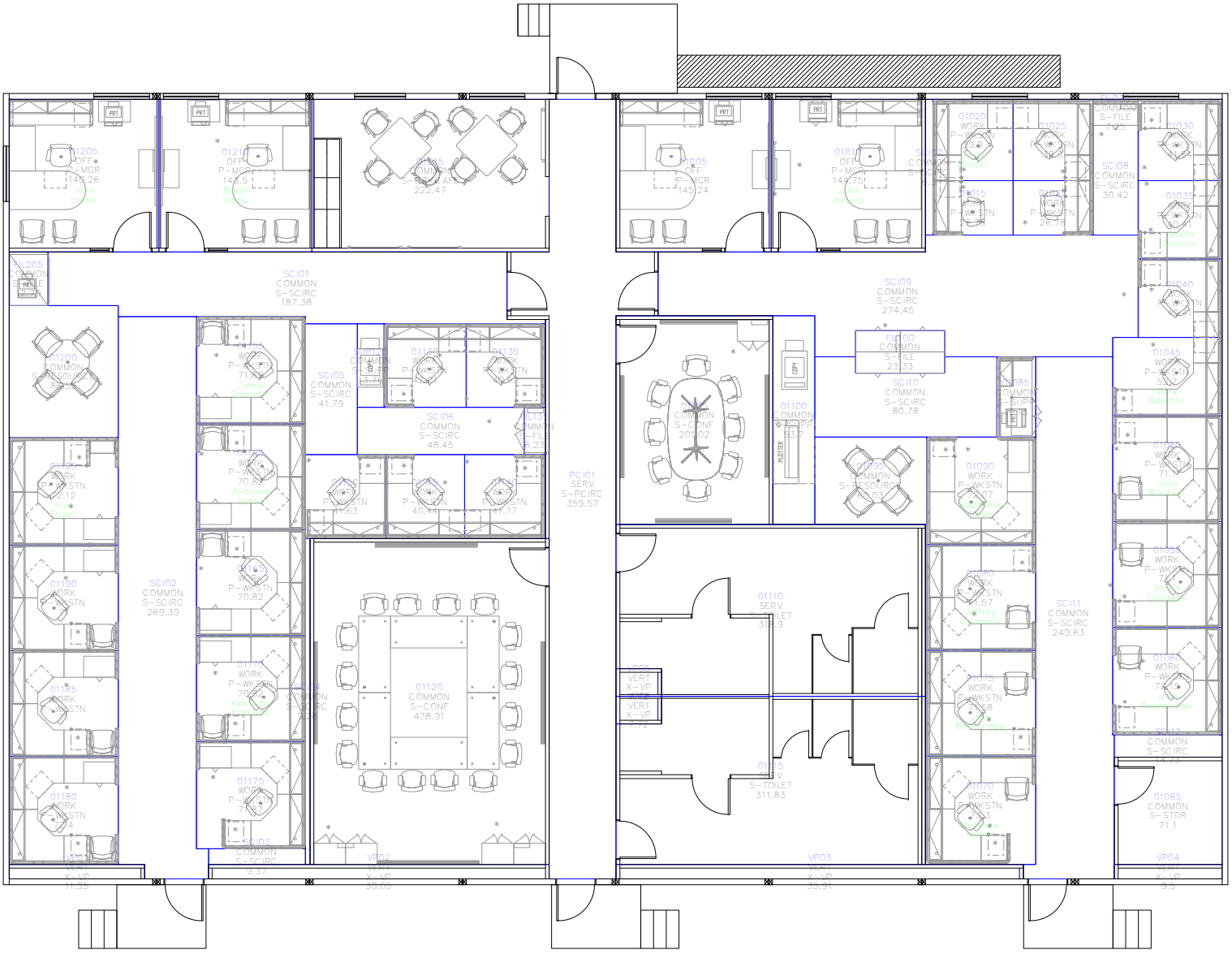
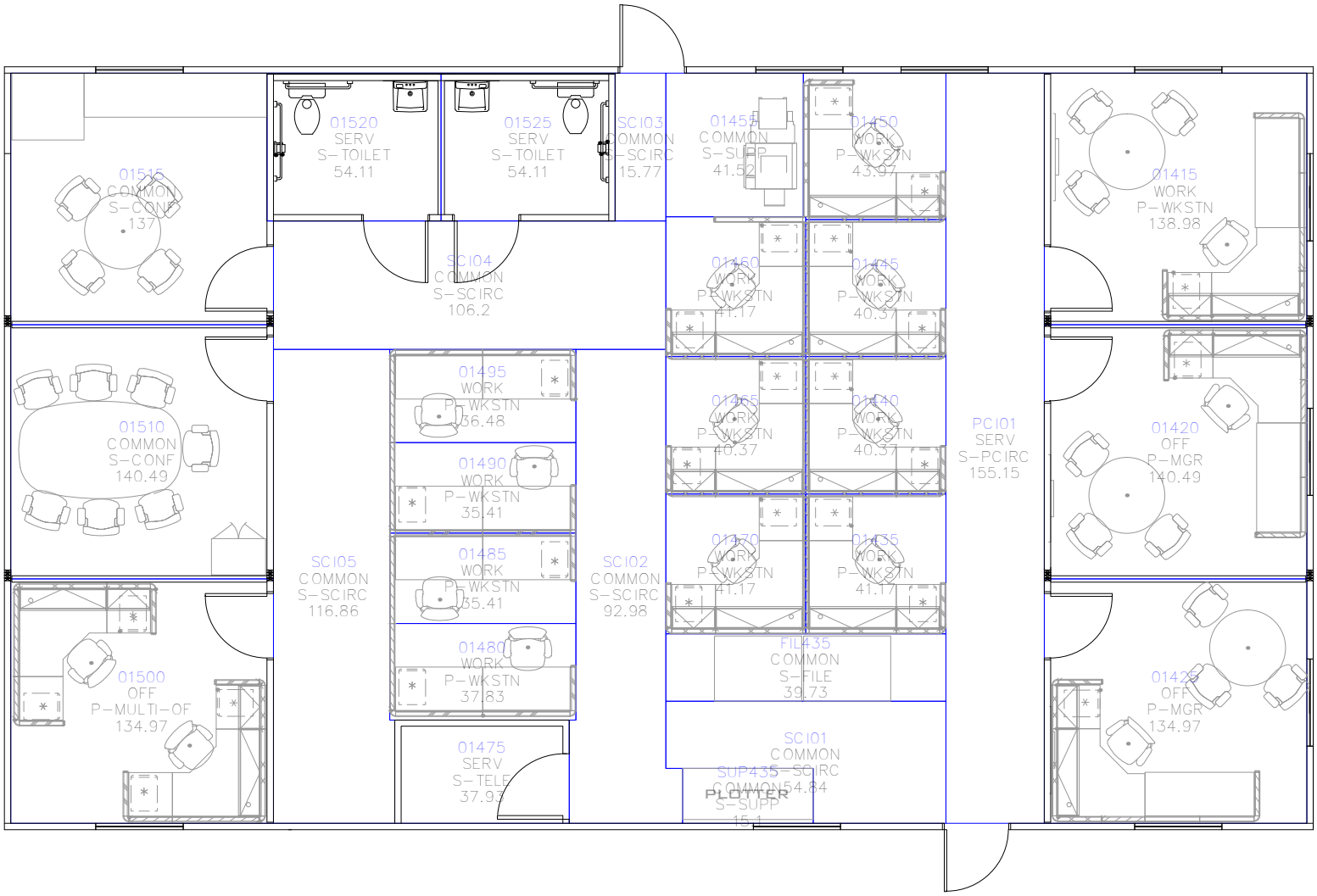
01



SPL SUNRISE 230kv (ALPINE TRAILER)
1010 TAVERN ROAD
ALPINE, CA 91901
6685
6685_02
01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COMMON
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COMMON54.84
PLOTTER
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01425
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P-MGR
134.97


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PC102
SERV
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APPENDIX N: INCIDENT ACTION PLAN

Appendix N -- Incident Action Plan

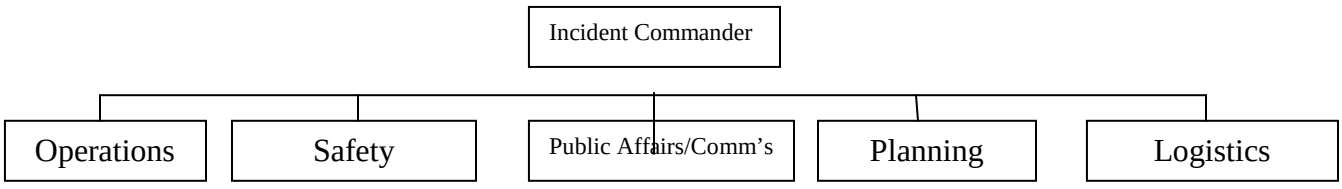
Incident Action Plan

I. Purpose – The purpose of this document is to establish processes and provide a general plan that will help effectively manage moderate to large scale incidents that may occur during the East County Substation Project. Principles of the Incident Command System (ICS) will be used to manage each incident and help bring structure to what can often be a chaotic event lacking organization and communication.

II. General– Construction of the East County Substation Project involves technical and challenging work in some of the most difficult and dangerous terrain in San Diego and Imperial counties. The higher risk work activities involve heavy equipment operations, helicopter operations, trenching & shoring, tower construction, traffic control along major thoroughfares and driving on unpaved mountainous roads. This work will frequently be done during harsh weather conditions in areas that are prone to wild fire and other natural disasters. Additionally, this project has its opponents that include sensitive land owners, residents and various organizations that involve an added level of concern for project employees.

III. Incident Management Team (IMT) – An IMT will be assembled with project personnel who are familiar with the key functions needed to manage an Event Level III incident. Team members will include, but are not limited to; Incident Commander (IC) , Operations Lead, Public Affairs/Communications Lead, Planning Coordinator, Safety Lead and Logistics Coordinator. Depending on the nature and level of complexity of the incident one person may handle multiple functions or several people may be assigned to a single function. Additionally, the IMT members may change based on availability of personnel or need during an incident.

IV. Incident Command Structure



V. Determining Event Levels

a. **Event Level I** – An internal SDG&E or project contractor incident only, minor consequences or affect to the company, level of command – Supervisor (IC), and the IC designated or approved at the Manager level.

Examples; 1) SDG&E employee sprains ankle while hiking down a hill from tower site, 2) property owner upset with contractor crew shouts obscenities and locks them out of property preventing work for the day 3) vehicle incident involving project employees with minor injuries.

b. **Event Level II** – Incident involves multiple agencies or issues, moderate consequences or affect to the company, level of command – Manager (IC), IC designated or approved at Director level.

Examples; 1) small brush fire started due to project activities. Crew is able to extinguish with on-site fire tools at less than 1 acre but CAL FIRE and USFS engines respond. 2) Contractor lineman suspended from tower with minor head injury and broken leg requires multi-agency rescue operation. 3) break in at material yard with significant damage to numerous underground cable reels.

c. **Event Level III** – Major incident with potential high consequence politically, financially, or legally to company and/or a fatality on the incident, level of command – Director (IC) designated or approved at the VP level.

Examples; 1) contract helicopter crashes along route with fatalities 2) member of public is seriously injured by work related activities and draws expansive media coverage 3) rapidly moving wildfire starts in project area where multiple employees and contractors are working.

For Event Level III incidents on ECO a pre-established Incident Management Team will be used whenever possible and include officers, directors, and managers associated with the ECO who have been trained in the Incident Command System. Other team members can and should be brought in based on availability and need. The primary assembly location for the IMT will be the Alpine Headquarters located at 1010 Tavern Road in Alpine, unless requested otherwise by the IC. For Event Levels I & II, incidents teams will be formed as the need dictates with ICS trained participants whenever possible.

**** An interim IC at a lower level may be designated during the initial stages of the incident to manage the incident until the qualified IC arrives and assumes command.***

VI. Command & Control - It is critical that positive command and control be established by identifying an Incident Commander(IC) as early as possible during an event. Key information and decisions will be passed through the IC and help prevent duplication of effort and assumptions that someone else is handling it. For minor incidents this can be the person on scene, the Major Projects Base Supervisor. The IC can change during the course of an incident. This change must be communicated to all involved with the incident in order to maintain positive command and control.

VII. General Steps of Incident Management;

1. Notification and Assessment of an Incident and Identification of an Incident Commander.
    a. Information comes into Major Projects Base from the field.
        i. Collect as much incident information as possible. Who, what, when and where?
        ii. Determine incident event level (Level I, Level II or Level III.
        iii. Establish positive command and control by determining who will be the Incident Commander(IC). Major Projects Base supervisor or manager to determine who this is using the protocols addressed above.
2. If needed, place request for emergency response via 911 or established Major Projects Base protocol.
    a. Identify Incident Command Post (could be same as emergency responders ICP, Alpine HQ, temporary work headquarters on the ROW)

3. Internal & External Notifications

    a. Major Projects Base to make appropriate internal notifications based on; confirmed facts, nature of the incident and the determined Event Level. Updates will be provided through Major Projects Base as more information becomes available.
    b. Public Affairs Lead will determine what, if any, additional external notifications need to be made based on the nature of the incident. The IC will approve what information is released.
    c. If the incident involves a contractor, their primary point of contact will be notified and regular communications established. If necessary, a joint

command will be set up between SDG&E and the contractor to help manage the incident.

d. *Depending on magnitude and severity of the incident, simple information exchange & coordination, up to a unified command structure maybe instituted between SDG&E and the Agency in-charge of the incident (sheriff, fire department, etc.). The SDG&E Incident Commander at the very least will contact the responding agency incident commander with a briefing on current actions and the company's plan of action.*

4. Identify Location of Incident Command Post (ICP).

    a. Communicate ICP to those who need to know (notification distribution list).

5. For Event Level III incidents, assemble SDG&E Incident Management Team as required.

    a. If IMT members are unavailable or on extended delay, the IC should select others to fill the need.
    b. Planning Meeting – A planning meeting should be held as soon as possible once the IMT is assembled and as needed until the event is concluded.
        i. Identify immediate, short-term and longer-term needs for the incident. Have someone take notes and document the information exchange and action items.
        ii. Safety; has danger/risk been eliminated/mitigated? If not, what measures need to be taken? Safety messages/direction to employees?
        iii. Operations; status of incident scene, determine operational needs.
        iv. Communication/Public Affairs; internal, external, employee families.
        v. Logistics; additional equipment or personnel, coordination with contractor(s), if extended incident consider shifts for field personnel and IMT.

    c. Status Meetings – Hold regular status meetings during the event for each functional area to provide updates and description of needs. As the event

winds down, determine what items remain (financial documents, Claims reports, incident detail reports (legal), and logistics.

APPENDIX O: EVACUATION ROUTE MAP

Legend

- Rally_Points
- ECO - Structures
- Evacuation Routes

ECO - TieLines

TYPE

- OVERHEAD
- UNDERGROUND
- Substation Areas

Path: W:\Taskers\2012\12-0004 Safety Coordination Pre-Construction\12-0004 Overview_Draft_map_for_safety_rev1.mxd

APPENDIX P: EMERGENCY CONTACT INFORMATION

Appendix P – Emergency Contact Information

East County Substation Project
Emergency Contact Information

Employee Name: _____

Employee Cell Phone: (_____) _____ - _____

Current Street Address: _____

City, State, Zip _____

Permanent Street Address: _____

City, State, Zip: _____

Employer: _____

Supervisor's Name: _____

Supervisor's Cell Phone: (_____) _____-_____

Friend/Co-worker's Name: _____

Friend/Co-worker's Cell Phone: (_____) _____-_____

Family Emergency Contact Name: _____

Relationship: _____Cell Phone: (_____) _____-_____

Name of Nearest Relative NOT living with Employee: _____

Relationship: _____Cell Phone: (_____) _____-_____

Employee's Signature: _____date: _____

APPENDIX Q: PROJECT SECURITY PLAN

Appendix Q
East County Substation Project
Project Security Plan

1.0 Yard/Site Protection – Power Sources

The site/yard power source should have adequate protection from theft or vandalism.

2.0 Establish an End of Day Security Check Routine

The end-of-day routine is recommended and best enforced by the person who is responsible for jobsite loss-prevention. An end-of-day security routine should include locking all access points to the site, ensuring that all materials, ignition access, and equipment are accounted for and locked down, and that all Conex boxes are secured. The posting of security personnel is recommended for site/yards.

3.0 Disabling Equipment at Night and During the Weekend

Disabling tools should be considered during periods of inactivity such as overnight. This may include such actions as battery removal, securing ignition locks, removing spark plugs, and utilizing locking fuel caps. Key boxes should be removed from the site if possible. Keys should not be left at the site 'hidden' in the vehicle. Recognized protocols for immobilizing vehicles are recommended.

4.0 Yard/Site Security

Where fencing is installed to prevent unlawful access to a site and or yards, minimal access points should be developed and maintained. Proper security of the site/yards should include consultation with the Project Security Coordinator.

Storage areas often require lights, video cameras, and motion detectors. Lighting should follow the Project Construction Lighting Mitigation Plan. The top of the fencing should be constructed to prevent unauthorized access. All aspects of safety and security risks should be considered to ensure adequate and qualified security personnel are placed where appropriate. When guard service at a site is used to perform access control and asset protection, and it is deemed appropriate, 24 hour coverage should be considered.

5.0 Security Guard Services

- Notification of the placement of qualified guards along the ROW or related sites must be made to the security coordinator on a timely basis. Contact information for the guards will be supplied to the security coordinator. The security coordinator will inform the project operations base of any changes.
- Guards must be issued an appropriate cell phone or radio for communications with the operations base.
- Guards will be offered suitable protection from environmental conditions.
- General Duty Protocols for the guards must be reviewed by the security coordinator and when possible be reviewed regularly with the contractor and security coordinator.

- Guard Station protocols must be established—preferably by the guard service and approved by the security coordinator.
- Guards will document incidents. Immediate notifications established in the guard protocols will be made. These incidents will be documented and reviewed by the guard service within the next day and submitted to the security coordinator. Routine reports must be reviewed by the guard service on a weekly basis and maintained by the guard service until the end of the project.
- Guard supervisors will inspect the guards on a periodic basis as designated and approved by the security coordinator. Supervisors will review the logs, inspections, and incidents and should submit a summary to the security coordinator on a timely basis as set by the security coordinator.

6.0 Right-of-Way: Motor Vehicles

Operators of motor vehicles in construction yards and along the ROW must possess a valid Driver's License for the type of vehicle at the time of operation by the operator.

Motor vehicles must be properly maintained for the road as well as the ROW.

Operators must follow Rules of the Road as well as obey the posted speed limit.

- 15 MPH on access roads
- 5 MPH in construction yards

When operating any motor vehicle, all distractions, including texting and talking on a cell phone, must be avoided.

7.0 Reporting Requirements

Incidents of thefts, hostile incidents, vandalism, or 'sensitive customer' issues should be reported to project security as soon as possible but no later than 24 hrs after they are discovered. Reports may be made via telephone if necessary.

Employees terminated for theft or hostile acts, incidents involving hostile employees, or criminal acts must be reported immediately. These employees will not be allowed to work on SDGE properties for any contractor.

All project keys, badges, and/or other project access identifiers used by former employees must be returned to the office of the Security Coordinator.

8.0 Gate Protocols

Lock/secure gates after entering. Gates should only be left open if workers are immediately present to control access through the gate. Gates should not be 'dummy locked' without prior approval.

Ensure the gate lock is in the proper daisy chain or locking tab order. Remember, after removing the lock; replace the same lock, in the same position. Do not use any other securing devices or ropes other than the approved locking system to secure the gate.

Keys may be distributed to project personnel on a limited basis as needed and returned upon leaving the project. Keys will be disseminated by Project Security or their designated representative.

9.0 Personal Awareness Advisory

Personal safety is based on one simple concept...**prevention**.

10.0 Security Awareness

- Call Base to report suspicious persons or activity in or around your worksite.
- Avoid walking alone at night unless absolutely necessary.
- Walk purposefully, know where you are going, and project a no-nonsense image.
- Avoid potentially dangerous situations. Avoid distractions like cell phone use without scanning your immediate area occasionally.
- If you feel threatened, leave the area, locate an emergency phone, call Base or 9-1-1
- Have your car door keys ready; as well as your cell phone at the ready.

11.0 Contact and Reporting Information

- ECO Base –Phone # 619.717.8118

- SDG&E Security Coordinator – Jack Strumsky
  Phone # 858.740.1519
  jstrumsky@semprautilities.com

- SDG&E Security Agent – Andrew Kincaid
  Phone # 213.798.8331
- SDG&E Security Agent – Charles Gouge
  Phone # 619.609.6397
- SDG&E Project Safety Lead – Mike Toby
  Phone # 619.209.9076

ATTACHMENT C: BETA HEALTH AND SAFETY PLAN

Beta Engineering
4725 Highway 28 East
Pineville, LA 71360
phone 318.487.9599
fax 318.442.1741
betaengineering.com

EAST COUNTY PROJECT
SAN DIEGO GAS & ELECTRIC COMPANY

BETA PROJECT NOs. B533 & B567

SAFETY & HEALTH PROGRAM

BETA DOCUMENT NO. B533-SHP
REVISION 4
NOVEMBER 15, 2012

1. Safety and Health Overview

SAFETY AND HEALTH MISSION STATEMENT

Beta Engineering
4725 Highway 28 East
Pineville, LA 71360

phone 318.487.9599
fax 318.442.1741
betaengineering.com

The safety and health of each employee of Beta Engineering and those of its subcontractors will not be compromised for profit or production. This Safety and Health Program must be followed by all Beta Engineering employees and the employees of its subcontractors.

Beta Engineering recognizes that safety is an integral part of production efficiency. Beta intends to maintain a safety and health program consistent with the best practices of construction.

All employees, contracted services personnel, and vendors are expected to work safely and to be productive in the protection of themselves and others. The commitment to this program by all levels of the organization must be firm, aggressive, and communicated to all employees.

Beta's management recognizes that accidents and injuries are best eliminated by eliminating the causes. We are committed to the dedication of adequate time and resources for the continuous improvement in preventing accidents and injuries and improving the environment that promotes employee health and safety. Beta's management is also committed to providing the necessary training to meet the needs of the safety program.

All supervisory personnel understand and accept accountability for preventing injuries and occupational illnesses to the people they supervise. The supervisors are responsible for developing a positive attitude towards safety and health in themselves and those they supervise.

Employees and other personnel are accountable to know and follow safety policies and procedures. All equipment will be designed, maintained and operated in a manner to assure compliance with the safety and health requirements of our industry.

Beta Engineering

Marvin H. Veuleman, Jr.
President

1. SAFETY AND HEALTH OVERVIEW

The Beta Engineering Safety and Health Program will be enforced and followed by the direction of the Director of Construction and Safety: Mike Melder.

1.1. SAFETY AND HEALTH PROGRAM

1.1.1. Purpose

The purpose of this program is to reduce the potential of injuries occurring to Beta Engineering personnel and their subcontractors and to protect the public, buildings, equipment, materials and other assets from injury or damage.

1.1.2. Policy

This plan covers Beta Engineering, employees, subcontractors and visitors to the work site. It is the policy of Beta Engineering to furnish a safe work place and to prevent injuries not only to Beta Engineering employees, but to protect all subcontractors and the general public as well. This Health & Safety Plan incorporates several attachments. Where there are inconsistencies between the plan and the attachments, the most stringent requirement will apply to the safety requirements for this project.

1.1.3. General

Beta Engineering management must be satisfied that their employees and subcontractors are not only capable of accomplishing the required job, but the project must also be able to be completed safely. Beta Engineering, its subcontractors and visitors to the site must demonstrate a positive safety attitude, a thorough working knowledge of applicable regulations, and a willingness to cooperate and to accept health, safety and environmental issues as an equal operating partner with cost, quality and schedule.

1.1.4. Imminent Danger Situations

Beta Engineering expressly authorizes all employees to halt any operation of the company where there is danger of serious personal injury from hazards.

1.2. EMPLOYEE RIGHTS AND RESPONSIBILITIES

1.2.1. Management Responsibilities

1.2.1.1. Establish rules and programs designed to promote safety and make known to all employees the established rules and programs.

1.2.1.2. Provide all supervisors with copies of appropriate rules and regulations.

1.2.1.3. Make available training necessary for employees to perform their tasks safely.

1.2.1.4. Provide protective equipment for employees to perform their tasks safely.

1.2.1.5. Impress upon all the responsibility and accountability of each individual to maintain a safe workplace.

1.2.1.6. Record all instances of violations and investigate all accidents.

1.2.1.7. Discipline any employee disregarding this program.

1.2.1.8. Require all subcontractors, as a matter of contract, and all material suppliers, through purchase order terms, to follow safety rules.

1.2.1.9. Encourage all prime contractors to work safely.

1.2.1.10. Appoint a company employee with enforcement authority over safety matters.

1.2.1.11. Conduct safety inspections of all the company's jobsites, maintain records, and continually monitor the program for effectiveness.

1.2.2. Construction Manager/Safety Manager Responsibilities

1.2.2.1. Plan production so that all work will be done in compliance with established safety regulations.

1.2.2.2. Be responsible for on-the-job safety and health and secure the correction of safety deficiencies.

1.2.2.3. Make sure proper safety materials and protective devices are available and used and all equipment is in safe working order.

1.2.2.4. Instruct foreman in safety requirements.

1.2.2.5. Review accidents, supervise correction of unsafe practices, and file accident reports.

1.2.2.6. Conduct jobsite safety meetings and provide employees with proper instruction on safety requirements.

1.2.2.7. Require conformance to safety standards from subcontractor.

1.2.2.8. Notify company office of safety violations

1.2.2.9. Provide for the protection of the public from company operations.

1.2.2.10. Ensure the safety and protection of others present on the site, including Beta Engineering its subcontractors, the general public, visitors, and the employees of other contractors.

1.2.3. Subcontractor Foreman Responsibilities

1.2.3.1. Carry out safety programs at the work level.

1.2.3.2. Be aware of all safety requirements and safe working practices.

1.2.3.3. Plan all work activities to comply with safe working practices.

1.2.3.4. Instruct new employees and existing employees performing new tasks on safe working practices.

1.2.3.5. Install and maintain devices to protect the public from company operations.

1.2.3.6. Make sure protective equipment is available and used.

1.2.3.7. Make sure work is performed in a safe manner and no unsafe conditions or equipment are present.

1.2.3.8. Correct all hazards, including unsafe acts and conditions which are within the scope of your position.

1.2.3.9. Secure prompt medical attention for injured employees.

1.2.3.10. Report all injuries and safety violations to Beta's Construction Safety Manager.

1.2.4. All Personnel Responsibilities

1.2.4.1. Strive to make all operations safe.

1.2.4.2. Maintain mental and physical altitude conducive to working safely.

1.2.4.3. Keep all work areas clean and free of debris.

1.2.4.4. Assess results of your actions on the entire workplace. Work will not be performed in ways that cause hazards for yourself or others.

1.2.4.5. Before leaving work, repair or adjust the location of safety precaution signs that were moved or damaged during work activities. Unsafe conditions will not be left to imperil others.

1.2.4.6. Abide by the safety rules and regulations of every construction site.

1.2.4.7. Work in strict conformance with federal, state, and local regulations.

1.2.4.8. Pay attention during all safety training and safety meetings.

1.2.4.9. Clean, maintain, and inspect any tools and personal protective equipment assigned to you on the job.

1.2.4.10. Notify your supervisor and/or Safety Manager whenever conditions of the site change that you think warrant re-evaluation.

1.2.4.11. Look out for your “buddy” on site and notify him/her of any unsafe condition and evacuate together when necessary.

1.2.4.12. Protect yourself and notify your supervisor whenever you think an unsafe condition exists or an unsafe act is being performed.

1.2.4.13. Attend training to keep yourself aware of the hazards on the job and about personal protective equipment used on the job.

1.2.4.14. Report injuries and seek medical treatment promptly when injured.

1.2.4.15. You have the responsibility, as a condition of employment, to read and sign an acknowledgment that you will follow Beta Engineering’s safety rules. These rules have been developed for the safety of yourself and your co-workers and have been deemed appropriate for you to implement and follow. If, however, you feel that you are incapable of following any rule you may contact the Safety Manager for clarification.

1.2.5. Subcontractor and Supplier Responsibilities

1.2.5.1. Abide by all safety rules.

1.2.5.2. Notify all other contractors when their activities could affect the health or safety of others.

1.2.5.3. Check in with jobsite supervision before entering the jobsite.

1.2.5.4. Inform controlling contractor of all injuries to workers.

1.2.5.5. Report to controlling contractor any unsafe conditions that comes to your attention.

1.2.6. Architects, Engineers, Beta Engineering its Subcontractors, and Visitors

1.2.6.1. Abide by all safety rules.

1.2.6.2. Inform Construction Manager before entering a construction jobsite.

1.2.6.3. Check in with the Construction Manager so personal protective equipment may be issued such as hard hats, eye protection and respirators, if necessary.

1.2.7. All Personnel Rights

1.2.7.1. You have the right to a safe and healthy work place, and protection against physical, chemical, and biological hazards.

1.2.7.2. You have the right to specialized personal protective equipment when working around flammable materials.

1.2.7.3. You have the right to "intrinsically safe" tools and equipment when working around flammable materials.

1.2.7.4. You have the right to training about hazards of your job so that you can work safely and productively.

1.2.7.5. You have the right to know about toxic substances that you may encounter when working on the job.

1.2.7.6. You have the right to refuse to work if the assignment is immediately dangerous to life or health (IDLH).

1.2.7.7. You have the right to be provided appropriate training to safely conduct your work tasks.

1.2.7.8. You have the right to file a safety complaint with OSHA and to remain anonymous when filing the complaint. You also have the right to talk to an OSHA Inspector (Compliance, Safety and Health Officer, CSHO) in private on an OSHA inspection.

1.2.7.9. You have the right to see posted citations stating violations of OSHA standards that Beta Engineering may receive. You also have the right to know when the hazards (violations) have been fixed (abated).

1.2.7.10. An OSHA 300 Log records all injuries which are OSHA recordable and shall be posted in a highly visible area in the office and work areas of Beta Engineering.

1.3. SAFETY ORGANIZATION

1.3.1. Construction Safety Manager- The Construction Safety Manager responsibilities include: enforcement of the Safety and Health Program, site inspections and site supervision for Haz-Mat release incidents. The Safety Manager reports to the Project Manager and to the Director of Construction and Safety.

1.3.2. Construction Manager - The Construction Manager's responsibilities include: Coordination of construction activities, safety and quality assurance for all active construction sites through the supervision of, and communication with, the construction managers.

1.3.3. Project Manager- The Project Manager assumes the overall responsibility for the safety program under their direction.

1.4. SAFETY GOALS

In keeping with the philosophy of this project as described, each subcontractor shall put forth its best effort to attain the following goals:

1.4.1. A Lost Time Incident Rate (LTIR) as defined by OSHA of 0.00 for the total project.

1.4.2. A Recordable Incident Rate (RIR) as defined by OSHA of 2.0 or less for the total project.

1.4.3. Zero Property Damage - This includes the Beta Engineering's property, equipment, buildings, vehicles, etc. as well as all contractor furnished equipment, vehicles, tools, materials, etc.

1.4.4. Drug Free Workplace

Beta Engineering is committed to providing a safe drug-free work place for all employees and subcontractors working on this project. Therefore, all employees and

subcontractors on this project shall be subject to drug and alcohol testing. A urine drug screen and alcohol test may be administered under the following circumstances:

1.4.4.1. Pre-hire/Initial Employment drug screening.

1.4.4.2. Existing employees, non-bargaining and bargaining unit of contractors, subcontractors, OEMS (Original Equipment Manufacturers Representatives), and other third parties transferred from another location to work on this project.

1.4.4.3. Testing for cause-observed behavior, post-accident as requested.

1.4.4.4. Periodic testing: All employees once per year, announced.

1.4.4.5. Random testing: Random selection of employees, unannounced.

1.4.4.6. Positive test results will lead to immediate removal from the site.

1.4.4.7. No alcoholic beverages, containers, or drug paraphernalia are permitted on the project site. Possession, control, sale, or distribution of these substances will result in immediate removal from the site.

1.5. GENERAL PROJECT SAFETY RULES

1.5.1. Access to this project is restricted to employees and those authorized by Beta Engineering. All subcontractors will be authorized to work within a specified area of this project. Any subcontractors or their employees who are in an unauthorized area of the project or who are not being escorted by an authorized Beta Engineering representative, will be removed from the site.

1.5.2. Each Subcontractor shall be responsible for ensuring that the project construction supervisor is competent in speaking, reading and writing the English language. If there are employees on-site that do not speak, read or write the English language, that subcontractor shall ensure that there is a sufficient number (at least two) of employees that can communicate English between the non-English speaking employees.

1.5.3. No personal audio devices are allowed on site.

1.5.4. No glass containers are allowed on site.

1.5.5. Unless otherwise posted the speed limit is 10 mph on the project site.

1.5.6. Only authorized and trained persons are permitted to operate equipment.

1.5.7. No riders on machinery or equipment. Riders in trucks are to be seated, in a seat while the vehicle is moving. No employees may be transported in the back of a pick-up truck at any time.

1.5.8. All mobile machinery must have operable backup alarms at ALL times.

1.5.9. No one shall enter a trench or excavation unless it is inspected by a competent person and properly shored or sloped.

1.5.10. Only trained, qualified operators will use power-actuated tools, and only when proof of training is readily available.

1.5.11. Each subcontractor will be responsible for maintaining a complete first aid kit in their field office and/or "gang-box(s)", and have a qualified person to use it.

1.5.12. Report all accidents, unsafe conditions or practices immediately to your supervisor and the Construction Manager. The Construction Manager Shall immediately report all accidents and /or unsafe conditions to the Construction Safety Manager or SDG&E Base as appropriate.

1.5.13. Private owned vehicles must be parked in designated parking areas only. POV designated parking areas will be relocated from time to time as the project progresses. . All company vehicles shall be identified by a subcontractor's name. No contractor vehicles (trucks) allowed on site without prior authorization from Beta Engineering.

1.5.14. All electrical cords and power tools are to be regularly inspected with a written record submitted to the Construction Manager on a monthly basis. Defective tools and equipment are to be tagged "Defective" and removed from service immediately.

1.5.15. All wire, synthetic, or chain slings shall be inspected before each use.

1.5.16. Each Contractor shall be responsible for providing and distributing clean drinking water for its employees.

1.5.17. Each Contractor shall be responsible for providing adequate and clean sanitary facilities for its employees.

1.5.18. Adequate temporary lighting is to be installed in accordance with all federal, state and local governmental regulations.

1.5.19. Any subcontractors performing, involved in, or participating in any of the following unsafe and improper behavior will be subject to discipline up to and including removal from the jobsite.

1.5.19.1. Under the Influence: Entering or being found within the project worksite while under the influence of, or in the possession of intoxicating liquor or controlled substances.

1.5.19.2. Unauthorized photos or videos: Taking photos or videos of site, equipment, or personnel without the consent of Beta Engineering or SDG&E.

1.5.19.3. Stealing: Unauthorized removal, attempted removal, or possession of property belonging to someone else or to Beta Engineering.

1.5.19.4. Fighting: On company property.

1.5.19.5. Dangerous Weapons: In possession of guns or dangerous weapon while on site.

1.5.19.6. Property Damage: Willful damage to equipment, buildings, or other project property.

1.5.19.7. Adjacent Property: Trespassing, disturbance of property, animals, structures, or equipment of property outside of the project construction limits.

1.5.19.8. Sleeping: During working hours.

1.5.19.9. Horseplay: Scuffling, pranks, wrestling, or throwing material at others.

1.5.19.10. Insubordination: Refusal to perform a safe work assignment given by a supervisor.

1.5.19.11. Infectious Disease: Knowingly harboring a disease that can be transmitted through workplace contact.

1.5.19.12. Visiting Other Operations: Do not visit other operations if work does not require you to do so.

1.5.19.13. Housekeeping: Willful littering, writing, defacing, or other poor housekeeping actions to equipment, buildings, locker room/toilet facilities, or other project property

1.5.19.14. Unsafe Act: Willful actions which place yourself or coworkers in an unsafe working environment or situation.

1.5.19.15. Absence: Repeated unauthorized absence from job.

1.5.19.16. Profanity: Threatening other employees by profane and abusive language.

1.6. EMERGENCY PROGRAM

1.6.1. Emergency Response Procedures

In order to facilitate a prompt and orderly response to site emergencies, all subcontractors shall comply with emergency procedures as outlined in the Medical Emergency Response Procedure, Fire and Hazardous Material Spill Response Procedure.

1.6.2. Medical Emergency Response Procedures

1.6.2.1. If an injury occurs which requires emergency assistance, the subcontractor should use their in-house system to alert their supervisors of the situation.

1.6.2.2. During normal hours the subcontractor shall alert the Construction Safety manager or SDG&E Base as appropriate. If injury occurs after hours, the subcontractor shall alert the on-site supervisor. The individual should be prepared to provide the type of emergency, severity of emergency, name and contact information of the person making the call. The individual shall not break communication until directed.

1.6.3. Emergency Response Plan

1.6.3.1. If a fire or hazardous material spill occurs, the contractor shall use their in-house emergency notification system to alert their supervisor of the situation.

1.6.3.2. Minor Emergency - If safe to do so and the subcontractor's employees have been properly trained they should assess the situation and extinguish the fire or clean up the spill. The subcontractor must then report the incident to the Safety Department.

1.6.3.3. Major Emergency - During normal working hours the sub-contractor shall alert the site security department and inform them of the situation. If the fire or spill occurs after hours, the subcontractor shall call the on-site supervisor to summon the site emergency response team. The individual should be prepared to provide the type of emergency, location, severity of emergency, name and contact information of the person making the call.

The individual shall not break communication until directed.

1.6.3.4. Based on the magnitude of the emergency, the on-site supervisor or designate shall summon the appropriate off-site assistance.

1.6.3.5. If the emergency is of a magnitude that requires an evacuation of employees, the on-site supervisor or designate shall inform the Construction Manager and the Safety Department.

1.6.3.6. The construction work force shall be notified to evacuate by direct radio communication from the Construction Manager.

1.6.3.7. Upon hearing announcement or given direction, all personnel shall report to the site evacuation area (unless otherwise directed).

1.6.3.8. All subcontractors are held responsible to account for all of their personnel and are to report any missing personnel. This information will be relayed to the emergency response team.

1.6.3.9. All personnel shall remain in the designated evacuation area until released by the Construction Manager.

1.7. First Aid Program

This program covers minimum performance standards applicable to all employees and locations. Local practices requiring more detailed or stringent rules or local, state or other federal requirements regarding this subject can and should be added as an addendum to this procedure as applicable.

Each jobsite must ensure that first aid supplies are readily available to all employees in case of accident. This includes identifying and posting the location of a designated medical treatment facility and/or emergency care center in a conspicuous location at each fixed location or fixed jobsite. Should outside medical services be unable to respond in a reasonable amount of time as defined by OSHA (3 to 4 minutes), the jobsite may use various strategies to provide access within this time frame.

1.7.1. **Established Medical Treatment Facility** means the occupational medical treatment provider and/or emergency care center identified as being capable of, and established to treat employee injuries and illnesses.

1.7.2. **First Aid** includes the following types of treatment:

1.7.2.1. Using non-prescription medications at non-prescription strength

1.7.2.2. Cleaning, flushing, or soaking wounds on the skin surface

1.7.2.3. Using wound coverings, such as bandages, ‘BandAids’, gauze pads, etc., or using ‘SteriStrips’ or butterfly bandages

1.7.2.4. Using hot or cold therapy

1.7.2.5. Using any totally non-rigid means of support, such as elastic bandages, wraps, etc.

1.7.2.6. Using temporary immobilization devices while transporting an employee, such as splints, slings, neck collars, or back boards

1.7.2.7. Drilling a fingernail or toenail to relieve pressure, or draining fluids from blisters

1.7.2.8. Using eye patches

1.7.2.9. Using simple irrigation or a cotton swab to remove foreign bodies not embedded in or adhered to the eye

1.7.2.10. Using irrigation, tweezers, cotton swab or other simple means to remove splinters or foreign material from areas OTHER than the eye

1.7.2.11. Using finger guards

1.7.2.12. Using massages

1.7.2.13. Drinking fluids to relieve heat stress

1.7.3. **Illness**: a skin disease/disorder, respiratory condition, poisoning, or other illnesses resulting from an event in the work environment. Examples include, but are not limited to:

1.7.3.1. Contact dermatitis

1.7.3.2. Eczema

1.7.3.3. Silicosis

1.7.3.4. Asbestosis

1.7.3.5. Toxic inhalation

1.7.3.6. Poisonings by lead, mercury, or other metals

1.7.3.7. Poisonings by carbon monoxide, hydrogen sulfide, or other gases

1.7.3.8. Poisonings by organic solvents or by other chemicals

1.7.3.9. Heatstroke, sunstroke, heat exhaustion, or other heat-related factors

1.7.3.10. Freezing, frostbite, or other cold-related factors

1.7.3.11. Effects of Non-ionizing radiation (welder's flash or lasers)

1.7.3.12. Bloodborne Pathenogenic diseases

1.7.3.13. Microbial Exposure

1.7.3.14. Ionizing Radiation

1.7.4. **Injury**: any wound or damage to the body resulting from an event in the work environment. Examples include:

1.7.4.1. Cut/laceration

1.7.4.2. Puncture

1.7.4.3. Abrasion

1.7.4.4. Contusion/bruise

1.7.4.5. Fracture

1.7.4.6. Chipped tooth

1.7.4.7. Amputation

1.7.4.8. Insect bite

1.7.4.9. Electrocution

1.7.4.10. Thermal, chemical, electrical or radiation burn

1.7.4.11. Sprain/strain injuries to muscles, joints and connective tissues which results from a slip, trip, fall or other similar accident

1.7.5. **Medical Treatment**: the managing and caring for a patient for the purpose of combating disease or disorder. The following activities are NOT medical treatment:

1.7.5.1. First aid

1.7.5.2. Visits to a doctor solely for observation or counseling

1.7.5.3. Diagnostic procedures, including administering prescription medications that are used solely for diagnostic procedures

1.7.6. **Work-related Injury or Illness**: an injury or illness resulting from an event or exposure in the work environment causing or contributing to the condition or significantly aggravating a preexisting condition.

1.7.7. **Work Environment**: work sites where one or more employees are present as a condition of their employment.

1.7.8. **Requirements for Designated Medical Treatment Facility**

1.7.8.1. Beta Engineering will ensure that medical personnel are readily available to employees to provide advice and consultation within reason regarding matters of employee occupational health.

1.7.8.2. Each fixed facility and fixed jobsite must identify and post the location of a designated medical treatment facility and/or emergency care center including name, address, telephone numbers, and hours of operation. This information shall be posted in a conspicuous location at each fixed facility or fixed jobsite. The designated medical treatment facility or emergency care center should maintain similar hours of operation as the facility and be able to respond to a workplace emergency within a reasonable amount of time.

1.7.8.3. The construction safety officer shall post the emergency procedures and phone numbers, in a conspicuous location at each fixed facility or fixed jobsite. Many medical providers have and will provide their own posting. The Safety Officer must determine if the posting has the necessary elements needed to inform employees regarding the designated medical treatment facility.

1.7.9. First Aid

1.7.9.1. **ALL INJURIES, REGARDLESS OF HOW SMALL, MUST BE REPORTED TO THE EMPLOYEE'S IMMEDIATE SUPERVISOR AND TREATED AS SOON AS POSSIBLE AFTER AN ACCIDENT.**

1.7.9.2. If an employee becomes injured or ill anywhere due to a work-related or non-work related problem and needs immediate medical aid, it must be reported to his/her Supervisor or the Safety Officer. Failure to report minor injuries or to receive supervised medical treatment may result in serious infections or complications to the employee's health.

1.7.9.3. In the absence of a clinic or hospital near the workplace, OSHA regulations require that a person or persons be trained to render first aid and that first aid supplies be readily available. Although the term "readily available" has not been defined in the regulations, OSHA has indicated that 3-4 minutes is acceptable as the time frame within which to begin first aid.

1.7.9.4. OSHA's interpretation presents a challenge because our "workplace" is not always in a fixed location; it is a changing environment that follows the employee wherever they may be working. Accordingly, Beta will use various strategies to provide employees with access to First Aid. These may include training personnel to self-administer First Aid; training personnel who are willing to serve as "first responders" and render First Aid/CPR to others on a voluntary basis; providing access to trained individuals from other companies who work at jobsites (especially construction sites); providing access to client medical clinics; or calling 9-1-1 or local emergency phone numbers as indicated in the posted Health and Safety Plan.

1.7.9.5. Because of the potential for exposure to bloodborne pathogens and significant liability concerns, there is no job in the Company that requires an employee to render First Aid or cardiopulmonary resuscitation (CPR) in the course and scope of their employment, unless such a requirement becomes necessary due to local, State or Federal Safety and Health Regulations.

1.7.9.6. Transportation of injured persons will be by ambulance unless a volunteer chooses to assist by driving the injured employee to a medical facility. If there is any question as to the best method of transportation an ambulance should be utilized.

1.7.9.7. When Beta's strategy for providing access to First Aid/CPR involves the use of "first responders", a First Responders Program should be established and administered at the local level. The Safety Officer is responsible for monitoring and maintaining this program, if implemented.

1.7.10. **Elements of the First Responder Program should include:**

1.7.10.1. Safety Officer must be certified in basic First Aid & CPR per a recognized certification source such as the Red Cross, local hospital, etc. The Red Cross first aid course and CPR course are approximately 8 hours in duration. CPR requires annual refreshers. First Aid requires refreshers every three (3) years.

1.7.10.2. Branch Safety Officer will seek employees who wish to volunteer to be trained and certified in basic First Aid & CPR per a recognized certification source as defined by local or State requirements. These employees must maintain "current" First Aid and CPR certification, appropriately documented, in their personnel file.

1.7.10.3. Basic First Aid & CPR will be administered by First Responders only to stabilize the employee until professional medical attention can be provided.

1.7.10.4. Due to the potential occupational exposure to First Responders, it is the responsibility of the Safety Officer or his/her designee to develop and follow an Exposure Control Program, where and to the extent such a program is required by OSHA 29CFR 1910.1030 - Bloodborne Pathogens Standard. (This program is not required unless First Aid/CPR response is a required part of an employee's job description and function at Beta. However, we will still encourage Voluntary Responders to learn and follow universal precautions.)

1.7.11. **Employee First Aid / CPR**

1.7.11.1. Employee training in basic First Aid and cardiopulmonary resuscitation (CPR) is encouraged because of its value and benefit to individuals, their families and the community.

1.7.11.2. The company also supports any employee who, while on the job, chooses to act as a "Good Samaritan" to assist a fellow employee or another person with First Aid or CPR. It is Beta's intent that first Aid supplies and basic personal protective equipment against bloodborne pathogens be accessible to employees at every work site during all shifts.

1.7.11.3. If an employee makes the decision to provide first aid to someone, universal precautions shall be followed and it should be assumed that all blood and bodily fluids are contaminated with bloodborne pathogens. In addition, they should wear protective medical gloves found in the First Aid Kit and use any other personal protective equipment (such as protective glasses with side shields or a full face shield) to help avoid exposure to blood in the eyes or on the face.

1.7.11.4. First Aid providers should follow the example of emergency medical personnel, doctors and nurses who wear personal protective equipment to prevent exposure to bloodborne pathogens.

1.7.11.5. If blood or potentially contaminated material gets on the skin, it must be washed off immediately using water and a non-abrasive soap. If available, an antiseptic soap or rinse must be used. If blood ever gets in the eyes, lips, mouth or nose, the employee must go to a sink, water fountain, eye wash or body wash station and flush the area with running water as quickly as he/she can.

1.7.11.6. The supervisor must always be aware of the potential exposure to a bloodborne pathogen after the employee has washed or flushed the exposed area. Decontamination of the exposed surfaces, tools and equipment should be conducted. This must be done immediately, and no later than the end of the shift or work period. Remember that there is a vaccine for Hepatitis B. This must be discussed with a physician as soon as possible after a potential exposure.

1.7.12. **First Aid Stations / First Aid Kits**

1.7.12.1. A First Aid Station or First Aid Kit is to be readily available to employees as described previously. For employees working off-premises, a first aid kit should be provided in each company vehicle, signed-out for use when traveling in personal vehicles and rental vehicles, or provided on the jobsite.

1.7.12.2. Whether within the facility or in a vehicle, each First Aid Kit must be stored in a properly labeled weather-proof container, stocked with the basic supplies. The safety officer will designate who will is responsible for inspecting and how often kits will be inspected. The physician's approval of the inventory list is not required, but may be needed to address unusual exposure situations. Each First Aid kit will have the following items:

- Gauze pads (at least 4 x 4 inches).
- Two large gauze pads (at least 8 x 10 inches).
- Box adhesive bandages (band-aids).
- One package gauze roller bandage at least 2 inches wide.
- Two triangular bandages.
- Wound cleaning agent such as sealed moistened towelettes.
- Scissors.
- At least one blanket.
- Tweezers
- Adhesive tape.
- Latex gloves.
- Resuscitation equipment such as resuscitation bag, airway, or pocket mask.
- Two elastic wraps
- Splint.
- Directions for requesting emergency assistance.

1.7.12.3. **IMPORTANT**: If an employee declines First Aid and/or medical treatment for a reported on-the-job injury after the Supervisor recommends it, that employee should NOT be allowed to continue work. Supervisors should

discuss each situation with the Safety Officer or Project Manager before allowing that employee to return to duty.

1.7.12.4. The Safety Officer, or someone he/she may designate, is responsible for checking and maintaining the First Aid Cabinets. Supervisors on jobsites are responsible for assuring suitable supplies are provided in the first aid kits on-site or in their vehicles. This person will take a weekly inventory of supplies and make sure the station or kit remains adequately stocked.

1.7.12.5. Because of the variety of operations that the company is involved in, it is suggested that consultation with the Facility's designated medical treatment facility be arranged to determine if the First Aid Kits are adequate for the operational exposures of your particular workplace.

1.7.13. **Emergency Eye / Body Wash Stations**

1.7.13.1. Where the eyes and/or body of any employee may be exposed to injurious chemical / corrosive materials, suitable eye and/or body drenching and/or flushing facilities shall be provided. Emergency eye and/or body wash stations can be either of temporary or permanent installation.

1.7.13.2. In areas where the extent of possible exposure to injurious chemical / corrosive materials is very low, a specially designated pressure controlled and identified water hose can be used when proper personal protective equipment also is used (e.g. full face shield). The hose system must be equipped with a proper face and body wash nozzle and provide copious amounts of low velocity potable water. An appropriate portable eye wash device containing not less than one gallon of potable water, would also be acceptable under these conditions.

1.7.13.3. At locations where hazardous chemical / corrosive materials are handled by employees (e.g. battery servicing facility), proper eyewash and body drenching equipment must be available. Although OSHA has not adopted specific requirements regarding flow rates for drenching/flushing facilities, ANSI Z358.1 provides detailed information regarding the installation and operation of emergency eyewash and shower equipment, including the requirements for flow rate.

1.7.13.4. Section 4.1 of ANSI Z358.1 specifies that emergency shower heads shall be capable of delivering a minimum of 20 gallons per minute (gpm) of flushing fluid at a velocity low enough to be non-injurious to the user. A sufficient volume of flushing fluid shall be available to supply the flow rate for a minimum fifteen minute period. As such, both temporary and permanently installed eye / body wash stations must provide at least 20 gpm for 15 minutes.

1.7.13.5. Inspection and maintenance of eye wash systems should be provided at least weekly by assuring sanitary conditions and /or following the manufacturer's requirements for maintenance. Plumbed systems should also be provided a water flow test to minimize contaminants in the line. Inspection and maintenance should be properly documented.

1.7.14. **Bloodborne Pathogens (Universal) Precautions Training**

When an employee comes into direct contact with blood, bodily fluids or body tissues of another person, they are at risk of becoming infected with diseases that may be carried in the other person's body fluids. Accidental exposures can happen on or off the work site, in any number of day-to-day situations. This is why Beta Engineering believes that each employee should have a basic understanding and awareness of the

dangers of contracting a potentially deadly disease through such exposures. Communicating basic information about these hazards, including information contained in this program, is part of Beta's safety and health program. Therefore, employees should receive a basic awareness level training concerning "Universal Precautions" such that employees may follow Universal Precautions in the event of potential exposure to blood or other body fluids.

1.7.15. **Training Requirements**

Training records must be maintained by the Safety Officer containing the date of the training, summary of the training session, names and qualifications of the instructors conducting the training, names and job titles of the persons attending the training. Training records must be maintained for a minimum of three (3) years from the date the training was conducted. Training must be conducted by a qualified and competent person knowledgeable in the subject matter.

1.7.16. **First Responder Exposure**

If an employee is a First Responder or decides to be a "Good Samaritan" and provides first aid to an injured victim involving blood or bodily fluids, personal protective equipment must be used and Universal Precautions followed treating all bodily fluids as infectious. Refer to OSHA 29CFR 1910.1030 - Bloodborne Pathogens Standard for specific information.

First Aid Stations must at least include latex gloves, one-way valve CPR mask, biohazard bags, plastic baggies, and tongs.

1.7.17. **References**

OSHA 29 CFR 1926.50

OSHA 29 CFR 1910.151

2. Hazard Communication Program

2. HAZARD COMMUNICATION (HAZCOM) PROGRAM

2.1. Purpose

The policy of Beta Engineering is that every employee is entitled to work under the safest conditions possible. This Hazard Communication Program is to ensure that all employees are aware of the health hazards associated with chemicals and hazardous substances used at our project sites and that all employees have been trained in procedures for safely working with hazardous substances.

This program complies with the requirements of OSHA Hazard Communication Standards CFR 1926.59 and CFR 1926.21b (3). A copy of the Beta Engineering Hazard Communication Program will be available at every project site. Our Hazard Communication Coordinator will provide copies to contractors and employees for their review.

2.2. Program Coordinator Responsibilities

The Director of Construction and Safety has been designated as the Beta Engineering Hazard Communication Program Coordinator (HCPC). Every project site will also have a project site coordinator who will be the project foreman or forewoman, or his or her safety representative. The project site coordinator will be responsible for:

2.2.1. Notifying each site subcontractor about the applicability of this procedure.

2.2.2. Advising and verifying to contractors on the project site that a hazardous chemical will be introduced or is present on the site.

2.2.3. Providing Material Data Safety Sheets (MSDS) to employees, if requested.

2.2.4. Ensuring that all employees have been trained in the proper use of hazardous substances and chemicals during project tasks.

2.2.5. Verifying that all employees under his or her supervision have been informed of the hazards prior to working with hazardous substances or chemicals on the project site.

2.2.6. Verifying that containers are clearly labeled as to contents, appropriate warnings are noted, and the names and addresses of manufacturers are identified.

2.3. Inventory of Hazardous Chemicals and Substances

A list of hazardous chemicals and substances used at the project site will be submitted to the general contractor, and an updated list will be maintained as the project progresses. A copy of this list is supplied upon request by the project site coordinator or project management. The HCPC will request and maintain copies of all subcontractors' MSDS, which will be immediately available to all personnel.

2.4. Hazard Determination Procedure

Beta will rely on manufacturers' labels or MSDSs to evaluate the various hazards of chemicals used on the project site. The HCPC will accept the information provided on the MSDS. If information is missing or the manufacturer fails to supply an MSDS, the HCPC or the project site safety manager will request the information from the supplier in writing.

2.5. Labels and Other Forms of Warnings

2.5.1. Since chemical manufacturers are required to label their containers of hazardous chemicals, Beta will use these labels as our primary means of warning employees about the products. All containers received for use should be clearly labeled as to content, appropriate warnings should be noted, and the names and addresses of manufacturers should be listed.

2.5.2. The HCPC and the project site coordinator are responsible for ensuring that all containers are labeled. Labels are not to be removed from any container or defaced in any manner. If a label is missing or illegible, notify the HCPC or project site coordinator

immediately. The MSDS can serve as a temporary label that will assist employees in identifying the chemical involved with the least chance of error.

2.6. **Material Safety Data Sheets (MSDS)**

2.6.1. The original copies of the MSDS will be retained by the HCPC at the corporate office. Copies of the MSDSs for hazardous chemicals used on a specific project site may be obtained upon request them from the HCPC. Generic materials common to the majority of project sites will be included in the new project packets and the Safety Manual.

2.6.2. Each Project Manager will monitor employees under his or her direct supervision for proper training and proper precautions prior to introducing hazardous chemical to the project site. The MSDS will be the primary source of information. While all MSDSs may not be uniform in appearance, they must all contain the following information:

2.6.2.1. Identity of the product

2.6.2.2. Acute and chronic health effects and related heath information (target organ affected)

2.6.2.3. Exposure Limits Threshold Limit Value (TLV)

2.6.2.4. Carcinogenic Hazard level

2.6.2.5. Appropriate personal protective equipment to be used

2.6.2.6. Emergency and first-aid procedures

2.6.2.7. Identification of the party responsible for the MSDS

2.6.3. Subcontractors must provide an MSDS to Beta Engineering's Project Manager or Safety Manager before introducing hazardous chemical to a project site. If a subcontractor fails to do so, the Manager will require the MSDS immediately or stop work.

2.7. **Personal Protective Equipment (PPE)**

Personal protective equipment suitable for the chemical hazards will be maintained on the project site as long as the hazard exists. If respirators are required, refer to the "Respiratory Protection Program" section of this manual that addresses the use of respirators. Other PPE will be available, at no cost, to any employee exposed to hazardous materials.

2.8. **Emergency Response**

2.8.1. An emergency response plan will be prepared if hazardous materials are on site in quantities that require a plan. The plan will be prepared before the materials arrive on site and will be communicated to all affected employees. The plan will be updated as needed to ensure it is current.

2.8.2. All incidents of overexposure, spills or leaks of any hazardous material will be reported immediately. Proper spill containment and emergency care for those exposed must be provided immediately.

2.9. **Employee Information and Training**

2.9.1. Training relating to the Hazard Communication Standard (1926.59 CFR) is the responsibility of the project superintendent or the safety representative. The HCPC will assure that all requirements are followed in order to be in compliance with the law. At no time will any Beta employee be expected to perform non-routine tasks involving exposure to hazardous chemicals without proper instruction.

2.9.2. Training by the Safety Department or Project Manager will be implemented by Beta Engineering to ensure that employees handling hazardous chemicals are aware of the nature of the materials and are trained in procedures to minimize exposure to such

substances. This training will address the Requirements of the Federal Hazard Communication 1910.1200 (General Industry) and 1926.59 (Construction); both standards are identical. This requirement may be met by presentations based on MSDS videotape or similar material.

2.9.3. Monitoring and sampling will be performed to detect the presence of hazardous chemicals in quantities that could affect employees' health.

2.9.4. Location of hazardous chemicals in the employees' work location will be defined prior to any work being performed in the area.

2.9.5. Training instructors will point out specific containers, meters, pipes and so forth that contain hazardous chemicals in the work location and will explain the system being used to list hazardous chemicals.

2.9.6. As defined in 29 CFR 1910.1200 under Health Hazards, chemicals that pose health hazards meet one or more of the following definitions: carcinogen, toxic agent, corrosive, irritant, sensitizer or target organ effect (agent that damages the lungs, skin, eyes or mucous membranes).

2.9.7. Physical Hazards means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric (a chemical that will ignite spontaneously in air at a temperature of 130 degrees F or below), unstable (reactive) or water-reactive.

2.9.8. Supervisors will be furnished lists of chemicals meeting the criteria by the Safety Department. All MSDS and lists of hazardous materials will be available to all employees in their workplace.

2.9.9. Material Safety Data Sheets (MSDS) and Labels.

2.9.9.1. These shall be used as a method of conveying information about the chemicals being used. The Safety Department or instructor will present the MSDS form in detail, which may be accomplished using the video presentation entitled "Material Safety Data Sheets."

2.9.9.2. Supplemental information may be used as needed. Provisions must be made to answer questions about the form itself.

2.9.9.3. Physical and chemical hazards of the specific substances found in the employees' workplace.

2.9.9.4. The hazardous chemicals list, MSDS and labels may be used to call attention to the various hazards. Provisions must be made to answer questions about chemical properties and toxic effects.

2.9.9.5. Measures employees can take to protect themselves.

2.9.9.6. The instructor will discuss the work procedures designed to minimize exposure to hazardous chemicals. Protective clothes, if provided, must be discussed in connection with specific exposures. (It is assumed that appropriate training has been given previously for any protective equipment provided; if not, this training must be included as well.)

2.9.10. Emergency procedures in event of a spill or release of specific chemicals.

2.9.10.1. In work locations where hazardous chemicals are being handled, employees must be instructed in specific steps to minimize exposure, should an accidental release occur. The following list includes, but is not limited to, the items that will be addressed:

- Personal protective equipment for the individual employee, such as air-supplied respirator or other PPE

- Alarm to be sounded - how and when
- Procedures to halt the release, such as block valves, pump shutdown controls, etc.
- Procedures to confine or neutralize the release: curbing or diking liquids, covering spill with fire fighting foam to control vapors, etc
- Evacuation—when, where
- Warning signs or barriers to prevent inadvertent entry by persons unaware of the situation
- When re-entry is permitted
- Clean-up procedures
- Each employee shall understand his role in handling the emergency release and restoring the process to normal operation.
- Location and availability of the written Hazard Communication Program, the list of hazardous chemicals in the work location and MSDSs describing in detail the hazards associated with each of the chemicals listed.

2.9.11. An appropriate binder or file shall be provided to retain the written program, chemical lists, MSDSs and other materials directly related to this Hazard Communication Program. This file is to be accessible during working hours to all affected employees and will be located in the project site trailer and the main office.

2.9.12. The Project Manager shall advise the subcontractor of any known hazardous chemicals in the workplace to which the subcontractor's employees may be exposed. The file will be made available to the subcontractor in the workplace to assist the subcontractor in project planning and protective measures.

2.9.13. Special precautions required of Beta Engineering and its subcontractors, such as wearing of protective clothing, will be brought to the attention of the subcontractor. Training materials may be made available to the subcontractor at the discretion of local management.

2.9.14. Prior to reporting for duty, employees assigned to work at locations where hazardous chemicals are present shall receive the same training as outlined above. Training is the responsibility of the Project Manager and/or the Safety Department, but it may be conducted by qualified persons designated to train new employees. The hazardous substance training may be a part of the general indoctrination program, but each required element must be addressed.

2.9.15. Whenever a new hazardous substance is introduced into the workplace, the Project Manager will ensure that:

2.9.15.1. Prior to introduction of such a substance, the employees assigned to work in the area have been advised of the new substance, have been trained in the proper handling procedures and are aware of emergency procedures.

2.9.15.2. Material Safety Data Sheets have been added to the information binder referred to in 2.9.11 above.

2.9.15.3. Containers of the new substance are properly labeled.

2.9.16. The Project Manager will ensure that training required to meet standards or regulatory requirements concerning working with hazardous substances is documented in safety activity reports. The reports shall include but not be limited to the name and signature

of employee trained, date of training, list of topics discussed, list of audiovisual aids and/or textbooks used, and name of instructor(s).

2.10. **Material Safety Data Sheets (MSDS) document requirements**

2.10.1. The Project Manager is responsible for having a MSDS accessible at the work site for each hazardous chemical to which an employee may be exposed.

2.10.2. MSDS for products are on file and will be used.

2.10.3. The Project Manager has a responsibility to note on any requisition for chemicals whether MSDS is already on file.

2.10.4. The Purchasing Department has the responsibility to request an MSDS on any hazardous chemical purchased for which an MSDS is not already on file.

2.10.5. MSDS received with a chemical shipment or separately are to be forwarded to the Safety Department for review prior to use of the substance.

2.10.6. The Safety Department will promptly forward approved MSDS to the Project Manager for use at the project site.

2.10.7. The Project Manager will file approved MSDS in the binder described under the training paragraph 2.9.11.

2.10.8. The Project Manager is responsible for ensuring that the appropriate MSDS has been placed in the binder before any hazardous chemical is used at the project site.

2.10.9. When new and significant health information is found concerning a hazardous chemical in the project site, the MSDS will be revised by the Safety Department within 10 days. Revised copies will be distributed immediately to the Project Manager for inclusion in the binder.

2.10.10. Employees will be made aware of the significant change as soon as possible (but within 30 days) from the time the Project Manager receives the revised MSDS.

2.10.11. Certain chemical identities may be withheld from MSDS in accordance with regulations set out by Federal Standard 29 CFR 1910.1200 for Trade Secret Information. In all cases, the MSDS will detail the properties and effect of such chemicals and will be treated as any other MSDS as far as availability to employees. Questions regarding Trade Secret Information will be referred to the Safety Department or a qualified representative of Beta Engineering.

2.11. **Labeling at the Project Site**

2.11.1. The following procedures will ensure that employees are aware of hazardous chemicals that are contained in piping and storage tanks at the project site:

2.11.1.1. Each container of hazardous materials must be labeled, tagged or marked with the identity, appropriate hazard warning, and name and address of manufacturer or other responsible party. The Project Manager is responsible for ensuring that all containers of hazardous chemicals within or leaving their respective project site are adequately labeled or placarded.

2.11.1.2. Shipping containers must be placarded in accordance with Department of Transportation (DOT) regulations.

2.11.1.3. The labels on containers of hazardous substances that come into the project site must be checked for legibility by the Construction Manager.

2.11.2. To meet the Federal Hazard Communication Standard, the label affixed to a container by the manufacturer, importer or distributor must meet the following minimum requirements:

2.11.2.1. Identify hazardous chemical(s)

2.11.2.2. Show appropriate hazard warnings

2.11.2.3. May use words, pictures or symbols, as appropriate

2.11.2.4. Must be legible and in English

2.11.2.5. Contain name and address of the chemical manufacturer, importer or other responsible party

2.11.2.6. Carcinogens and other chemicals require specific labeling prescribed by OSHA standards if present in greater than 0.1% in a substance.

2.11.3. If a label is missing or illegible, the Construction Manager is responsible for obtaining and affixing a replacement label.

2.11.4. If no label, temporary or permanent, can be affixed within three days, the hazardous chemical will be removed from the project site and stored in a safe place pending disposition.

2.11.5. Portable containers need not be labeled if the chemicals are transferred from labeled containers and remain in the custody of the person who performs the transfer. Individual sample bottles need not be labeled provided the rack or carrier is labeled and the hazards associated with all containers are essentially the same.

2.11.6. Where the Project Manager deems it prudent to have warning labels on containers of hazardous materials not previously labeled, he or she should request a label from the manufacturer or distributor, or should seek the assistance of the Safety Department in generating such a label.

2.11.7. The Safety Department is responsible for annual review of labels for products being shipped from the project site and to cause any revision deemed necessary to meet current regulations or Beta Engineering policy positions.

2.11.8. The annual training will be conducted and documented by the HCPC and Project Managers. Weekly SafeTalk meetings will provide additional training and review concerning the dangers of working with hazardous chemicals.

2.11.9. Instructions and information will be provided to Beta Engineering and its subcontractors prior to the introduction of hazardous chemicals for non-routine tasks. New employees will receive training in the workplace. This training will be the responsibility of and documented by the Project Manager. When training is complete, the following “Training Certificate” will be issued to those completing the training.

2.12. **Methods to Inform Contractors about Hazards**

Information on hazardous chemicals known to be present will be exchanged with other employers. Subcontractor responsibilities are, but are not limited to:

2.12.1. Maintain a list of chemicals on the project site.

2.12.2. Submit all MSDS to Beta Engineering’s Construction Manager prior to the use of the hazardous chemical or substance.

2.12.3. Ensure all containers labeled with OSHA-required information or the container contents.

2.12.4. Train their employees in their own Hazard Communication Program.

2.12.5. Keep accurate Hazard Communication records.

2.12.6. Comply fully with the Federal or State Hazard Communication Program.

The term "contractor" as used here includes, but is not limited to, general or prime contractor, subcontractor and construction manager.

TRAINING CERTIFICATION

I have received Hazard Communication Training as described in the Hazard Communication Program.

The training was conducted on _____.
(Date)

_____
Employee Signature

_____
Social Security Number

_____
Project Site

I hereby certify that the above named employee has been provided with Hazard Communication Training on _____.
(Date)

_____
Instructor's Signature

EMPLOYEE ATTENDANCE TRAINING RECORD

The below-described Hazard Communication Training was conducted for employees and subcontractors of BETA ENGINEERING.

Description of training:

I certify that I attended the above described Hazard Communication Training.

EMPLOYEE NAME	**SIGNATURE**

I certify that the above described training was provided to employees as listed above, and that each employee signed the attendance record.

Signature

TO BE POSTED AT ALL PROJECT SITES

YOU HAVE A RIGHT TO KNOW ABOUT HAZARDOUS SUBSTANCES IN YOUR WORKPLACE

IT'S THE LAW!

The OSHA Hazard Communication Standard gives employees a way to learn about chemical hazards in the workplace and how to work safely with these materials. OSHA requires employers to inventory and list all hazardous and toxic substances used in the workplace and to collect Material Safety Data Sheets for these substances. Employers must also label or otherwise identify hazardous chemicals. Employees must know how to get information about the hazardous substances in their workplace and be trained in the safe use of these materials.

We are complying with OSHA by compiling a chemical information list and Material Safety Data Sheets, checking that containers are labeled, and providing you with training.

- **Chemical Information List:** Our Chemical Information List contains all of the chemicals we are using at _____ (this project site). A copy of this list is available at each site. Your foreman or forewoman will generally have the list and may leave it at a central location, such as a project trailer. At this project site the list is available at _____. Lists of chemicals used by other employers on the site are also available to you. Check with your project manager for access to those lists.

- **Material Safety Data Sheets:** Material Safety Data Sheets for the chemicals used on this project are available at the following location: _____. If you need to review a data sheet, please see _____.

(Name)

(Times and Location)

- **Labels:** The products we use are labeled in accordance with the Right-to-Know Law. They contain identification of any hazardous components and an appropriate hazard warning. Some of the products we use are consumer products and may not indicate the hazards of their use. When in doubt, see the list and Material Safety Data Sheet.

TRAINING SESSION ON HAZARD COMMUNICATION

I know where the Material Safety Data Sheets for my work are kept.

I understand the safe work procedures and precautions to be taken when working with these products, including the use of protective equipment and/or apparel.

I know where emergency supplies are kept.

I know where the emergency phone number and Hazard Communication information is posted.

I am aware that I may review copies of the hazardous chemical list, the company's written program, and the Material Safety Data Sheets.

_____

Employee Signature

_____

Printed Name Date

_____

Social Security Number

_____

Project Site

3. Fall Protection Plan

3. FALL PROTECTION

3.1. Purpose

Work activities where employees may be subject to falls and/or falling objects shall be conducted safely with associated hazards eliminated and/or controlled.

This policy covers minimum performance standards applicable to all Beta employees its subcontractors and visitors to the site. Local practices requiring more detailed or stringent rules or local, state or other federal requirements regarding this subject can and should be added as an addendum to this procedure as applicable.

This policy applies to all Beta work sites, offices, client jobsites, etc., where field construction related and service work activities where an involve exposure to heights greater than or equal to six (6) feet and/or falling objects exist.

3.1.1. **Anchorage**: a secure point of attachment for lifelines, lanyards, or deceleration devices that is capable of supporting 5,000 lbs. per employee or two times the intended impact load, whichever is greater; or for a positioning system, 3,000 lbs. without failure three (3) times the intended load.

3.1.2. **Approved**: for the purpose of this section, authorized by the Safety Officer, tested and certified by the manufacturer or any recognized national testing laboratory to possess the strength requirements specified in this section.

3.1.3. **Catenary Line** – see Horizontal Lifeline.

3.1.4. **Competent Person**: an individual knowledgeable (through experience and/or training) of fall protection equipment, including the manufacturer's recommendations and instructions for the proper use, inspection, and maintenance; who is capable of identifying existing and potential fall hazards; who has the authority to take prompt corrective action to eliminate those hazards; and who is knowledgeable of the rules contained in this section regarding the erection, use, inspection, and maintenance of fall protection equipment and systems.

3.1.5. **Controlled Access Zone**: an area to which access is controlled and in which certain work may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

3.1.6. **Deceleration Device**: a device manufactured (fall) shock-absorbing device whereby the forces of the fall are rapidly reduced to meet acceptable levels.

3.1.7. **Drop Line**: a vertical lifeline secured to an upper anchorage for the purpose of attaching a lanyard or device.

3.1.8. **Employee**: every laborer regardless of title or contractual relationship.

3.1.9. **Fall Arrest System (Personal)**: approved safety equipment components such as body harnesses, shock absorbing lanyards, deceleration devices, droplines, horizontal and/or vertical lifelines and anchorages, interconnected and rigged to ones body as to arrest a free fall.

3.1.10. **Fall Protection Work Plan**: a written planning document in which the employer identifies areas in the work area where a fall hazard of 6 feet or greater exists, whereby conventional Fall Restraint and Fall Arrest Systems cannot be utilized.

3.1.11. **Fall Restraint System**: an approved device and any necessary components that function together to restrain an employee in such a manner as to prevent that employee from falling to a lower level.

3.1.12. **Fall Distance**: the actual distance from the employee's work platform (area) to the level where a fall would stop (ground level or otherwise).

3.1.13. **Full Body Harness**: a configuration of connection straps which distribute a fall arresting force over at least the thighs, shoulders and pelvis, with provisions for attaching a lanyard, lifeline, positioning rings, or deceleration devices.

3.1.14. **Full Body Harness System**: a Class III full body harness and shock absorbing lanyard attached to an anchorage or attached to a horizontal or vertical lifeline which is properly secured to an anchorage(s) capable of withstanding the forces specified in the applicable sections.

3.1.15. **Hardware**: snap hooks, D-rings, buckles, carabineers, adjusters , and O-rings used to attach the components of a fall protection system together.

3.1.16. **Holes (floor, roof or walking surface)**: any opening in the floor greater than two inches whereby falling objects or an employee may fall a distance of six feet or great.

3.1.17. **Holes (wall)** – see Wall Opening.

3.1.18. **Horizontal Lifeline**: an approved rail, rope, or synthetic cable installed in a horizontal plane between two anchorages and used for attachment of an employee's lanyard or lifeline device while moving horizontally.

3.1.19. **Lanyard**: a flexible line of webbing, rope or cable (usually in two, four or six foot lengths) used to secure a body belt or harness to a lifeline or an anchorage point.

3.1.20. **Leading Edge**: the advancing edge of a floor or roof, where a fall of six feet or more is possible to the ground or to another level.

3.1.21. **Lifeline (vertical or horizontal)**: an approved vertical line from a fixed overhead anchorage or horizontal line between two horizontal anchorages, independent of walking or working surfaces, to which a lanyard or device is secured.

3.1.22. **Restraint Line**: a line from a fixed anchorage or between two anchorages to which an employee is secured in such a way as to restrict the employee from reaching a point where falling to a lower level is possible.

3.1.23. **Safety Line** – see Lifeline.

3.1.24. **Shock Absorbing Lanyard**: a flexible line of webbing or rope used to secure a body belt or harness to a lifeline or anchorage point that has an integral shock absorber of either a rip-stitch or retractable configuration.

3.1.25. **Snaphook**: a 'locking' hook at the end of a lanyard or restraining/positioning line that has a double-action locking mechanism intended to eliminate unintentional unhooking from the D-ring of a body harness. Non-locking snaphooks are prohibited.

3.1.26. **Standard Guardrail**: a toprail 42 inches high (plus or minus three inches), a midrail installed midway between the top edge of the guardrail system and the surface toeboard with a minimum height of 4 inches. The midrail should be at approximately

3.1.27. **Static Line** – see Lifeline.

3.1.28. **Toeboard**: a barrier at the base of the guardrail system to prevent material and objects from falling off the surface. They are at least four (4) inches of nominal height with no more than one (1) inch clearance from the surface.

3.1.29. **Unprotected Sides and Edges**: any side or edge (except at entrances to points of access) of a floor, roof, ramp, or runway where there is no wall or guardrail system.

3.1.30. **Walking/Working Surface**: for the purpose of this section, any area whose dimensions are 45 inches or greater in all directions through which employees pass or conduct work, and can include scaffolding and aerial lifts regardless of surface dimensions.

3.1.31. **Wall Opening**: a gap in a wall where the outside bottom edge is 6 feet or more above lower levels, and the inside bottom edge (e.g. parapit wall) is less than 39 inches above the walking/working surface.

3.1.32. **Work Area**: that portion of a walking/working surface where work activities are being performed.

3.2. **Training Requirements**

3.2.1. New employees with work responsibilities requiring the use of fall protection will be oriented to the Fall Protection Program (and any local addendums) as part of the 'new employee orientation program'.

3.2.2. At new worksites, jobsites, etc., during the pre-job meeting to describe specific fall protection requirements of the job.

3.2.3. Thereafter, every foreseeably exposed employee will be trained at least annually, to include the following:

3.2.3.1. The nature of fall hazards in the typical work area

3.2.3.2. The correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems

3.2.3.3. The use and operation of conventional and non-conventional fall protection systems

3.2.3.4. The role of each employee in the safety monitoring system when such a system is in use

3.2.3.5. The limitations on the use of mechanical equipment during the performance of roof work on low-slope roofs

3.2.3.6. The correct procedures for equipment and materials handling and storage, and the erection of overhead protection

3.2.3.7. The correct fit, maintenance and use of (personal) fall arrest system components, as determined by the manufacturer(s)

3.2.3.8. Rescue procedures in the event an individual falls

3.2.3.9. All other details in this section (and local addendums)

3.2.4. Toolbox talks for related issues of this manual section shall be covered periodically.

3.2.5. Retraining shall also occur whenever deficiencies in the training program are identified, standard requirements change or are modified or new a fall protection systems is introduced.

3.2.6. Any employee who has not received orientation or annual training (as previously outlined) shall not be allowed to work at heights identified by this section above grade level.

3.2.7. Training provided shall be documented and maintained in a training file at the Branch Office. Training will include dates of training, instructor's name, topics/material covered and attendee names with signatures.

3.3. **Conventional Fall Arrest and Fall Restraints Systems shall be utilized where the exposure to falls greater than 6 foot and from falling objects as is reasonably foreseen. The following systems shall be utilized:**

3.3.1. Guardrail System (fall restraint and potentially falling objects)

3.3.2. Toprails and midrails of guardrail systems constructed of wood shall be at least ¼ inch diameter or thickness to prevent cuts and lacerations.

3.3.3. If wire rope is used for toprails, it shall be flagged at not more than 6 feet intervals with high-visibility material. Steel and plastic banding are prohibited for use as toprails or midrails.

3.3.4. The top edge height of toprails, or (equivalent) guardrails shall be 42 inches, plus or minus 3 inches, above the walking/working level.

3.3.5. Screens, midrails, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there are no walls or parapet walls at least 21 inches high. When midrails are used, they shall be installed at a height midway between the top edge of the guardrail system and the walking/working level. When screens and mesh are used, they shall extend from the top rail to the walking/working level. Intermediate members, such as balusters, when used between posts, will not be more than 19 inches apart.

3.3.6. The guardrail system shall be capable of withstanding a force of at least 200 pounds of force applied within 2 inches of the top edge in any outward or downward direction. When the 200 pounds is applied in a down-ward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches above the walking/working level.

3.3.7. Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members will be capable of withstanding a force of at least 150 pounds of force applied in any downward or outward direction at any point along the midrail or other member.

3.3.8. Guardrail systems shall be free of sharp edges and burrs to protect against punctures or lacerations and to prevent clothing from snagging.

3.3.9. The ends of top rails and midrails shall not overhang terminal posts, except where such an overhang does not constitute a projection hazard.

3.3.10. When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.

3.3.11. At uncovered holes, guardrail systems shall be set up on unprotected sides or edges. When holes are used for the passage of materials, the hole shall have not more than two sides with removable guardrail sections. When the hole is not in use, it shall be covered or provided with guardrails along unprotected sides/edges.

3.3.12. If guardrail systems are used around uncovered holes that are used as access points (such as ladderways), gates shall be used or the guardrail shall be offset at a 45 degree angle to prevent accidental walking into the hole. Toeboards shall be utilized around the edges not utilized as the actual access point.

3.3.13. If guardrails are used at unprotected sides or edges of ramps and runways, they shall be erected on each unprotected side/edge.

3.3.14. When guardrail systems, in combination with netting, is used to prevent materials from falling from one level to another, openings shall be less than two (2) inches in any dimension to prevent passage of potential falling objects.

3.4. **Covers for Holes (fall restraint and from falling objects)**

3.4.1. Covers (see Guardrail Systems within this section) shall be installed over holes equal to or greater than 2” in floors, roofs and walkways that are more than 6 feet above lower levels.

3.4.2. Hole covering material shall support at least two times the potential weight that will cross over it. If plywood is chosen as the cover material, it shall be of at least ¾ inch in thickness.

3.4.3. Hole covers shall be secured in place in such a manner as to not easily be displaced. Examples of securing methods include, but are not limited to: nailing, attached cleats, wire, etc.

3.4.4. Such covers shall have the word 'HOLE' or 'COVER' predominately marked on the top surface. Where covers are too small for such marking, they shall be painted or significantly marked in the color orange.

3.5. **Restraining/Positioning System (fall restraint)**

3.5.1. Only full body harness systems with positioning rings are to be utilized with any restraining/positioning system.

3.5.2. Restraint line (rope) length shall not exceed the distance to fall exposure, and shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater.

3.5.3. Requirements for body harness systems, snaphooks, D-rings, and other connectors used with positioning device systems shall meet the same criteria as those for fall arrest systems (3.8) of this section, as covered in the Tools Section of this Manual.

3.5.4. No makeshift fall protection equipment may be utilized.

3.6. **(Personal) Fall Arrest System**

3.6.1. (Personal) Fall Arrest Systems shall do all of the following:

3.6.1.1. Limit maximum arresting force on an employee to 1,800 pounds. Note: total body weight including tools cannot exceed 310 lbs. to stay under arresting force limit

3.6.1.2. Be rigged so that an employee can neither free fall more than 6 feet nor contact any lower level

3.6.1.3. Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet

3.6.1.4. Have sufficient strength to withstand 5000 lbs or twice the potential impact energy of an employee free falling a distance of 6 feet or the free fall distance permitted by the system, whichever is less (excluding horizontal lifelines which require a safety factor of at least two times the potential impact energy).

3.6.1.5. All components of the (personal) fall arrest system (lanyards, body harness and attached hardware, and shock-absorbing devices) shall meet the design specifications of OSHA 1926.502 Subpart M and ANSI A10.32 and ANSI 2359.1

3.7. **The following items/actions are prohibited for use with (personal) fall arrest systems:**

3.7.1. Body belts

3.7.2. Non-locking snaphooks

3.7.3. Lanyards without shock absorbers

3.7.4. Tying back to the lanyard (once around another object) for a means of an anchorage point, unless the lanyard was designed for this purpose by the manufacturer, the object tied around can support the anticipated fall force and the object does not have sharp edges or burrs

3.8. **(Personal) fall arrest systems shall be utilized in the following manner:**

3.8.1. Pre-Use Inspection:

3.8.2. All components shall be inspected prior to each use for wear damage, and other deterioration in accordance with manufacturer's requirements (see equipment inspection and maintenance procedures of this section).

3.8.3. General Proper Body Harness Fit Guidelines (two employees are usually required to completely fit each other)

3.8.4. The body harness type and size shall meet the physical needs of its user (male/female or small, medium, large, etc.).

3.8.5. Follow the manufacturer's guidelines on proper fit.

3.8.6. Shoulder, thigh, button and chest straps shall be fit snugly whereas it is slightly difficult to slide the hand underneath.

3.8.7. Loose straps ends shall be folded back under.

3.8.8. D-ring placement should be between the shoulder-blades.

3.8.9. Chest straps should be positioned across the mid-chest area.

3.8.10. Anchorage Points

3.8.10.1. Anchorages shall be used under the supervision of a competent person, as part of a complete (personal) fall arrest system that maintains a safety factor of at least two (i.e., capable of supporting at least twice the weight expected to be imposed upon it).

3.8.10.2. Anchorages used to attach (personal) fall arrest systems will be independent of any anchorage being used to support or suspend platforms and shall be capable of supporting at least 5,000 pounds of force per person attached.

3.8.11. Anchorage points can include:

3.8.11.1. Lifelines (horizontal and vertical)

3.8.11.2. Designed anchorage points on aerial lifts

3.8.11.3. Eye-bolts listed for use by the manufacturer and rigged to meet the fall force requirements

3.8.11.4. Specially designed anchorage tools specifically designed to meet fall force requirements, including wrap-around lanyards as approved by the manufacturer with special snap-hooks and or I-beam clamps designed specifically as an anchorage point

3.9. **Prohibited anchorage points include, but are not limited to:**

3.9.1. Standard guardrails and railing

3.9.2. Ladders/rungs

3.9.3. Scaffolding, unless the scaffolding is approved by the manufacturer for/with anchorage points

3.9.4. Light fixtures, ductwork, conduit, piping, pipe vents, wiring/duct/piping harnesses, other roof stacks, vents or fans

3.9.5. C-clamps

3.9.6. Piping (unless capable of meeting the criteria of an anchorage point)

3.9.7. To a lanyard (wrapped around a solid object), unless the lanyard and hardware is manufactured for that purpose

3.10. **Lifeline/Lanyard Applications**

3.10.1. Lanyards shall only be attached to anchorage points sufficient to meet the fall force requirements.

3.10.2. Shock-absorbing lanyards are required to limited the fall force to less than 1800 pounds.

3.10.3. Self-retracting lanyards (retractables) that automatically limit free fall distance to 2 feet or less will be capable of sustaining a minimum tensile load of 3,000 pounds are required when the fall distance is eighteen feet or less. Self-retracting lanyards are always recommended and are required when the fall distance is more than nineteen and one-half (19.5) feet.

3.10.4. Lanyards that do not limit free fall distance to 2 feet or less, such as ripstitch lanyards and tearing/deforming lanyards will be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

3.10.5. Horizontal lifelines will be designed, installed, and used under the supervision of a Competent Person, as part of a complete (personal) fall arrest system. Lifelines shall be protected against being cut or abraded. Horizontal lifelines cannot exceed sixty feet in length., and cannot have more than two employees tied to it. As such, the horizontal lifeline shall be designed to be capable of sustaining a minimum load of 10,000 pounds.

3.10.6. Vertical lifelines shall be utilized with leading edge work, and shall reach the ground, and the method of anchorage attachment shall be of proper design (i.e. no knots).

3.10.7. On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used to connect to a horizontal lifeline will be capable of locking in both directions on the lifeline.

3.11. **Safety Net System (fall arrest and potentially from falling objects)**

3.11.1.1. When utilized, safety nets shall be installed as close as practicable under the walking/working surface on which employees are working and never more than 30 feet below such levels.

3.11.1.2. Safety nets will be inspected at least once a week for wear, damage, and other deterioration. The maximum size of each safety net mesh opening will not exceed 36 square inches nor be longer than 6 inches on any side, and the openings, measured center-to-center, of mesh ropes or webbing, will not exceed 6 inches.

3.11.1.3. Defective/unfit nets are not to be used and are to be taken from service and immediately destroyed by cutting into unuseful sizes and properly disposed.

3.11.1.4. Mesh crossings will be secured to prevent enlargement of the mesh opening. Each safety net or section will have a border rope for webbing with a minimum breaking strength of 5,000 pounds. Connections between safety net panels will be as strong as integral net components and be spaced no more than 6 inches apart.

3.11.1.5. Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net surface.	Minimum required horizontal distance of outer edge of net from edge of working surface.
Up to 5 feet	8 feet
More than 5 feet up to10 feet	10 feet
More than 10 feet	13 feet

3.11.1.6. Safety nets shall be tested at the beginning of each workday and shall be capable of absorbing an impact force of a drop test consisting of a 400-pound bag of sand 30 inches in diameter dropped from the highest walking/working surface at which workers are exposed, but not from less than 42 inches above that level. Employees shall not be allowed in work areas controlled with safety nets until this test is complete.

3.11.1.7. If safety nets are utilized for the dual purpose of employee fall protection and the protection of other workers from falling objects, the net webbing opening shall be small enough to prevent passage of potential falling objects.

3.11.1.8. Items that have fallen into safety nets, such as materials, scrap, equipment, and tools, shall be removed as soon as possible and at least before the beginning of the next work shift.

3.12. **Where conventional fall restraint and fall arrest methods cannot be utilized (or utilized safely), the following non-conventional methods can be utilized**

3.12.1. A written work plan shall be developed when a project or task possesses a fall exposure whereby these systems are utilized. A sample written plan format can be found in 29 CFR 1926 Subpart M Appendix E.

3.12.2. A Competent Person will develop and implement a written Fall Protection Work Plan including each area of the work place where the employees are assigned and where fall hazards of 6 feet or more will exist. The Risk Assessment for this project/task should be reviewed for this document.

3.12.3. The written Fall Protection Work Plan shall include:

3.12.3.1. Identification of fall hazards in the work area

3.12.3.2. Description of the non-conventional method (or in combination with conventional method) of fall protection to be provided

3.12.3.3. Description of the correct procedures for the assembly, maintenance, inspection, and disassembly of any fall protection system to be used

3.12.3.4. Description of the correct procedures for the handling, storage, and securing of tools and materials

3.12.3.5. Description of the method of providing overhead protection for workers who may be in or pass through the area below the work site

3.12.3.6. Description of the method for prompt, safe removal of injured workers

3.12.3.7. Description of the method for destruction of personal fall arrest system equipment subjected to the forces of any fall

3.12.3.8. Be available at all times on the jobsite

3.13. **Controlled Access Zone System**

Controlled access zone systems shall be set up as follows:

3.13.1. The zone shall be established no closer than six (6) feet or further than twenty-five (25) feet from any leading edge.

3.13.2. Control line shall extend parallel along the entire length of the unprotected or leading edge.

3.13.3. Only trained employees are allowed in the Zone

3.13.4. The Zone shall have signage marking it as a 'Controlled Access Zone'

3.14. **Warning Line System (pitches of <4:12 and flat surfaces only)**

Warning line systems consist of ropes, wires, or chains, and supporting stanchions and are set up as follows:

3.14.1. Flagged at not more than 6-foot intervals with high-visibility material

3.14.2. Rigged and supported so that the lowest point including sag is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches from the walking/working surface

3.14.3. Stanchions, after being rigged with warning lines, will be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally against the stanchion, 30 inches above the walking/working surface, perpendicular to the warning line and in the direction of the floor, roof, or platform edge

3.14.4. The rope, wire, or chain will have a minimum tensile strength of 500 pounds, and after being attached to the stanchions, shall support without breaking the load applied to the stanchions as prescribed above

3.14.5. Line will be attached to each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in the adjacent section before the stanchion tips over

3.14.6. Warning lines will be erected around all sides of roof work areas. When mechanical equipment is being used, the warning line will be erected not less than 6 feet from the roof edge parallel to the direction of mechanical equipment operation, and not less than 10 feet from the roof edge perpendicular to the direction of mechanical equipment operation

3.14.7. When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet from the roof edge.

3.14.8. The warning line system shall be used in conjunction with one of the following:

3.14.8.1. Safety monitoring system (most common); or

3.14.8.2. (Personal) fall arrest system; or

3.14.8.3. Safety net system; or

3.14.8.4. Guardrails

3.15. **Safety Monitoring System**

3.15.1. A competent person will appoint the 'safety monitor' and will ensure that the safety monitor:

3.15.1.1. Is competent in the recognition of fall hazards

3.15.1.2. Is capable of warning workers of fall hazard dangers and in detecting unsafe work practices

3.15.1.3. Is operating on the same walking/working surfaces of the employees and can see them

3.15.1.4. Is close enough to work operations to communicate orally with the employees and has no other duties but the monitoring function

3.15.1.5. Has the authority to stop work

3.15.2. Only employees engaged in roof/surface work and the safety monitor shall be allowed in an area where an employee is being protected by a safety monitoring system.

3.16. **Specific Fall Hazard Procedures**

3.16.1. Aerial Personnel Lifts

3.16.1.1. Employees utilizing aerial personnel lifts (e.g. scissor lifts, genie lifts, cherry-pickers, boom-lifts, etc.) shall use a restraint/positioning system or (personal) fall arrest system, even though a guardrail system is in place. Refer to Aerial Personnel Lifts for specific information on operating this equipment.

3.16.1.2. Attachment points for these systems shall be capable of withstanding 5,000 pounds and shall be maintained in the floor of the lift or where designed by the manufacturer.

3.16.1.3. Rails of such lifts shall not to be used as attachment points unless designed for that purpose by the manufacturer.

3.16.1.4. Only when proper attachment points are unavailable on the lift should attachment points outside of the lift be utilized.

3.16.2. Excavations

3.16.2.1. Employees who work at the edge of an excavation with a depth of 6 feet or more will be protected from falling into the excavation by guardrail systems or covers.

3.16.2.2. Where walk-ways are provided to permit employees to cross over excavations, guardrails are required on the walkway if the fall would be 6 feet or more to the lower level.

3.17. **Hoist Areas**

3.17.1. Each employee in a hoist area will be protected from falling 6 feet or more by guardrail, restraint/positioning or (personal) fall arrest systems.

3.17.2. Employees shall be protected by (personal) fall arrest system. If guardrail system (or chain gate or guardrail), or portion thereof, must be removed to facilitate hoisting operations, as during the landing of materials, and a worker may lean through the access opening or out over the edge of the access opening to receive or guide equipment and materials that employee shall be protected by a (personal) fall arrest system.

3.18. **Falling Objects (additional protection from)**

3.18.1. Except for scaffolding and aerial lifts, no materials or equipment shall be stored within 6 feet of working edges.

3.18.2. When canopies are used as protection from falling objects, canopies shall be strong enough to prevent collapse and to prevent penetration by any objects that may fall onto them.

3.18.3. When toeboards are used as protection from falling objects, they shall be erected along the edges of the overhead walking or working surface for a distance sufficient to protect persons working below. Toeboards will be capable of withstanding a force of at least 50 pounds of force applied in any downward or outward direction at any point along the toeboard. Toeboards will be a minimum of four (4) 3.5 inches tall from their

top edge to the level of the walking/working surface, have no more than one (1) 0.25 inches clearance between its bottom and the walking/working surface, and be solid or have openings no larger than one (1) inch in size.

3.19. **Ladders (where work height due to leaning out exposure is equal to, or exceeds six foot and/or the maximum ladder height is within the distance to a leading edge)**

3.19.1. If work is performed outside the rails of a ladder equal to, or exceeding 6'; or if three-point contact on the ladder cannot be maintained, a (Personal) Fall Arrest System shall be utilized if anchorage points are available.

3.19.2. If anchorage points are not available or other traditional fall control systems are not feasible, a non-conventional system can be utilized (see Section 3.12).

3.20. **Leading Edge Work**

Employees working near a leading edge 6 feet or more above lower levels shall be protected by guardrail, safety net, restraint/positioning, or (personal) fall arrest systems. If these systems are not feasible the systems under section 3.12 can be utilized.

3.21. **Roadway/Vehicular Passage Covers**

Covers located in roadways and vehicular aisles shall be able to support at least twice the maximum axle load of the largest vehicle to which the cover might be subjected, and secured/marked as indicated in section 3.4.

3.22. **Low-sloped (<4:12 pitch)**

Employees engaged in roof activities on low-slope roofs with unprotected sides and edges 6 feet or more above lower levels will be protected from falling by guardrail systems, safety net systems, (personal) fall arrest systems or a combination of a warning line system and one of the following: guard-rail system, safety net system, (personal) fall arrest system, or safety monitoring system.

3.23. **Steep Roofs (>4:12 pitch)**

Employees on a steep roof with unprotected sides and edges 6 feet or more above lower levels will be protected by either guardrail systems with toeboards, a safety net system, or a (personal) fall arrest systems.

3.24. **Wall Openings**

Employee working on, at, above, or near wall openings (including those with chutes attached) shall be protected from falling by the use of either a guardrail system, a safety net system, or a (personal) fall arrest system.

3.25. **Equipment Inspection**

Inspection, Replacement and Destruction - All equipment hereafter noted shall be visually inspected before each use, replaced immediately if any of the defective conditions are found, tagged 'out of service' and sent back to the branch office for destruction.

3.25.1. Body Harness Inspection

3.25.1.1. Beginning at one end, holding the body side of the harness toward you, grasp one area of the harness with your hands six to eight inches apart. Bend the strap in an inverted "U". Follow this procedure the entire length of the belt or harness. Watch for frayed edges, broken fibers, pulled stitches, cuts, burn marks or chemical damage. Special attention should be given to the attachment of buckles and D-rings to strap webbing. Inspect for frayed or broken strands. Broken webbing strands generally appear as tufts on the webbing surface.

3.25.1.2. Rivets should be tight and unmovable with fingers. Body-side rivet base and outside rivet burr should be flat against the material. Bent rivets will fail under stress. Especially note condition of D-ring rivets and D-ring metal wear pads (if applicable). Discolored, pitted, or cracked rivets indicate chemical corrosion.

3.25.1.3. Inspect the tongue or billet of bolts for loose, distorted, or broken grommets. Harnesses using punched holes without grommets should be checked for torn or elongated holes causing slippage of the tongue buckle.

3.25.2. Hardware (Buckles, D-Rings, Snaps and Thimbles)

3.25.2.1. Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on frame. Check for distortion or sharp edges.

3.25.2.2. Inspect the friction buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar.

3.25.2.3. Inspect the sliding bar buckle frame and sliding bar for cracks, distortion, or sharp edges. The sliding bar should move freely. Knurled edge will slip if worn smooth. Pay special attention to corners and ends of sliding bar.

3.25.2.4. Inspect the forged steel D-ring for cracks or other defects. Inspect the assembly of the D-ring to the body pad or D-saddle. If the D-ring can be moved vertically independent of the body pad or D-saddle, the harness should be replaced. Check D-Rings and D-Ring metal wear pad (if any) for distortion, cracks, breaks, and rough or sharp edges. The D-Ring bar should be at a 90 degree angle with the long axis of the belt and should pivot freely.

3.25.2.5. Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seal into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper.

3.25.2.6. The thimble must be unmovable in the eyes of the splice, and the splice should have no loose or cut strands. The edges must be free of sharp edges, distortion, or cracks.

3.25.3. Lanyard (shock-absorbing)

Begin at one end and work to the opposite end. Slowly rotate the lanyard so the entire circumference is checked. Factory Spliced ends require particular attention.

3.25.4. Lanyard (Webbing) Retractable (requires two employees)

Bend the webbing over a non-lacerating edge, observe each side of the webbed lanyard. This will reveal any cuts or breaks. Swelling, discoloration, cracks, and charring are obvious signs of chemical or heat damage. Closely observe for any breaks in the stitching.

3.25.5. Rope

Rotation of the rope lanyard while inspecting from end to end will bring to light any fuzzy, worn, broken, or cut fibers. Areas weakened by extreme loads will appear as noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in period. Strands should be separated and inspected since the rope may wear on the inside if grit or moisture becomes embedded.

3.26. **Equipment Storage/Cleaning**

3.26.1. Storage areas shall be maintained as clean, dry and free of exposure to fumes or corrosive elements.

3.26.2. Cleaning methods established by the manufacturer shall be followed for all components.

3.26.3. Body harnesses

3.26.3.1. Wipe off surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back and forth motion

3.26.3.2. Wipe the belt dry with a clean cloth. Hang freely to dry but away from excessive heat

3.26.3.3. Bolts and other equipment should dry thoroughly without close exposure to heat, steam, or long periods of sunlight

3.26.3.4. Mildly dirty cotton may be cleaned normally. For heavy dirt or grease, soak belts in a solution of one tablespoon of grease cutter to one gallon of water. DO NOT USE A STRONGER SOLUTION. After soaking, rinse again, then hang to dry

3.26.4. Fall protection, which is not in the original package, shall be stored in a clean, dry area

3.27. **Post-Fall or Near-Miss Incidents**

3.27.1. Fall incidents and near-misses shall be thoroughly investigated to determine root causes and facilitate corrective measures to prevent reoccurrences.

3.27.2. Employees involved in a fall equal to, or greater than 6 feet shall be required to receive an immediate medical evaluation.

3.27.3. All components of a (personal) fall arrest system involved in any fall with a fall distance of over six feet shall be immediately and completely replaced. The previous equipment shall be tagged ‘out of service’ and sent back to the branch office or manufacturer for proper disposal.

3.27.4. Any equipment involved in a fall or near-miss incident shall be sent back to the branch office or manufacturer for destruction.

3.27.5. **References**

OSHA 29 CFR 1926 Subpart M

OSHA 29 CFR 1910 Subpart D

ANSI A10.32

ANSI 2359.1

4. Ladders and Scaffolding

4. LADDERS AND SCAFFOLDING

4.1. Ladders

Ladders are to be constructed and used in accordance with OSHA Regulations, Part 1926.1050 through 1926.1060 and in accordance with the following:

Except where permanent stairways, temporary stairways, suitable ramps, or runways are available, ladders must be provided to give safe access to all elevations. Only wooden or fiberglass ladders are permitted on site. Job made ladders must meet OSHA regulations 29 CFR 1926 Subpart X.

4.1.1. Wood side rails must be seasoned, straight grained wood, free from defects that will impact their strength.

4.1.2. Side rails must be free from splinters and sharp edges.

4.1.3. Ladders with broken rungs or steps, broken or split side rails, or faulty and defective parts must not be used. Ladders with such defects shall be withdrawn from service immediately and tagged for repair or destruction.

4.1.4. Portable ladders should be placed so the horizontal distance at the bottom is not less than one quarter of the vertical distance to the top of portable ladders should be placed so that the side walls have secure footing.

4.1.5. Single short ladders must not be spliced together to provide longer reach.

4.1.6. All extension ladders must be tied off.

4.1.7. Portable ladders must have non-slip bases or other means to prevent displacement when used on smooth surfaces.

4.1.8. Ladders must be of sufficient length to project not less than 3 feet above the landing.

4.1.9. Single portable ladders over thirty feet in length shall not be used. If greater heights must be reached separate ladders must be used and intermediate landing platforms provided.

4.1.10. The area around the top and bottom of the ladder shall be kept clear of debris. The top two (2) steps of a stepladder must not be used as a step.

4.2. Scaffolding

OSHA Standards 1926.450 through 454 apply to scaffolds used in construction work and contain useful information, including some sketches.

4.2.1. Scaffolds and other elevated work platforms can expose workers to falls and failing objects if appropriate safety measures are not implemented. Scaffolds should be designed, built and inspected by competent persons.

4.2.2. There are several types of scaffolds that are addressed specifically in the OSHA standards. All scaffolding is required to be designed by a qualified person and must be erected in accordance with that design. All working levels of scaffolds are required to be fully planked or decked between the front uprights and guardrail supports in the back.

4.2.3. Scaffolding must be provided for employees engaged in work that cannot be done safely from the ground or from solid construction. Work of a short duration that can be done safely from ladders or manlifts will be the only exception.

4.2.4. Suspended scaffolding or staging shall be fastened to prevent it from swaying.

4.2.5. Scaffolding or staging more than ten feet above the ground or floor, suspended from an overhead support, or erected with stationary supports shall have a safety or guardrail and toe boards properly attached. Scaffolds four feet (4') to six feet (6'0') in

height having minimum horizontal dimensions in either direction of less than forty-five inches shall have standard guardrails and toe boards installed on all open sides.

4.2.6. Guardrails shall be two inches by four inches (2" X 4") or the equivalent and approximately forty-two inches (42") in height and mid rail at twenty-one inches (21"). Supports shall be at intervals not to exceed eight feet (8'). Toe boards shall be a minimum of four inches (4') in height.

4.2.7. All scaffolding should be adequately designed to carry, without failure, four (4) times the maximum intended load. Scaffolding from different manufacturers must not be mixed.

4.2.8. Where persons are required to work or pass under the scaffold, a screen consisting of No. 18 gauge U S. Standard wire, one-half inch (1/2") mesh, or the equivalent shall be provided between the toe board and the guardrail extending along the entire opening.

4.2.9. All scaffolds must be maintained in safe condition; scaffolds damaged or weakened by any cause shall be immediately repaired and shall not be used until repairs have been completed.

4.2.10. Only qualified designated persons are allowed to make repairs and or modifications to any scaffold structures. Any non-qualified persons modifying or altering scaffolding will be subject to disciplinary measures.

4.2.11. All lumber used in the construction of scaffolds must be Grade A treated longleaf yellow pine (2 " x 12 "), free of knots.

4.2.12. All lumber used in the construction of scaffolds should be dressed and must be sound, straight-grained, free from cross-grain, shakes, and large, loose, dead knots, or any defects impairing its strength or durability. All loads carrying timber must conform to federal regulation OSHA 1926,451 (A) (9 & 10).

4.2.13. All nails used in the construction of scaffolds, staging, and supports must be of ample size and length. Nails must be used in sufficient quantities at each connection to develop the designed strength of the scaffold.

4.2.14. When taking down scaffolds, all nails should be immediately withdrawn from the lumber.

4.2.15. Barrels, boxes, loose tile blocks, loose piles of bricks, or other unstable objects, shall not be left on the scaffolding.

4.2.16. The poles, or vertical legs, of scaffolds must be securely and rigidly braced to prevent swaying and displacement.

4.2.17. When materials are being hoisted up on a scaffold, a tag line must be used to prevent the material from striking against the scaffold, unless hoisting equipment is being used and there is no danger of material striking against the scaffold.

4.2.18. Scaffolds must be cleared of all tools, loose materials, and rubbish at the end of each working day.

4.2.19. Ice and snow must be removed before employees are permitted to resume work on scaffolds. Clinging ice should be removed from all guardrails and uprights, and the planking sanded to prevent slipping.

4.2.20. Employees shall not work on scaffolds during storms or high winds.

4.2.21. An access ladder or equivalent safe access shall be provided,

4.2.22. All scaffolds must be inspected by a competent person.

4.2.23. Tube and coupling scaffolding must be pinned.

4.2.24. Scaffold Tags

All scaffolds must be inspected by the designated competent person prior to use. A color coded tag must be placed on the scaffold at the point of access if any defects are identified. All affected employee shall be trained on the tagging system to ensure compliance with this program. The safety department will determine the appropriate tagging system for each jobsite or facility.

4.2.25. Each employee who erects, dismantles, repairs, maintains, moves, inspects or works from scaffolds of any type is required to be trained by a person "qualified in the subject matter." Training is to be completed before employees are assigned to perform the assigned work.

4.2.25.1. Training for those who work from scaffolds must include:

- The nature of any fall hazards, electrical hazards and falling-objects hazards in the work area
- The correct procedures for dealing with electrical hazards and for erecting, maintaining and disassembling the fall protection system and falling-object systems being used.
- The proper use of the scaffold and proper handling of materials while on the scaffold
- The maximum intended load and load-carrying capacity of the scaffold
- Any other applicable information

4.2.25.2. Training for those who erect, disassemble, move, operate, repair, maintain or inspect scaffolding is to include:

- The nature of scaffold hazards
- The correct procedures for erecting, dismantling, moving, operating, inspecting and maintaining scaffolds
- The design criteria, maximum intended load bearing capacity and intended use of the scaffold
- Any other pertinent information

4.2.26. Retraining is required when we believe the employee does not understand the assigned duties and at least:

4.2.26.1. Where changes in the project site present a hazard not included in the original training

4.2.26.2. When changes in the type of fall protection, scaffolds, falling-object protection or other equipment present a hazard not included in the original training

4.3. **Swinging Scaffolds**

4.3.1. This type of scaffold shall consist of a light platform, supported at the ends by hangers and cables or ropes that are securely attached with proper anchorage at a higher elevation.

4.3.2. The swinging scaffold platform shall be one of the following three types:

4.3.2.1. Ladder type - consisting of rungs or straight-grained oak, ash, or hickory, at least in diameter, constructed according to Table D-17 of OSHA 29. CFRIO10.28 (9)(12)(i) or Table L-14, 1926.451 (i)(10)(i).

4.3.2.2. Plank type - consisting of planks supported on stirrups or hangers.

4.3.2.3. Beam type - consisting of longitudinal side stringers, with cross beams set on edge and spaced not more than four feet (4') apart on which the longitudinal platform planks are laid.

4.3.3. Plank Type

4.3.3.1. When plank platforms are used, the planks shall not be less than two inches (2") thick and eight inches (8") wide.

4.3.3.2. All planks must be of uniform thickness.

4.3.3.3. Where two (2) or more planks are used, they shall be tied together by cleats, one inch by six inches (1 " x 6"), and nailed on the underside of the plank at intervals of no more than four feet (4').

4.3.3.4. The planks not extend more than twelve inches (12”) beyond the supporting hangers. However, the planks must extend at least six inches (6") beyond the supporting hangers.

4.3.3.5. A bar shall be nailed across the platform on the underside of each end to prevent the platform from slipping off the hanger.

4.3.3.6. The clear space of the platform plank, between supports, shall not exceed eight feet (8').

4.3.4. Beam Type

4.3.4.1. When beam type platforms are used, the side stringers shall be of straight grained lumber free from knots, and not less than two inches by six inches (2" x 6").

4.3.4.2. The stringers shall be supported on the stirrups or hangers with a clear span between hangers not to exceed twelve feet (12').

4.3.4.3. The stringer shall be bolted to the hangers by U-bolts passing around the hangers and bolted through the stringers with nuts drawn up tight on the inside face.

4.3.4.4. The platform shall be supported on cross beams two inches by six inches (2" x 6") in between the side stringers, thoroughly nailed thereto, and spaced not more than four feet (4') on centers.

4.3.4.5. The platform shall not be less than twenty inches (20") or more than thirty-six inches (36") wide overall.

4.3.5. Every swinging scaffold shall be equipped the entire length of the platform, (on the side away from the building), with a guardrail, an intermediate guardrail, or safety cable and a toe board.

4.3.6. The ropes supporting a swinging scaffold shall be of wire, synthetic, or fiber ropes capable of supporting at least six (6) times the rated load, properly rigged into a set of six inch (6") blocks, consisting of at least one double and one single block.

4.3.7. All blocks shall fit the size of rope they carry, and shall be constructed to prevent chaffing the rope running through the blocks.

4.3.8. Suitable padding must be provided at points where ropes are subjected to chaffing.

4.3.9. Swinging scaffolds shall not be used for the storage of materials

4.3.10. Two or more swinging scaffolds shall not, at any time, be combined into one by bridging the distance between them with planks or any other form of connection.

4.3.11. Lifelines, securely fastened from above, must be provided for each person working on a swinging scaffold. The lines shall hang free of the scaffold and shall conform to OSHA 1926,104.

4.4. **Steel or Patented Scaffolds, Etc.**

4.4.1. Check and follow local, state, and federal codes, ordinances, or regulations pertaining scaffolding.

4.4.2. Inspect all scaffold parts before using. Never use scaffold parts that have been damaged or deteriorated.

4.4.3. Keep all equipment in good repair.

4.4.4. Provide adequate sills for scaffold posts and use base plates,

4.4.5. Use adjusting screws instead of blocking to adjust the scaffold if uneven grade conditions exist. (Screws shall not be adjusted more than 12" in height.)

4.4.6. Fasten all braces securely- Do not climb braces.

4.4.7. On wall scaffolds, place and maintain anchors securely between structure and scaffold at least every twenty-five feet (25') of length and twenty-five feet (25') of height.

4.4.8. Equip all planked or staged areas with proper guardrails and toe guards when required.

4.4.9. Power lines near scaffolds are dangerous- Exceptional care must be taken and no scaffold should be within ten feet (10') of a bare or un-insulated power line. Do not use ladders as makeshift devices on top of scaffolds to increase the height.

4.4.10. Drawings and specifications of all frame scaffolds over one hundred twenty-five feet (125') in height above the base planks shall be designed by a Registered Professional Engineer and copies made available to the Beta Engineering Engineer for inspection purposes before erection

4.4.11. Do not overload scaffolds.

4.5. **Rolling- Scaffolds**

4.5.1. No employee shall ride rolling scaffolds.

4.5.2. Remove all material and equipment from platform before moving scaffold.

4.5.3. Caster brakes must be applied at all times when scaffolds are not being moved.

4.5.4. Do not, in any manner, attempt to move a rolling scaffold from the top.

4.5.5. Watch out for holes in the floor and overhead obstructions.

4.5.6. Use horizontal diagonal bracing near the bottom, top, and at intermediate levels of twenty-five feet (25').

4.5.7. The working platform height of a rolling scaffold must not exceed four (4) times the smallest base dimension unless guyed or otherwise stabilized.

4.6. **Suspended Baskets by Crane**

4.6.1. Suspended baskets from a crane may be used by permit only. Obtain permits from the site safety department.

4.6.2. Suspended baskets may only be used if there is no other way to do the job safely.

4.6.3. Suspended baskets and the cranes must be inspected before each use.

4.6.4. Suspended baskets may only be used with cranes that have a positive anti two block system.

4.6.5. Suspended baskets may only be used after a test lift is made.

4.6.6. All personnel in the basket must be tied off, above the basket.

5. Confined Space Entry Program

5. CONFINED SPACE ENTRY PROGRAM

5.1. Policy

Beta Engineering makes it a company policy that any employee who is required to work in or around a confined space or other hazardous location shall be properly trained and equipped to perform his work without risk of injury or illness. The required training must be documented.

5.1.1. **Acceptable entry conditions**: The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

5.1.2. **Attendant**: An individual stationed outside one or more permit spaces who monitors the authorized entrant and who performs all attendant's duties assigned in the employer's permit space program.

5.1.3. **Authorized entrant**: The employee authorized by the entry supervisor to work in the confined space.

5.1.4. **Blanking or blinding**: The absolute closure of a pipe, line or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line or duct with no leakage beyond the plate.

5.1.5. **Double block and bleed**: The closure of a line, duct or pipe by closing and locking or tagging two inline valves, and by opening and locking and tagging a drain or vent valve in the line between the closed valves.

5.1.6. **Emergency**: Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

5.1.7. **Engulfment** : The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.

5.1.8. **Entry**: The action by which a person passes through an opening into a permit-required confined space. It occurs as soon as any part of the entrant's body breaks that plane of the opening into the space.

5.1.9. **Entry permit:** The written or printed document provided by the employer to allow and control entry into a permit space.

5.1.10. **Entry supervisor**: The person (Beta construction manager or subcontractor safety representative) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

5.1.11. **Hazardous atmosphere**: An atmosphere that may expose employees to the risk of death, incapacitation, impairment or ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

5.1.11.1. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL)

5.1.11.2. Airborne combustible dust at a concentration that meets or exceeds its LFL

5.1.11.3. Atmospheric concentration of any substance for which a dose or permissible exposure limit (PEL) is identified in the most recent version of OSHA CFR 1926.

5.1.11.4. Atmospheric oxygen concentrations below 19.5% or above 23.5% oxygen

5.1.12. **Hot work permit**: The employer's written authorization to perform operations (for example, riveting, welding, cutting, burning and heating) capable of providing an ignition source.

5.1.13. **Immediately dangerous to life and health (IDLH)**: Any condition that poses an immediate or delayed threat to life or that would interfere with an individual's ability to escape unaided from a permit space.

5.1.14. **Inerting**: The displacement of the atmosphere in a permit space by noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

5.1.15. **Isolation**: The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as blanking or blinding; misaligning or removing sections of lines, pipes or ducts; double block and bleed systems; lockout or tag-out of all sources of energy; and blocking or disconnecting all mechanical linkages.

5.1.16. **Line breaking**: The intentional opening of a pipe, line or duct that is or has been carrying flammable, corrosive or toxic material, and inert gas, or any fluid at a volume, pressure or temperature capable of causing injury.

5.1.17. **Nonpermit confined space**: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or physical harm.

5.1.18. **Oxygen-deficient atmosphere**: An atmosphere containing less than 19.5% oxygen by volume.

5.1.19. **Oxygen-enriched atmosphere**: An atmosphere containing more than 23.5% oxygen by volume.

5.2. Confined Space Entry Program

Because of various working environments, Beta Engineering recognizes that it may be hazardous, dangerous or even deadly for employees to enter a confined space if proper precautions are not taken.

To help protect Beta Engineering employees and subcontractors from accidents and injury in confined space situations, we have adopted a Permit Required Confined Space Program (PRCS). If the area to be worked in meets the following criteria then a Confined Space Permit shall be properly executed. For the purpose of this program a "Confined space" is defined as the following:

5.2.1. Permit Required Confined Space (PRCS)

This type of confined space usually does contain, or have the potential to contain, any hazards which are capable of causing death or serious physical harm, and:

5.2.1.1. Is large enough and so configured that a worker can bodily enter and perform work

5.2.1.2. Has limited or restricted means for entry or exit such as tanks, vessels, silos, storage bins, hoppers, vaults and pits

5.2.1.3. Is not designated for continuous worker occupancy

5.2.1.4. And one of the following:

- Contains or has the potential to contain a hazardous atmosphere
- Contains a material that has the potential for engulfing entrapment

- Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section
- Has mechanical equipment that may start automatically
- Contains any other recognized serious safety or health hazards

Beta Engineering and its subcontractors shall exercise safety and health precautions whenever PRCS entry is required by an employee. PRCS entry that personnel are likely to encounter include manholes, excavations (not meeting OSHA requirements), storage tanks, bins, hoppers, chutes, process vessels and large equipment. Familiarity with PRCS definitions and procedures are required so that inadvertent access to a PRCS does not occur without the proper precautions. Most, if not all, PRCS should be marked as such; familiarity with the definition of a PRCS is necessary, however, in the event that a PRCS is not identified or marked.

All confined spaces meeting the above criteria must be considered as a permit required confined space.

5.3. **Procedures for Identifying a Confined Space**

5.3.1. Beta Engineering or the subcontractor entering a confined space shall designate a trained and qualified representative to evaluate each work place to determine the existence and type of confined space in the area where the employees will be working.

5.3.2. Before employees are allowed to begin work, the designated representative shall coordinate with the construction manager to evaluate the project site and to determine the type of confined space(s) that exists.

5.3.3. If permit required spaces are found to exist, the designated representative will identify the location by posting an appropriate sign and notifying the Beta Construction Manager.

"Danger—Permit Required Confined Space—Do Not Enter"

5.3.4. If the employees will have to enter to perform work in the confined space, they will do so by following the Beta confined space policy. Subcontractors may use their own Confined Space Entry Procedure if it meets or exceeds the Beta and OSHA requirements.

5.4. **Coordination with Host Employer**

When employees are to work in facilities containing confined space(s) that are controlled by the host employer, the authorized representative shall coordinate all confined space entry requirements with a properly authorized representative of the host employer. The following are examples of information that must be shared by the host employer, who shall:

5.4.1. Apprise the contractor representative of all elements, including hazards identified in the confined space; experiences the host employer has had with the space; and, if appropriate, the reason(s) why a space is classified as a permit required confined space.

5.4.2. Indicate any precautions or procedures that have been implemented by the host employer for the protection of his employees in or near the confined space area where employees of the contractor will be working.

5.4.3. Coordinate all entry operations to protect both host employer employees and contractor employees who are working near the confined space to be entered. If host employer employees and contractor employees are to work in the confined space simultaneously, written entry procedures shall be developed and implemented to

ensure the safety of all authorized entrants, and to ensure that employees of one employer do not endanger the employees of another employer.

5.4.4. Provide to the authorized contractor representative any available information regarding the permit space hazards and any entry operations mandated by the host employer. Further, the authorized contractor representative shall provide a copy of the company confined space program to the host employer for their review and approval before any entry operation is performed by any contractor employee. Approval to use the company confined space program as is, or as modified by special requirements of the host employer, shall be in writing and shall be signed by an authorized representative of the host employer.

5.4.5. Furnish or make available any material safety data sheet (MSDS) information as to the contents, if any, previously contained in the confined space. Contact the Beta Construction Manager if you have any concerns or questions.

5.5. **Preparation for Entry into a Confined Space**

Before entry into a permit space is authorized, the authorized subcontractor representative shall:

5.5.1. Ensure all persons are trained in confined space work and the training is documented

5.5.2. Confirm that potential atmospheric, configuration, engulfment, or other recognized hazards have been identified and documented via JSA (Job Safety Analysis) and reviewed by a qualified person

5.5.3. Implement all measures necessary to prevent unauthorized entry

5.5.4. Implement barricades and barriers to protect workers inside and outside of confined space

5.5.5. Assign responsibility and specify acceptable entry conditions

5.5.6. Conduct purging, inerting, flushing or ventilating of the confined space to eliminate or control atmospheric hazards

5.5.7. Implement an energy lockout policy, if necessary

5.5.8. Determine PPE, tools and equipment to be used are suitable for the work to be done

5.6. **Training/Responsibilities**

All entry supervisors, attendants and entrants must be properly trained to enter a confined space. All roles of responsibilities must be defined in the training process. This required training shall be documented and made available to all affected employees. To acknowledge that the proper training has been accomplished the following information must be evident through a certificate that displays the following: Employee name, the trainer signature, date of training.

The permit shall be reviewed whenever there is a reason to believe that conditions inside the confined space have changed, unauthorized entry of a permit space, an injury or near-miss occurs, or employees feel the permit is ineffective and does not protect the employee. If a change is required, Beta's construction manager or the subcontractor's safety representative shall determine if re-training is required to proceed with entry into the space.

The program shall be reviewed at least once a year to ensure its effectiveness and it's compliance with applicable regulations. Included in the review shall be the expired or cancelled permits from the prior year.

5.7. **Roles and Responsibilities:**

5.7.1. Entry Supervisor: This person is responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry

and overseeing entry operations, and for terminating entry as required by this section. Responsibilities of the entry supervisor are as follows:

5.7.1.1. Knows the hazards of the PRCS. If a hazardous atmosphere may exist, the entry supervisor must know the mode of entry into the body (inhalation, absorption, ingestion and so forth), signs or symptoms, and consequences of exposure.

5.7.1.2. Verifies the permit is properly completed with required signatures and that all procedures are followed.

5.7.1.3. Terminates the entry and cancels the permit.

5.7.1.4. Verifies that rescue services are available and that the means for summoning help are operable

5.7.1.5. Verifies that only authorized entrants are allowed into the confined space

5.7.1.6. Maintains close supervision of the attendants and entrants during entry.

5.7.1.7. Collects and maintains records of the confined space permits

5.7.2. Authorized Entrant: The authorized entrant is the employee authorized by the entry supervisor to work in the confined space. Only entrants that completed PRCS training will be allowed in the space. There are no exceptions to this requirement. Responsibilities of the entrant are as follows:

5.7.2.1. Knows the hazards of the PRCS. If a hazardous atmosphere may exist, the employee must know the mode of entry into the body, signs or symptoms of exposure, and consequences of exposure.

5.7.2.2. Uses the personal protective equipment required by the supervisor. If respirator use is required, the employee must comply with the “Respiratory Protection Program” section of this manual.

5.7.2.3. Maintains communication with the attendant.

5.7.2.4. Alerts the attendant of any hazards encountered or any emergency situations.

5.7.2.5. Exits the space if the attendant identifies any hazards.

5.7.3. Attendant: An individual stationed outside one or more permit spaces who monitors authorized entrants and who performs all attendant’s duties assigned in the employer's permit space program. Responsibilities of the attendant are as follows:

5.7.3.1. Knows the hazards of the PRCS. If a hazardous atmosphere may exist, the attendant must know the mode of entry into the body, signs or symptoms of exposure, and consequences of exposure.

5.7.3.2. Is aware of possible behavioral effects of hazard exposure in authorized entrants.

5.7.3.3. Continuously maintains an accurate count of authorized entrants.

5.7.3.4. Remains outside the space during entry operations. The attendant will not perform any other duties that might interfere with monitoring the PRCS.

5.7.3.5. Monitors activities inside and outside the space to determine whether the space is safe for the entrants.

5.7.3.6. Summons rescue and other emergency services as soon as the attendant determines that the authorized entrants may need assistance to escape from permit space hazards. The attendant will not attempt any entry rescues.

5.8. **Minimum Equipment Needed for PRCS Entry**

5.8.1. Although the equipment needed to perform a PRCS entry will vary (depending upon the situation), certain minimum equipment is necessary for safe entry, as noted below:

5.8.1.1. Ladders

5.8.1.2. Portable lighting

5.8.1.3. Ventilation equipment

5.8.1.4. Tripods and harness

5.8.1.5. Communication equipment

5.8.1.6. Atmospheric monitors

5.8.1.7. Personal Protective Equipment

5.8.1.8. Handrails for vertical PRCS

5.8.1.9. GFCI for extension cords

5.8.1.10. Barricades to protect from external hazards

5.8.2. The authorized subcontractor representative shall ensure that necessary equipment is available on location, that the equipment is in proper operating condition and that personnel operating or using the equipment have been properly trained.

5.8.3. Appropriate light shall be provided within and outside the confined space. Some of the precautions that shall be taken when selecting lighting are as follows:

5.8.3.1. If the atmosphere inside the confined space is classified as flammable or explosive, the electrical equipment used shall conform to Article 500, National Electric Code.

5.8.3.2. All personnel entering the confined space shall be provided with explosion-proof flashlights, if other means of lighting are not available.

5.8.3.3. Extension cords in damp or wet areas could cause electric shock hazards. Only approved low-voltage (6 or 12volt) lights and extension cords with ground-fault circuit interrupters shall be used.

5.8.4. Barricades shall be placed to protect employees from external hazards

5.9. **Isolating Energy Sources**

Before subcontractor employees enter any confined space, the space shall be removed from service and shall be completely protected against the release of energy and/or material(s) into the space. This provision means that all energy sources leading to or located within the confined space which are potentially hazardous to the workers shall be locked out, tagged, relieved, disconnected, and/or restrained. If the entry is made into a host employer's confined space, the subcontractor's designated representative shall verify that all valves, disconnects, pressure piping and all other energy sources are bled, opened and locked, drained, tested and relieved of stored energy. Additionally, the subcontractor’s designated person should accompany the host employer’s representative and witness the securement of all energy sources. They should satisfy themselves that all energy sources are truly secured.

In some cases, a machine may have more than one energy source (such as high- and low-voltage electrical, electrohydraulic, electropneumatic, and so forth). Ensure each energy source is truly locked out.

Energy sources include:

Electrical	Mechanical
Gravity	Pneumatic

Hydraulic Thermal Radioactive Sources

Kinetic

The objective for isolating all energy sources is to prevent unexpected or accidental energizing, start-up or release of stored energy that could cause injury to workers within the confined space.

Before any Beta Engineering employees, or its subcontractor's employees enters a confined space, the Beta Construction Manager shall apply a Beta lock on the energy source and maintain control of the key. This lock will remain in place until all work is completed and all employees have exited the space and are accounted for.

5.10. **Atmospheric Testing**

Before entry into any and all PRCS can occur, atmospheric conditions within the confined space must be evaluated by a qualified person using proper direct reading testing equipment that is correctly calibrated. Any employee involved in the entry has a right to review the all documentation of the calibration and monitoring process. It is important to understand that some gas or vapors are heavier or lighter than air, and will settle at the top, bottom or center of a PRCS. Therefore, it is necessary to test all areas: top, middle and bottom of a PRCS, using properly calibrated testing instruments to determine what gases are present and in what quantity. If any one of the atmospheric tests (oxygen, combustible gases, toxic gases, hydrogen sulfide) is at a concentration above its preset alarm-sounding level, no entry into the PRCS can be made. If testing reveals oxygen deficiency or the presence of toxic gases or vapors, the space must be ventilated (blower or fan) and retested before work entry.

Contact the Beta Construction Manager if there is any question about the safety of the atmosphere.

Never trust your senses to determine if the air inside the PRCS is safe. You cannot see or smell many toxic or combustible gases and vapors, nor can you determine the level of oxygen present without properly calibrated atmospheric testing instruments. Only employees trained in the use of atmospheric testing instruments are permitted to do so. Atmospheric testing must be continuous while entrants are inside the PRCS.

No compressed gas cylinders will be allowed into the confined space. All compressed gas hoses will be checked for damage before being brought into the confined space. All compressed gas cylinders will be turned off when they are not in use. Any additional equipment brought into the confined space must be identified as suitable for the location and atmosphere.

Prior to entering a PRCS, several conditions must be met with regard to acceptable atmospheric conditions, as noted below:

5.10.1. Oxygen Content: An oxygen content of 19.5% to 23.5% is required for entry into a PRCS. No entry is allowed into a space when oxygen levels are at 23.5% oxygen or higher. Spaces that contain less than 19.5% oxygen are Immediately Dangerous to Life or Health (IDLH), and may only be entered with extra-special precautions. Oxygen content must be tested first.

All entrants and attendants must be familiar with the signs and symptoms of an oxygen deficient atmosphere:

Oxygen Volume (%)	**Signs and Symptoms**
16%–12%	Increased breathing and pulse rate; slight disturbance of muscular coordination
14%–12%	Emotional upset; abnormal fatigue upon exertion; disturbed respiration

10%–6%	Nausea and vomiting; inability to move freely; possible loss of consciousness; possible physical collapse; may be unable to move or cry out although aware of difficulties
Below 6%	Convulsive movements; gasping respiration; respiration stops followed by heart stoppage

5.10.2. Flammable Atmospheres: Two things cause an atmosphere to be flammable: the oxygen in the air and a flammable gas, vapor, or dust in proper mixture. Different gases have different flammable ranges. When a source of ignition, spark, electrical tool or so forth is introduced into a space containing a flammable atmosphere, an explosion results. An oxygen-enriched atmosphere (23.5%) will cause flammables such as clothing and hair to burn violently when ignited. Both an enriched or oxygen-deficient atmosphere may affect the operation and interpretation of the combustible gas meter. Therefore, never use pure oxygen to ventilate a PRCS. Always ventilate with normal air. Any PRCS containing 10% or more of the Lower Explosive Limit (LEL) is considered a combustible atmosphere and may not be entered under any circumstance. Mechanical ventilation may be required to reduce the LEL to an acceptable level. Ventilation equipment must be explosion-proof when ventilating a combustible atmosphere. Flammability of the atmosphere must be tested second.

Toxic Atmospheres: Many substances (liquids, vapors, gases, mists, solid material and dust) can be considered hazardous in a PRCS. Toxic Atmospheres can result in the confined space when substances emit toxic gases, or when cleaning residue of a stored product. Any potential toxic gas, vapor or dust in a PRCS must be continuously monitored, and levels must be kept below the Permissible Exposure Limits (PEL). Air purifying respirators can be used only to protect against gases and vapors that have good warning properties.

5.10.3. Carbon Monoxide: No employee is allowed to enter a confined space with 25 ppm of carbon monoxide, the current TLV (Threshold Limit Value).

Physiological Effects of Carbon Monoxide Exposure

Personal Protection Action Levels (PPAL)	Effects and symptoms	Time
25	Permissible exposure limit	8 hours
200	Slight headache, discomfort	3 hours
400	Headache, discomfort	2 hours
600	Headache, discomfort	1 hour
1000–2000	Confusion, headache, nausea	2 hours
1000–2000	Tendency to stagger	1 hour
1000–2000	Slight palpitation of the heart	30 min
2000–2500	Fatal	Less than 1 hour

5.11. **Fire Hazards**

To preclude the possibility of fires occurring that could become a hazard to the workers inside the confined space, the following precautions shall be taken as a minimum:

5.11.1. Access to and egress from the confined space shall be maintained clear of any obstructions at all times. If welding or cutting is to be performed in the confined space, combustible materials shall be covered with flame-retardant materials.

5.11.2. Flammable liquids (such as acetone and alcohol) shall be stored in UL- or FM-approved containers. The amount of flammable liquid(s) brought into the confined space shall not exceed the amount needed to perform the work each day.

5.11.3. Properly rated fire extinguishers shall be immediately available.

5.11.4. Cylinders containing oxygen, acetylene or other fuel gases shall not be taken into the confined space.

5.11.5. All rags, brushes, wipes, gloves and the like shall be stored in metal containers with lids. The containers shall be emptied daily.

5.11.6. A firewatch person shall be posted during all welding, burning and heating operations to monitor for fires and ensure that after the work has ceased, or at the end of a work shift, there are no fire conditions present.

5.11.7. Where flammable liquids or gases are used in confined spaces, continuous monitoring with a calibrated combustible gas detector shall be maintained in the confined space while flammable materials are present.

5.12. **Immediately Dangerous to Life or Health (IDLH)**

All confined spaces have the potential to become IDLH environments. In certain, very rare circumstances, it may be necessary for the trained PRCS rescuers to conduct a rescue in conditions that are already known to be IDLH. Regular work will never be conducted in PRCS that are already known to be IDLH.

Entry is not permitted in PRCS that are known to be IDLH, except for rescue. The following is a list of conditions that are considered IDLH or serious safety hazards:

5.12.1. Oxygen content less than 19.5%, or greater than 23.5%

5.12.2. Combustible atmosphere over 10% of the Lower Explosive Limit (LEL)

5.12.3. Any atmospheric toxin over the IDLH value for that compound

5.12.4. Any unguarded fall exposures over 6 feet

5.12.5. Any live and exposed energized equipment

5.12.6. High pressure steam lines in poor condition

5.12.7. Sustained atmospheric temperatures above 100 degrees F

5.12.8. Unshored or unsloped excavation walls

5.12.9. Areas subject to flash flooding

5.12.10. Tanks or other vessels not properly ventilated

5.12.11. Toxic gases at or near IDLH concentrations

5.12.12. Any other IDLH condition

5.13. **General/Physical Hazards**

In addition to the areas discussed previously, evaluation of a PRCS should consider the following potential hazards:

5.13.1. Temperature extremes

5.13.2. Engulfment hazards

5.13.3. Noise

5.13.4. Slick, wet surfaces

5.13.5. Falling objects

5.13.6. Excavation sloping

5.13.7. Combustion engines near the PRCS

5.13.8. The potential for toxic gases

5.13.9. Fire hazards

5.13.10. Mechanical equipment that may start automatically

5.13.11. Weather conditions outside the space

5.14. **Issuance of a Confined Space Permit**

The following procedures are to be followed when a trained entry supervisor is preparing a permit to enter a PRCS. Only a trained entry supervisor may prepare or sign a PRCS, following completion of the tasks referenced below:

5.14.1. Review the information on the PRCS entry permit request.

5.14.2. Determine if there is another way to accomplish the task(s) without entering the PRCS.

5.14.3. Determine the exact scope of work, number of employees who will be entering the space, size of the space, hours of work, number of days or shifts, and other information required to complete the permit. Address all health and safety issues (ventilation, PPE, lockout/isolation, potential for atmospheric condition changes in the space, rescue equipment and so on) during permit preparation. Insure that adequate barriers are provided to protect entrants and entry attendants from external hazards.

5.14.4. The Beta Engineering confined space entry permit form will be completed, and pre-entry atmospheric testing performed. Atmospheric testing should be done only by qualified persons using direct reading equipment that is properly calibrated. Results of the testing should be reviewed by the site or other qualified person before entry is permitted. The PRCS permit shall be brought to the PRCS entry site, and should be reviewed by the entry attendant and entrants.

5.14.5. Prior to atmospheric testing, any conditions that make it unsafe to remove an entrance cover should be eliminated before the cover is removed. Also, all required blanking of the process line, locking out of bins and feeders, examination of electrical equipment and other procedures that can be accomplished without entering the PRCS should be performed at this time.

5.14.6. The entry supervisor or entry attendant will test the atmosphere to determine if it meets safe entry criteria. If the entry is to last more than 15 minutes in duration, or there is a significant potential for the atmosphere to change after initial site entry, then continuous monitoring by a trained entry attendant is required. The entry supervisor will also examine the conditions, rescue, ventilation and communication equipment, entrant qualifications and other safety-related conditions prior to releasing the PRCS for entry, and will sign the permit section that relates to atmospheric testing. The entry supervisor will also determine if continuous monitoring of the confined space's atmosphere is required. If continuous monitoring is required, it will be in operation before entry is permitted.

Atmospheric testing will be made before ventilation equipment has been turned on. If atmospheric testing indicates that the air in the space is not within safe limits, then the PRCS must be ventilated and the atmosphere retested with the ventilation off. Testing after the ventilation system has been turned on should also be performed; this testing ensures that contaminants from other areas are not being drawn into the PRCS. No entry into a PRCS where atmospheric conditions or other conditions are found to be IDLH will be made without specific written approval from the Safety Department. Rescue of persons in a PRCS involving entry into the space may only be accomplished by rescuers specifically trained in confined space entry rescue.

5.15. **Entry Procedures**

The following procedures apply after the entry supervisor for entry has approved the PRCS:

5.15.1. The permit must be posted at the entrance to the PRCS. The entry supervisor must sign all posted permits. The permit must be posted continuously throughout the shift, and is valid for one shift only. All entrants must review the permit before entering the PRCS. The permit will review some of the safety requirements that must be accomplished prior to any entry into the permit access confined space. The confined space must be periodically tested for three gases: oxygen, carbon monoxide and flammable gases.

5.15.2. All ventilation equipment must be in operation. The entry supervisor should examine the erection of all rescue winches and test them to insure reliability. The entry attendant should also take up his or her post at the entrance to the PRCS. Testing of communication and communication equipment (two-way frequency radios) between the attendant and the work crew should be performed at this time.

5.15.3. After the initial entry into the PRCS has been made, the entrant(s) shall first visually examine the space for obvious hazards, such as exposed electrical and mechanical hazards, fall hazards and atmospheric hazards. All such hazards will be addressed before proceeding with the scheduled work.

5.15.4. The entrants will also examine the efficiency of the ventilation system. If air is not being circulated to all parts of the PRCS, the ventilation system will be modified to do so before continuing with operations.

5.15.5. The entry attendant remains at the entrance to the PRCS at all times. The entry attendant may not leave his/her post for any reason unless relieved by another trained entry attendant, or until all the entrants have left the space and the entrance has been secured. The entry attendant will remain in contact with the work crew inside the PRCS at all times, and will monitor any change in conditions that could affect the

health and safety of the work crew. The entry attendant will talk to the entrants at least every five minutes to verify communication ability and to detect changes in the mental status of the entrants that may indicate that a problem exists in the PRCS. If changes in mental status (such as "drunken" or sluggish-type behavior) occur, the entry attendant will cause the PRCS to be immediately evacuated. If adverse conditions occur (or are likely to occur), then the entry attendant will immediately cause the confined space to be evacuated. Such evacuation can be accomplished by communicating with the work crew or, in the case of a vertical entry, by hoisting the Entrant using a winch.

5.15.6. If there are multiple PRCS locations on a site, a single attendant can be assigned, provided that the attendant can perform the duties as required for all PRCS. If multiple entries into a PRCS are anticipated, an additional attendant will be trained in all active PRCS programs and ready to assist the acting attendant, should issues occur that require the acting attendants full attention.

5.15.7. Under no circumstance whatsoever is the entry attendant to enter the PRCS to rescue any entrants, unless properly equipped and trained for PRCS rescue and properly relieved by another trained entry attendant. All entrants must evacuate the PRCS immediately upon instruction to do so by the entry attendant or entry supervisor.

5.15.8. At the conclusion of the work performed in the PRCS, the entry supervisor will ensure that the entrance to the space is closed or sealed. The entry supervisor will remove the PRCS permit from its permanent location, write the word "Expired" in large letters across the top, and return the expired permit to the Beta Construction Manager where it shall be filed for one year.

5.16. **Cancellation of Permit Required Confined Space**

The entry supervisor shall terminate entry to a permit required confined space and cancel the permit if an emergency or incident of which requires evacuation from the site or area, a condition not covered by the permit occurs in or around the confined space, the time period of permit expires or the work associated with the permit is completed. The cancelled permit shall be provided to the Beta construction manager for record keeping.

5.17. **PRCS Rescue**

In the event of a fire or medical emergency, the attendant must contact, or get in contact with someone who can contact, the rescue squad. The entry attendant shall have the emergency phone numbers posted in close proximity to the PRCS. Only trained PRCS rescue squads may make entry for rescue purposes. An entry attendant making a call for the PRCS rescue squad must stay at the entrance to the PRCS until the rescue squad arrives, or until the entrants have left the PRCS.

5.18. **Rescue Provisions**

Before entering any permit required confined spaces, provisions for employee rescue must be established. Rescue equipment may include tripods or refractors; full body harnesses; wristlets; air supplied respirators; trained rescue personnel; air-monitoring equipment; and any other materials unique to a confined space.

If Beta Engineering or its subcontractors are is relying upon a local fire department or the owner's emergency response team for rescue from confined spaces, the subcontractor is required to ensure the local service has the appropriately trained persons and the equipment to perform rescue operations. Because OSHA has very specific requirements for rescue operations and it is difficult to qualify and maintain qualification none of Beta’s employees are rescue qualified.

6. Lock Out Tag Out Program

6. LOCK OUT TAG OUT PROGRAM

6.1. Purpose

It is the policy of Beta Engineering to ensure that employees are adequately protected during operations involving confined space entry by ensuring that hazards are properly evaluated and controlled.

A lockout places equipment and systems in a ZERO ENERGY STATE whenever a person could be exposed to harm from that energy source. A lockout provides maximum protection to all equipment and to all people who are working on or about equipment powered by an energizing source such as electricity, water, air or steam.

6.2. Responsibilities

6.2.1. Individual: Every individual, who works on or about equipment that can be energized by any means, and has exposed parts that can be activated, is responsible for locking and tagging the equipment. In no case will the lockout by one individual suffice or be considered a lockout for another person.

1 person = 1 lock and tag, 2 persons = 2 locks and tags

6.2.2. Management: The lockout procedure must be thoroughly reviewed with each new employee by his supervisor before he or she starts to work. The supervisor will demonstrate the procedure to the employee. The employee will then demonstrate to the supervisor how to perform the lockout. Periodically (at least every six months), the supervisor will review with employees the lockout procedure.

6.2.3. Each employee will be issued a safety lock and tags by his or her supervisor before he or she begins working. Replacement or additional locks and tags are available from the supervisor.

6.2.3.1. Safety Department will provide guidance when questions or unusual conditions arise. Additionally, the Safety Department will monitor forcible lockout removal to prevent its misuse.

6.2.3.2. Project Engineer is responsible for ensuring that outside contractors' employees shall be advised of, and comply with plant safety procedures.

6.2.3.3. Production is responsible for preparing equipment to be worked on.

6.2.3.4. Any unauthorized person who removes a safety lock and/or danger tag from a piece of equipment or piping and operates or attempts to operate is subject to disciplinary action.

6.2.3.5. Absolute compliance to this procedure is a must. Failure to comply could result in severe injury to someone or to equipment—or even a plant disaster.

6.3. Location Survey

6.3.1. Conduct a survey of the facility worked at to determine locations of all hazardous energy sources. These sources may include the following:

Electricity	Falling
Pneumatic (air)	Water pressure
Hydraulic	Chemical
Elevated-machine members	Steam
Gas	Thermal
Mechanical	Nuclear
Springs	

6.3.2. Devise methods to control unintended operation of machines or equipment being serviced or maintained.

6.4. **Procedure**

6.4.1. This procedure establishes a lockout practice for securing machinery and equipment during periods of construction, maintenance or repair. It is essential that all contractors are consistent with their lockout procedures to ensure the safety of all employees. A lockout procedure renders inoperative electrical systems, pumps, pipe lines, valves and all other such energy systems that may accidentally be energized or started up while employees are exposed to injury.

6.4.2. Contractors and subcontractors will administer their own lockout program and will coordinate with others. All locks and applicable tags will be issued by contractor's or sub-contractor's supervisors to their own employees, and a log will be kept. Beta Engineering shall keep a lockout log on each project site (per the form in this section) for all work we perform. Thus, project supervisors are kept informed of locks put in place and their removal.

6.4.3. EACH PERSON SHALL HAVE HIS OR HER OWN LOCK ON ANY SYSTEM AND AT ANY TIME THAT PERSON FEELS THE NEED TO BE IN CONTROL OF THE LOCKOUT. NO ONE MAY REMOVE SOMEONE ELSE'S LOCK except in rare, exceptional and well documented instances. Approval for removal of another person’s lock is granted by the Project Manager or the Safety Department only. Each person should mark his or her own locks so they can be retrieved after removal. Only one system tag for identification is required, each individual shall put their name also on the system tag for identification of their lock.

6.4.4. For energy systems being worked on by multiple persons, multiple crafts or multiple contractors, a MULTILOCKOUT CLAMP is to be used. Each craft or subcontractor shall put its own system tag and lock on the bar also.

6.4.5. The required procedure is to LOG IT IN, ISOLATE THE SYSTEM, LOCK IT OUT, TAG IT OUT, TRY IT OUT.

6.4.5.1. LOG IT IN: Put all the information in the log to identify the system to be locked out, the name of the company and person locking the system out, and the method to contact the person or company affixing the lockout.

6.4.5.2. ISOLATE THE SYSTEM: Shut off all energy sources including electrical, air, pneumatic, gravity, chemical, light, hot, cold, valves, breakers and so forth. When possible, disconnect any possible contact between the machine and the energy source. Many systems or machines may have a

main power source and additional control systems on separate circuits. Be sure you lock out all power sources.

6.4.5.3. LOCK IT OUT: Put a lock directly on the disconnect or if necessary on a chain or other external mechanical device to assure it cannot be activated. Each person who will work on the equipment must place his or her own lock and tag on each energizing source. Multiple locking adapters are available when the number of locks needed for proper lockout exceeds the amount that the breaker or disconnect switch can accommodate. Different equipment in the project worksite may require as many as four or five disconnects to de-energize the equipment. All sources must be locked out; additional locks are available from the supervisor. The individual who attached the lock must have on his or her person the only key. The key is not to be passed to another individual. (Exception is during shift change lockout transfer: see section 6.6.)

6.4.5.4. TAG IT OUT: Using the tag assigned from the log, complete the information required on tag and attach to the lock or multilock clamp or to the device.

6.4.5.5. TRY IT OUT: The most important step to your lockout procedure is to try to turn on the machine or system when you believe it is locked out. Locking out the breaker or disconnect switch will not be considered adequate assurance that equipment is isolated. After the lock(s) and tag(s) have been attached, each person must check for proper lockout by attempting to start the equipment. All persons involved in locking out the equipment will be informed when the attempt is made to start the equipment. Be certain all persons are clearly out of the danger areas before testing the lockout. If there is no movement or other indication of residual energy, then you know you have zero energy state. Remember gravity energy and neutralize it by blocking moving parts, bleeding lines and so forth

6.5. **Examples of energy sources and systems that are required to be locked out**

6.5.1. Customer or Owner's Equipment Interface (New)

Live electrical systems will be locked out whenever any service work is performed. This requirement will remain in effect anytime any contractor is performing any type of work on the system. Any time repairs or modifications are made to electrical systems, either temporary or permanent, they shall be locked out. Locks shall be applied to the main disconnect switch whenever possible. All locks must be accompanied with a tag.

6.5.2. Tests and Repairs

6.5.2.1. Electrical systems and similar systems that provide power to equipment, such as pumps and electrical motors, shall be locked out any time work is performed on the system.

6.5.2.2. Pipelines, valves and other energy sources that could be inadvertently activated, causing a hazardous condition, shall be locked out, blanked off and otherwise secured to prevent accidental activation. Blinds in piping systems shall be securely inserted so they remain in place during the lockout period.

6.5.2.3. Lines, valves and similar systems that are being tested pneumatically or with other gases (such as nitrogen) shall be tagged as a test condition for those parts that must be activated for the test. Other parts that are in OFF POSITION will require a lock with the tag.

6.5.2.4. Areas affected by the pressure test shall also be signed, roped, taped and/or otherwise designated as no entry for nonessential persons. Such a condition shall be inspected by the Safety Representative or Project Manager prior to the start of the test.

6.5.2.5. DO NOT FORGET THE EFFECTS OF GRAVITY ON A SYSTEM. Pipes on a slope can release liquids unexpectedly. Presses can release the hammer even with the power off. Capacitors can release electrical energy unexpectedly. Be certain these energy sources are secured.

6.6. **Procedure for Shift-Change Lockout Transfer**

6.6.1. There will be occasions when a person's work shift ends prior to completion of work on equipment he or she has locked out. If someone else is expected to finish the work during the interim period before the person's next scheduled work shift, then he/she will be responsible for a lockout transfer. The lockout transfer will be accomplished in the following manner:

6.6.1.1. Contact the Supervisor having jurisdiction in the area where the equipment is located and request a lockout transfer.

6.6.1.2. The Supervisor will accompany the person who has the equipment locked out to the site of the lockout and place his own lockout lock and danger tag on the equipment requiring lockout.

6.6.1.3. After, and only after, the Supervisor's lock and tag are in place, the person who requested the lockout transfer may remove his lock and tag.

6.6.1.4. The Supervisor will maintain his or her lock and tag on the breaker or disconnect switch until the person who will complete the work has placed his lock and tag and completes the remainder of the requirements of the lockout procedure.

6.6.1.5. The subsequent shift Supervisor has accepted the lockout transfer by receiving the key for the lockout lock from the Supervisor he or she is relieving. The receiving shift Supervisor must verify proper lockout and sign the danger tag as soon as possible after the key transfer.

6.7. **Procedure for Removal of Lock**

6.7.1. When an individual has completed work and is prepared to remove his or her lock, he or she should again depress the stop button. This action will ensure the circuit is still in the "OFF" mode and will not start up when the breaker or disconnect is re-energized. The lock and tags should then be removed. No individual shall remove another’s lock and tag. The only exception for lock and tag removal is noted below.

6.7.2. Forcible Removal of Lock

There may be occasions when a person who has lockout equipment has left the worksite. In the event the lock must be removed, the following will be required:

6.7.2.1. Every effort shall be made to contact this person to obtain permission to remove the lock.

6.7.2.2. If he or she cannot be located, the Area Supervisor shall be responsible for taking whatever action is necessary to assure that personnel will not be endangered or equipment damaged before the lock is removed. He or she will, in any case, thoroughly inspect the equipment and assure there are no workers in the danger area.

6.7.2.3. The Supervisor will consult a member of the Safety Department before any safety lock is forcibly removed.

6.7.2.4. The supervisor must be present when the lock is removed. If a multiple locking adapter is used, cut the portion of the adapter containing the lock. The lock and adapter can then be used again.

6.8. **Rotating Equipment Not Restricted by Lockout**

There will be occasions when locking-out equipment will not be sufficient to eliminate the hazard from moving parts. Especially hazardous are blowers that have blades with large surface areas. Any air movement, such as a backdraft, may cause the blades to rotate, causing a severe pinch-point hazard. Thus, an additional lockout point is needed to control the blades from movement. A chain with a lock shall be attached to the blade (if possible) to control movement. If not, the hazard can be reduced by blocking the rotor or the drive shaft with a 2 X 4, or with some other construction-grade timber.

6.9. **Maintenance Check of Equipment**

There will be special cases where maintenance personnel must energize unguarded equipment in order to check shaft or gear alignment, timing, etc. In these special cases, the maintenance persons involved shall contact the area foreman to stand by while he or she checks the energized equipment. He or she shall also put a danger tag on the breaker and any other remote-starting station before energizing the equipment. The foreman and maintenance persons will also be responsible for keeping other people clear of the equipment until it has been properly guarded or locked out. Necessary precautions may include roping off the area or using barricades.

6.10. **Procedure of temporarily removing a lock**

There will be occasions when a person must temporarily remove a lock prior to completion of work to test the on equipment he or she has locked out.

6.11. **Training**

6.11.1. Beta Engineering, or its subcontractors, will provide training to ensure that the purpose and function of the energy control program are understood by affected employees and that the knowledge and skills required for the safe application, use and removal of energy controls are acquired by the employees.

6.11.2. Training shall include the purpose and correct use of lockout, recognition of hazardous energy sources, and the means and methods of controlling the hazards. Other employees in the area should be aware the equipment is locked out and should not attempt to start the equipment or system. Nor should they tamper with tags and or locks.

6.11.3. Employees should be instructed to use locks whenever possible. They should also learn the limitations of tags, which do not assure the system is secured.

6.12. **Working on Energized Electrical Equipment**

6.12.1. There will be special cases where the Electrician, Electrical Engineer and Instrument personnel must work on the equipment "hot" (not locked out). Only these people are authorized to do so. Contact the Safety Department before this work is started.

Any deviation from this procedure will be noted in a separate department procedure and approved by the Safety Department.

REMINDER: The success of this procedure is based on ONE PERSON — ONE LOCK — ONE KEY AND DANGER TAGS. PROTECT YOURSELF AND YOUR FELLOW EMPLOYEES.

6.13. **References**

OSHA 1910.147

7. Personal Protective Equipment

7. PERSONAL PROTECTIVE EQUIPMENT (PPE)

7.1. Purpose

The Occupational, Safety, and Health Act (OSHA) mandates that employers must ensure that all employees are using appropriate personal protective equipment (PPE) in all operations where employees are exposed to hazardous conditions. Prior to any work performed on a jobsite or facility a Job Hazard Assessment will be conducted by the safety department to determine all hazard associated with each job and the appropriate protection to prevent injury from identified hazards. Contractors and subcontractors shall comply with these requirements.

7.2. Minimum Personal Protective Equipment Requirements

7.2.1. All subcontractor's employees must utilize the following personal protective equipment (PPE) at a minimum, at all times while working on this project:

7.2.1.1. Each employee is required to wear an approved hard hat at all times while working on this project. The hard hat shall meet ANSI Z89.1 Class A or B. Class B is required for electrical contractors or workers. Hard hats shall identify the contractors by company and employee.

7.2.1.2. Each employee is required to wear approved, well constructed over the ankle steel toed work boots meeting ANSI Z41 Class 75. Steel toes shoes are site specific. Tennis shoes, low cut shoes, dress shoes, sandals, etc. are not permitted.

7.2.1.3. Proper work attire is to be worn at all times. Shorts and tank tops are not permitted. Shirts must have at least a 4" sleeve.

7.2.1.4. All subcontractor's employees are required to wear safety glasses with fixed side shields in accordance with ANSI Z87.1 Standards and OSHA requirements.

7.2.1.5. Each employee is required to have safety goggles when required.

7.2.1.6. Face and eye protection equipment shall be kept clean and in good repair. The use of defective equipment (with structural or optical defects) is prohibited.

7.2.1.7. Sunglasses are not permitted inside buildings. Mirrored lenses are not permitted on site.

7.2.1.8. Each employee is required to wear a class II, or higher, high visibility safety vest or shirt.

7.2.2. In those instances where employees are required to provide their own Personal Protective Equipment, the subcontractor shall be responsible to assure the adequacy, maintenance and sanitation of such equipment, in accordance with CFR 1910.132. Personal Protective Equipment provided by the employee shall meet minimum ANSI and OSHA standards as well as those specific to the project.

7.2.3. Selected PPE must be properly fitted to each affected employee.

7.3. Additional Personal Protective Equipment

7.3.1. Supplemental protective equipment may be required depending on the work operations involved. All Contractor employees will be required to wear the appropriate Personal Protective Equipment in accordance with the task involved.

7.3.2. Any employee required to work from elevated surfaces shall be required to wear fall protection equipment that meets ANSI A10.32 and 2359.1.

7.4. Grinding, Burning, Welding, Cutting Operations

7.4.1. Full face shields in addition to safety glasses are required for all grinding operations.

7.4.2. Burning goggles are required for all burning operations such as oxygen and acetylene, propane, and natural gas.

7.4.3. Welding hoods and flash glasses are required for all welding operations. Adequate screening/shielding for employees outside the work area shall be provided.

7.4.4. Fire retardant clothing is required for all burning and welding operations.

7.5. **Hearing Protection**

All employees shall utilize appropriate hearing protection (ear plugs or ear muffs) when required to protect from excessive noise levels generated from plant operations or construction equipment.

7.6. **Respiratory Protection (Respirators, Breathing Apparatus, Etc.)**

7.6.1. Conditions may exist which require the utilization of respiratory equipment to protect employees against exposure from inhalation of toxic or harmful gasses, vapors, mists, fumes, and dust. Each subcontractor must implement and enforce a respiratory program in accordance with the OSHA standard to protect employees from types of exposure.

7.6.2. Only respirators which are applicable and suitable for the purpose intended will be used. They should be selected on the basis of the hazard to which the employee is exposed.

7.6.3. Employees required to use respiratory protective equipment approved for use in atmosphere immediately dangerous to life shall be thoroughly trained in the use and limitations of such equipment.

7.6.4. Respiratory protective equipment will be inspected regularly and maintained in good condition by the contractor. Chemical cartridges will be replaced as necessary or recommended so as to provide complete protection. Dust respirators are to be replaced as necessary or recommended so as to avoid undue resistance to breathing.

7.7. **Employee Training (Respirators, Breathing Apparatus, Etc.)**

7.7.1. All employees required to use personal protective equipment shall be given individual instruction regarding PPE prior to its use. This training shall be documented.

7.7.2. All employees must be clean shaven to ensure proper fitting of the respirator. Each subcontractor must perform fit testing on each employee to ensure the proper fit of the respirator.

7.7.3. Each subcontractor must have a written respirator program and this program is to be submitted to the Engineer prior to working on this project.

7.8. **Respiratory Protection Program**

7.8.1. Purpose

The purpose of this operating procedure is to ensure the protection of all Beta Engineering and its subcontractor's, employees from respiratory hazards, through proper use of respirators.

7.8.2. Responsibilities

The Construction Manager is responsible for all facets of this program and has full authority to make necessary decisions to ensure success of this program. This authority includes hiring personnel and making equipment purchases necessary to implement and operate the program.

7.8.3. Program Elements

7.8.3.1. Respirators will be properly selected on the basis of hazards to which the worker is exposed. All selections will be made by the Corporate or Site Safety Supervisor. Only MSHA/NIOSH certified respirators will be selected and used.

7.8.3.2. The user will be instructed and trained in the proper use of respirators and their limitations. Training should provide the employee an opportunity to handle the respirator, have it fitted properly, test its face-piece-to-face seal, wear it in normal air for a long familiarity period, and finally to wear it in a test atmosphere.

7.8.3.3. Respirators will not be worn when conditions prevent a good face seal. No Beta Engineering employee nor its subcontractor's employees, who is required to wear a respirator, may wear beards or long mustaches that prevent a clean face to mask seal. To assure proper protection, the face-piece fit will be checked by the wearer each time the wearer puts on the respirator.

7.8.3.4. Respirators will be cleaned and disinfected by the employee to whom it is assigned after each days use. Respirators for emergency use will be cleaned and disinfected after each use.

7.8.3.5. Respirators will be thoroughly inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use such as positive pressure devices will be thoroughly inspected at least once a month and after each use.

7.8.3.6. Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained.

7.8.3.7. There will be regular inspection, fit test, and evaluation to determine the continued effectiveness of the program. The Construction Manager will make frequent "drop-in" inspections in areas where respirators will be used to ensure compliance with this program.

7.8.3.8. No person will be assigned tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment.

7.8.4. Respirator Use

How to wear:

7.8.4.1. Check exhalation flap and inhalation flap to be sure they are securely in place.

7.8.4.2. Place the chin into the chin cup and pull the head harness over the top of the head.

7.8.4.3. The lower strap should be below the ears and the upper strap above the ears. The triangular section of the harness should be on the back of the head in a secure position.

7.8.4.4. Be sure the cartridges and/or filters are properly installed on the mask.

7.8.4.5. Adjusting the harness:

- Pull on the free ends of the straps to tighten the harness. To loosen the harness, move the buckle bars toward the mask. Proper tension will prevent the mask from sliding when the head is shaken slowly back and forth.

- Test for proper fit by either Positive Pressure Test (Close the respirator's exhalation valve using the palm of your hand and breathe out gently into the face-piece. The face-piece should bulge a little, but if no air leaks out, you have a good fit.) or Negative Pressure Test (Close the inhalation valve or outside of cartridges with the palms of your hands and breathe in gently. The face-piece should collapse against your face. If, after you hold your breath for 10 seconds, the face-piece stays collapsed and no air leaks in, the respirator fits.)

7.8.5. Dangers

7.8.5.1. Not for Emergencies - Cartridge respirators will not save your life in an emergency. They are not for use against atmospheres immediately dangerous to life or health (IDLH), unknown atmospheres, or atmospheres deficient in oxygen.

7.8.5.2. Avoid Enclosed Spaces - Cartridge respirators must only be used where the atmosphere contains enough oxygen to support life (19.5%) and must not be used in poorly ventilated areas. It is the policy of Beta Engineering to wear positive pressure breathing apparatus when entering any confined space.

7.8.5.3. Get Into Fresh Air Immediately - If you sense danger signals such as: smell or taste of chemicals; eye, nose or throat irritation; breathing difficulties; illness, dizziness or nausea, leave the work area.

7.8.5.4. No Fire fighting - Cartridge respirators must not be used for fire fighting.

7.8.5.5. Odor or Taste - These respirators should not be used against air contaminants which lack warning properties such as irritant action, odor, or taste.

7.8.5.6. Filters/Cartridges - Use the correct type of filter/cartridge for the air contaminants.

- Acid gases - White
- Chlorine Gas - White with 1/2-inch green stripe completely around the canister near the bottom.
- Organic Vapors - Black
- Ammonia Gas - Green
- Acid Gases and Ammonia Gases - Green with 1/2-inch white stripe completely around the canister near the bottom.
- Carbon Monoxide - Blue
- Acid Gases and Organic Vapors - Yellow
- Acid Gases, Organic Vapors, & Ammonia Gases - Brown
- Radioactive materials, excepting tritium and noble gases - Purple (Magenta)
- Particulate (dusts, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors - Canister color for contaminant, as designated above, with 1/2-inch gray stripe completely around the canister near the top.

7.8.5.7. Avoid Sparks and Flames - Do not wear these respirators where open flames or sparks can contact the filters.

8. Excavation and Trenching Program

8. EXCAVATION AND TRENCHING PROGRAM

8.1. Purpose

This safety program is intended to provide safety information to all Beta employees, its subcontractor's employees and visitors to the site regarding the safety guidelines while working in or around excavations or trenching operations. All employees whose work requires them to work in or around excavations and trenching must be properly trained and be provided the appropriate safety equipment prior to performing work.

8.1.1. Prior to commencing any excavation and trenching operations the following must be performed by each subcontractor:

8.1.1.1. The area must be checked for existing utilities in accordance with the procedures as outlined in the Utility Identification and Protection Procedures.

8.1.1.2. A competent person must analyze and determine the condition of existing soil conditions to ascertain proper sloping or shoring requirements for the excavation or trench in accordance with OSHA Guidelines as set forth in 1926,606.

8.1.1.3. A competent person must analyze and determine a safe atmospheric condition exists within the excavation or trench in accordance with OSHA Guidelines as set forth in 1926.651.

8.1.2. This information shall be submitted to the safety department to obtain the excavation and trenching permit prior to digging.

8.2. Excavating and Trenching Operation

Each subcontractor must comply with the following during all excavation and trenching:

8.2.1. Excavation greater than 5'-0" in depth, except those made entirely of stable rock or are determined by the competent person to pose no indication of potential cave-in, shall be sloped and/or benched in accordance with OSHA Guidelines as determined by the competent person.

8.2.2. Trenches over 4'-0" in depth shall be sloped or shored in accordance with the OSHA Guidelines as determined by the competent person.

8.2.3. Supporting systems (shoring, piling, cutting, etc.) will be utilized for all trenching and excavation operations where soil conditions warrant such use as determined by the competent person and sloping and/or benching is not possible.

8.2.4. Loose excavation materials and other materials must be stored at a minimum of 2'-0" from the edge of the excavation or trench.

8.2.5. Adequate means of water accumulation prevention and protection shall be determined and provided by the competent person or the safety department. The protective measures shall be inspected and approved by the competent person prior to work being performed as OSHA Guidelines as set forth in 1926.651.

8.2.6. Overhead load and material placed near the trench/excavation opening will be secured or protected from falling into opening. The competent person or safety department will determine the proper means of protecting loads and or material from falling to lower levels.

8.2.7. Adequate means of access and egress must be provided in all excavations, Structural ramps for the sole use of employees must be designed by the competent person. Structural ramps for vehicular traffic must be designed by a competent person qualified in structural design and constructed in accordance with same.

8.2.8. Stairways, ladders or other safe means of access and egress must be placed in trenches over 4'-0” in depth so as to require no more than 25'-0” of lateral travel by employees.

8.2.9. All excavation and trenches shall be regularly inspected by the subcontractor’s competent person with corrective measures taken as conditions warrant.

8.2.10. All trenches and excavations will be protected from vehicular traffic, the competent person or the safety department will determine the appropriate means of protection for the specific trench or excavation.

9. Housekeeping

9. HOUSEKEEPING

Purpose

"A Clean Job is a Safe and Productive Job” - Research holds this statement to be true. Housekeeping will carry a high priority on all projects performed by Beta Engineering. All subcontractors shall be responsible for their own housekeeping including, but not limited to, material pick-up, trash collection and removal, proper disposal of scrap materials, tools and equipment pick-up, etc. Should it be determined that a subcontractor is not satisfactorily completing his housekeeping responsibilities, Beta Engineering may, at its option, take whatever action it deems necessary and back charge the involved subcontractor(s).

10. Machine Guarding

10. MACHINE GUARDING

This safety program is intended to provide safety information to all Beta employees its subcontractor's employees and visitors to the site regarding the safety guidelines of proper machine guarding. All employees whose work requires them work with machinery that may cause an injury shall be properly trained on the safety aspects of properly operating the machinery.

10.1. Requirements for Machine Guarding:

10.1.1. One or more methods of machine guarding shall be provided to protect employees in the machine area from hazards such as those created by point of operation, in going nip points, rotating parts, flying chips and sparks.

10.1.2. Guards shall be affixed to the machine where possible and secured elsewhere if not possible.

10.1.3. Guards shall not offer an accident hazard in itself.

10.1.4. The point of operation of machines whose operation exposes an employee to injury shall be guarded.

10.1.5. Revolving drums, barrels and containers shall be guarded by an enclosure which is interlocked with the drive mechanism.

10.1.6. When the periphery of the blades of a fan is less than 7 feet above the floor or working level, the blades shall be guarded with a guard having openings no larger than 1/2 inch.

10.2. Anchoring Fixed Machinery

10.2.1. Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

10.3. Machine Construction, General

Each machine shall be so constructed as to be free from sensible (able to be felt) vibration when largest size tool is mounted and run idle (no cutting load) at full speed.

10.4. Machine Controls and Equipment

10.4.1. A mechanical or electrical power control shall be provided on each machine to make it possible for operators to cut off the power from each machine without leaving their position at the point of operation.

10.4.2. On applications where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power.

10.4.3. Power controls and operating controls should be located within easy reach of the operators while they are at their regular work location, making it unnecessary for them to reach over the cutter to make adjustments. This does not apply to constant pressure controls used only for setup purposes.

10.5. Specific Machine Requirements

All woodworking machinery such as table saws, swing saws, radial saws, band saws, jointers, boring machines, shapers, planers, lathes, sanders, veneer cutters, and other miscellaneous woodworking machinery shall be effectively guarded to protect the operator and other employees from hazards inherent to their operation.

10.6. Table Saws

10.6.1. Circular table saws shall have a hood over the portion of the saw above the table, so mounted that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut.

10.6.2. Circular saws used for ripping shall have non-kickback fingers or dogs.

10.6.3. Feed rolls and blades of self feed circular saws shall be protected by a hood or guard to prevent the hand of the operator from coming into contact with the in running rolls at any point.

10.7. **Swing or Sliding Cut-Off Saws**

10.7.1. All swing or sliding cut off saws shall be provided with a hood that will completely enclose the upper half of the saw.

10.7.2. Limit stops shall be provided to prevent swing or sliding type cut-off saws from extending beyond the front or back edges of the table.

10.7.3. Each swing or sliding cut-off saw shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel.

10.7.4. Inverted sawing or swing cut-off saws shall be provided with a hood that will cover the part of the saw that protrudes above the top of the table or material being cut off.

10.8. **Radial Saws**

10.8.1. The upper hood shall completely enclose the upper portion of the blade to a point that will included the end of the saw arbor.

10.8.2. The sides of the lower exposed portion of the blade shall be guarded to the full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock and remain in contact with stock being cut.

10.8.3. Radial saws used for ripping shall have non-kickback fingers or dogs.

10.8.4. An adjustable stop shall be provided to prevent the forward travel of the blade beyond the position necessary to complete the cut in repetitive operations.

10.8.5. Installation shall be in such manner that the front end of the unit will be slightly higher than the rear, so as to cause the cutting head to return gently to the starting position when released by the operator.

10.9. **Band Saws and Band Resaws**

10.9.1. All portions of the saw blade shall be enclosed or guarded, except for the working portion of the blade between the bottom of the guide rolls and the table.

10.9.2. Band wheel saws should be fully encased. The outside periphery of the enclosure shall be solid. The front and back shall be either solid or wire mesh perforated metal.

10.10. **Abrasive Wheel Machinery**

10.10.1. An abrasive wheel is made up of individual particles that are bonded together to form a wheel. The hazard is that if not properly mounted and used, the wheel can literally explode. Sections of the wheel may fly out at high speeds and can strike the operator causing death of serious injury. Abrasive wheels shall be used only on machines provided with safety guards with the following exception:

10.10.1.1. Wheels used for internal work while within the work ground

10.10.1.2. Mounted wheels, used in portable operations, 2 inches or smaller in diameter.

10.10.1.3. Type 16, 17,18, 18R, and 19 cones, plugs, and threaded hole pot balls where work offers protection.

10.10.2. Abrasive wheel safety guards shall cover the spindle end, nut, and flange projections, except:

10.10.2.1. On all operations where work provides a suitable measure of protection to the operator.

10.10.2.2. Where the nature of the work is such as to entirely cover the side of the wheel

10.10.2.3. Machines designed as portable saws.

10.10.3. Work Rests

On offhand grinding machines, adjustable work rests of rigid construction shall be used to support the work. Work rests shall be kept adjusted closely to the wheel with the maximum opening of 1/8 inch to prevent the work from being jammed between the wheel and the rest, which may cause breakage.

10.10.4. Angular Exposure

Abrasive wheel safety guards for bench and floor sands, and for cylindrical grinders shall not expose the grinding wheel periphery for more that 65 degrees above the horizontal plane of the wheel spindle.

10.10.5. Exposure Adjustment

The protecting member of the abrasive wheel safety guard shall be adjustable for variations in wheel size so that the distance between the wheel periphery and the adjustable tongue of the end of the peripheral member at the top shall never exceed 1/4 inch.

10.10.6. Mounting

10.10.6.1. Immediately before mounting, all wheels shall be closely inspected and sounded by the user (ring test) to make sure they have not been damaged.

10.10.6.2. The spindle speed of the machine shall be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.

11. Hand and Power Tools

11. HAND AND POWER TOOLS

11.1. **Purpose**

This safety program is intended to provide safety information to all Beta employees its subcontractor's employees and visitors to the site regarding the safety guidelines while working hand and power tools. All employees whose work requires them to use hand and power tools shall be properly trained and be able to identify defective tools.

11.2. All hand and power tools must be maintained in a safe condition. Handles shall be tight and free from cracks and splinters. Impact tools must not have mushroomed head.

11.3. Electric hand tools must be double insulated, have a constant pressure switch and must not be raised or lowered by the cord.

11.4. All electrical connections must have all prongs intact, with cords in good condition.

11.5. Power tools must have proper guards attached and must be used as intended.

11.6. Personal protective equipment must be worn when there is a danger of flying abrasive, or splashing objects, or harmful dust, fumes, mists, vapors, or gases.

11.7. Compressed air shall not be used for cleaning if the pressure is over 30 psi.

11.8. Pneumatic tools must have positive locks, hoses and attachments.

11.9. Air hoses shall not be used to raise or lower tools.

12. Communication Systems

12. COMMUNICATION SYSTEMS

Effective communication programs are essential for a successful Safety and Health Program. To ensure effective communication the following guidelines will be followed:

12.1. Safety meetings must be conducted by all subcontractors on a weekly basis. An agenda must be prepared for each meeting which encourages open discussion of all employees. Written minutes and attendance records must be kept and copies forwarded to Beta Engineering.

12.2. All Beta Engineering employees and subcontractors may be required to attend a new employee orientation and training program which will be provided prior to the start of work on the project.

12.3. Beta Engineering requires each subcontractor to install and maintain a Safety Performance Bulletin Board where it is highly visible to their work force.

12.4. Cross functional safety teams will be established by each subcontractor to identify hazards and recommend improvements for safety and health on the project.

12.5. A toolbox meeting shall be held at the start of each workday. Additional toolbox meetings will be held as necessary if the work task or hazard changes from the work or hazards discussed in the morning toolbox meeting. During the toolbox meeting, the following shall be reviewed at a minimum:

12.5.1. Site Conditions

12.5.2. New Hazards

12.5.3. Changes in Hazards

12.5.4. Review Pre-Task Planning

12.5.5. Emergency References and Procedures

12.5.6. Safety Topics

Meetings shall be documented on the Safety Meeting Sign-in sheet and forwarded to the Construction Safety Manager daily.

12.6. A combination of cell phones and two way radios shall be used for communication between Beta's Construction Managers and all subcontractors on site. A contact list shall be provided to all construction managers on site and shall be updated each month at a minimum.

13. PSM Overview (Not Required on This Project)

14. Utilities Identification and Protection

14. Utilities Identification and Protection

14.1. Purpose

In general, the operations of subcontractors impact both private and public utilities. Damage to utilities can have disastrous results, including loss of power, fire, explosion, flooding and loss of life or serious injury. Therefore digging/trenching permits are required at each site.

The subcontractor shall be required to identify, locate, arrange for removal and/or protect, any utilities which might interfere with the work to be performed.

14.2. Existing Public Utilities

14.2.1. Identification of Utilities

Because public utilities are not controlled by the Contractor these utilities can be installed, removed, relocated, activated or deactivated without Contractor knowledge that these activities ever occurred. Therefore, it is essential that the location of these items be determined prior to the start of any work. The Contractor shall locate public utilities by either consulting with the individual utility company or calling the DigAlert or 811.

14.2.2. Protection of Utilities

Once identified and located, the subcontractor shall take the utmost care to protect utilities from damage. The subcontractor shall:

14.2.2.1. Use hand or very controlled mechanical excavation procedures for underground utilities.

14.2.2.2. Shore, support, brace and/or reinforce (as necessary) any utility

14.2.2.3. Clearly mark or identify any exposed utilities and provide appropriate warning of danger signs, as needed to protect employees, the public, and the utility itself.

14.3. Notification

14.3.1. At least three (3) working days (72 hours) prior to breaking ground or performing work which may impact utilities, the subcontractor shall notify in writing the: Project Safety Director, all public utility companies and any persons having property or structures near the work area.

15. General Work Rules

15. GENERAL WORK RULES

15.1. Abrasive Grinding

15.1.1. Abrasive wheel bench or stand grinders must have safety guards strong enough to withstand bursting wheels.

15.1.2. Adjust work rests on grinders to a clearance not to exceed 1/8 inch between rest and wheel surface.

15.1.3. Inspect and ring-test abrasive wheels before mounting.

15.1.4. Always leave wheel in working condition for next user.

15.1.5. Properly dress wheel before and after use.

15.2. Access

15.2.1. Use only safe means of access to and from work areas.

15.2.2. Jumping from or to work areas is not allowed, nor is sliding down cables, ropes or guys

15.3. Air Tools

15.3.1. Secure pneumatic tools to hose in a positive manner to prevent accidental disconnection.

15.3.2. Install and maintain safety clips or retainers on pneumatic impact tools to prevent attachments from being accidentally expelled.

15.3.3. All hoses exceeding 1/2 inch inside diameter require safety devices at the source of supply to reduce pressure in case of hose failure.

15.4. Attitude

15.4.1. All company employees are required to treat safety as the number one priority. As such, they are expected to report to work in good mental and physical condition to safely perform their assigned duties.

15.4.2. Before starting any task, employees must consider the possible effects of their actions on themselves and others and take appropriate protective measures.

15.5. Belt Sanding Machines

Belt sanders will not be used without guards in place.

15.6. Compressed Air

15.6.1. Compressed air used for cleaning purposes may not exceed 30 psi, and then only in conjunction with effective; chip guarding and personal protective equipment.

15.6.2. Exceptions to 30 psi are allowed only for concrete form, mill scale, and similar cleaning operations.

15.6.3. The use of compressed air to clean off yourself or other workers is not allowed.

15.7. Compressed Gas Cylinders

15.7.1. Put valve protection caps in place before compressed gas cylinders are transported, moved, or stored.

15.7.2. Cylinder valves will be closed when work is finished and when cylinders are empty or being moved.

15.7.3. Compressed gas cylinders will be secured in an upright position at all times.

15.7.4. Keep cylinders at a safe distance or shield from welding or cutting operations and place where they cannot become part of an electrical circuit.

15.7.5. Oxygen and acetylene must not be stored together.

15.7.6. Oxygen and fuel gas regulators must be in proper working order while in use.

15.8. **Concrete, Concrete Forms and Shoring**

15.8.1. All protruding reinforcing steel, onto or into which employees could fall, must be guarded to eliminate the hazard of impalement.

15.8.2. Wire mesh shall be secure from recoiling.

15.8.3. Form work and shoring shall be designed and constructed to safely support all loads imposed during concrete placement.

15.8.4. All components will be inspected prior to erection.

15.8.5. Forms and shores may not be removed until it has been determined that the concrete has gained sufficient strength to support its weight and superimposed loads.

15.9. **Cranes or Derricks**

15.9.1. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions must be conspicuously posted on all equipment.

15.9.2. Instructions or warnings must be visible from the operator's station.

15.9.3. Accessible areas within swing radius of a crane must be barricaded to prevent employees from being struck or crushed by the crane.

15.9.4. Except where electrical distribution and transmission lines have been de-energized and visibly grounded, or where insulating barriers not a part of or an attachment to the equipment or machinery have been erected to prevent physical contact with the lines, no part of a crane or its load shall be operated within 10 feet of a line rated to 50kV and for lines rated over 50kV,minimum clearance between the lines and any part of the crane shall be 10 feet plus 0.4 inch for each kV over 50 kV or twice the length of the line insulator, but never less than 10 feet.

15.9.5. Cranes will be inspected before each use by the operator. Any defects must be corrected before use.

15.9.6. Logs of crane inspections must be kept with the crane.

15.10. **Crane and Derrick Suspended Personnel Platforms**

15.10.1. Crane or derrick suspended personnel platforms may not be used unless the erection, use, and dismantling of conventional means of reaching the work site would be more hazardous or not possible.

15.10.2. Equipment used for this purpose must be tested and equipped in strict accordance with 1926.550(g) or state plan equivalents.

15.11. **Petroleum Gas (LPG)**

15.11.1. Each system will have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type.

15.11.2. Each container and vaporizer must be provided with one or more approved safety relief valves or devices.

15.11.3. Containers will be placed upright on firm foundations or otherwise firmly secured.

15.11.4. Portable heaters must be equipped with an approved automatic device to shut off the flow of gas in event of flame failure.

15.11.5. Storage of LPG within buildings is prohibited.

15.11.6. Storage locations must have at least one approved portable fire extinguisher, rated not less than 20-B.C.

15.12. **Medical Services and First Aid**

15.12.1. When a medical facility is not readily accessible, a person trained to render first aid will be available at the work site.

15.12.2. First aid supplies must be readily available.

15.12.3. The telephone numbers of physicians, hospitals or ambulances must be conspicuously posted.

15.13. **Motor Vehicles and Mechanized Equipment**

15.13.1. Check all vehicles in use at beginning of each shift to assure all parts, equipment and accessories affecting safe operation are in proper operating condition and free from defects.

15.13.2. All defects shall be corrected before placing vehicle in service.

15.13.3. No employee shall use any motor vehicles, earth moving, or compacting equipment having an obstructed view to the rear unless: vehicle has a reverse signal alarm distinguishable from the surrounding noise level, or vehicle is backed up only when an observer signals it is safe to do so.

15.13.4. Heavy machinery, equipment, or parts thereof, which are suspended or held aloft will be substantially blocked to prevent falling or shifting work under or between them.

15.14. **Personal Protective Equipment**

15.14.1. The employee is responsible for wearing appropriate personal protective equipment in operations where there is exposure to hazardous conditions, or where need is indicated to reduce hazards.

15.14.2. Lifelines, safety belts and lanyards will be used only for employee safeguarding.

15.14.3. Employees working over or near water, where danger of drowning exists, will wear US Coast Guard-approved life jackets or buoyant work vests at all times.

15.15. **Powder-Actuated Tools**

15.15.1. Only trained employees will be allowed to operate powder-actuated tools. All powder-actuated tools will be tested daily before use and all defects discovered before or during use will be corrected.

15.15.2. Tools will not be loaded until immediately before use.

15.15.3. Loaded tools will not be left unattended.

15.16. **Power Transmission Mechanical**

15.16.1. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded if such parts are exposed to contact by employees or otherwise constitute a hazard.

15.16.2. No equipment may be used without guards in place.

15.17. **Protection Of The Public**

15.17.1. All company personnel are charged with aiding in the protection of the public including, as your job description dictates

15.17.2. Install and maintain of signs, signals, light fences, guardrails, ramp, temporary sidewalks, barricades, overhead protection, etc. as necessary.

15.18. **Radiation, Ionizing**

15.18.1. Pertinent provisions of the Atomic Energy Commission's Standards for Protection against Radiation (10 CFR Part 20) relating to protection against occupational radiation exposure, will apply.

15.18.2. Persons using radioactive materials or X-rays will be specially trained, or licensed if required.

15.19. **Railings**

15.19.1. A standard railing will consist of top rail, intermediate rail, toeboard, and posts, and have a vertical height of 42 inches (plus or minus 3 inches) from upper surface of top rail to floor, platform, etc.

15.19.2. The top rail of a railing will be smooth-surfaced, with sufficient strength to withstand at least 200 pounds.

15.19.3. The intermediate rail will be approximately halfway between top rail and floor.

15.19.4. A stair railing will be of construction similar to a standard railing, but the vertical height will not be more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

15.20. **Respiratory Protection**

15.20.1. In emergencies, or when feasible engineering or administrative controls are not effective in controlling toxic substances, approved respiratory protective equipment will be provided and used.

15.20.2. Respiratory protective devices will be approved for the hazardous material involved and extent and nature of work requirements and conditions.

15.20.3. Employees required to use respiratory protective devices will be thoroughly trained in their use.

15.20.4. Respiratory protective equipment will be inspected regularly and maintained in good condition.

15.21. **Saws**

15.21.1. All portions of band saw blades will be enclosed or guarded, except for working portion of blades between bottom of guide rolls and table.

15.21.2. Portable, power-driven circular saws will be equipped with guards above and below the base plate or shoe.

15.21.3. The lower guard will cover the saw to depth of teeth, except for minimum as required to allow proper retraction and contact with the work, and will automatically return to covering position when blade is removed from the work.

15.21.4. Radial saws will have an upper guard which completely encloses upper half of the saw blade. The sides of lower exposed portion of blade will be guarded by a device that will automatically adjust to the thickness of and remain in contact with material being cut.

15.21.5. Radial saws used for ripping must have non-kickback fingers or dogs.

15.21.6. Radial saws will be installed so the cutting head will return to starting position when released by operator.

15.21.7. All swing or sliding cut-off saws will be provided with a hood that will completely enclose the upper half of the saw.

15.21.8. Limit stops will be provided to prevent swing or sliding type cut-off saws from extending beyond the front or back edges of the table.

15.21.9. Each swing or sliding cut-off saw will be provided with an effective device to return the saw automatically to the back of table when released at any point of its travel.

15.21.10. Inverted sliding cut-off saws will be provided with a hood that will cover the part of the saw that protrudes above top of the table or material being cut.

15.21.11. Circular table saws will have a hood over the portion of the saw above the table mounted so that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut.

15.21.12. Circular table saws will have a spreader aligned with the blade, spaced no more than one inch behind the largest blade mounted in the saw.

15.21.13. Circular table saws used for ripping will have non-kickback fingers or dogs.

15.21.14. Feed rolls and blades of self-feed circular saws will be protected by a hood or guard to prevent the hands of the operator from coming into contact with in-running rolls at any time.

15.22. **Scaffolds (General)**

15.22.1. Scaffolds will be capable of supporting 4 times maximum intended load and will be erected on sound, rigid footing, capable of carrying the maximum intended load without settling or displacement

15.22.2. Guardrails and toeboards will be installed on all open sides and ends of platforms more than 10 feet above ground or floor.

15.22.3. Exceptions to this would be needle beam scaffolds and floats which require the use of safety belts.

15.22.4. Scaffolds 4 feet to 10 feet in height, with a minimum dimension in either direction of less than 45 in inches, will have standard guardrails installed on all sides and ends.

15.22.5. There will be a screen with maximum 1/2 inch openings between toeboards and guardrail, where, persons are required to work or pass under scaffolds.

15.22.6. Planking will be Scaffold Grade, or equivalent, as recognized by approved grading rules for the species of wood used.

15.22.7. Overlap scaffold planking a minimum of 12 inches or secure from movement.

15.22.8. Scaffold planks will extend over end supports not less than 6 inches nor more than 12 inches.

15.22.9. Scaffolding and accessories with defective parts will be immediately replaced or repaired.

15.23. **Scaffolds (Mobile)**

15.23.1. Platforms will be tightly planked with full width of scaffold, except for necessary entrance opening, Platforms will be secured in place.

15.23.2. Guardrails made of lumber, not less than 2 x 4 inches (or equivalent) approximately 42 inches high, with a midrail of 1 x 6 inch timber (or equivalent), and toeboard will be installed at all open sides and ends on scaffolds more than 10 feet above ground or floor.

15.23.3. Toeboards will be a minimum of 4 inches in height.

15.23.4. Where personnel are required to work or pass under scaffolds, wire mesh shall be installed between toeboard and guardrail.

15.24. **Scaffolds (Swinging)**

15.24.1. On suspension scaffolds designed for a working load of 500 pounds, no more than two persons will be permitted to work at one time.

15.24.2. On suspension scaffolds with a working load of 750 pounds, no more than three, persons may work at one time

15.24.3. Each employee, will wear an approved safety belt or harness attached to a lifeline.

15.24.4. The lifeline will be securely attached to substantial members of the structure (not scaffold), or to securely rigged lines, which will safely suspend employee in case of fall.

15.25. **Scaffolds (Tubular Welded Frame)**

15.25.1. Scaffolds will be properly braced by cross bracing or diagonal braces, or both, for securing vertical members together laterally.

15.25.2. Cross braces will be of such length as will automatically square and align vertical members so erected scaffold is plumb, square, and rigid.

15.25.3. All brace connections will be made secure.

15.26. **Signs**

15.26.1. For the protection of all, warning signs such as "No Smoking, Keep Out," "Eye Protection Required", "Out of Order-Do Not Use," and "Authorized Personnel" will be posted.

15.26.2. All employees will obey these directions and aid in maintaining the signs.

15.27. **Stairs**

15.27.1. Flights of stairs having four or more risers will be equipped with standard stair railings or handrails a specified below.

15.27.2. Stairways less than 44 inches, wide with one side open must have at least one stair railing on the open side.

15.27.3. Stairways less than 44 inches wide having both sides open must have one stair railing on each side.

15.27.4. Stairways with more than 44 inches wide but less than 88 inches wide must have one handrail on each enclosed side and one stair railing on each open side.

15.27.5. Rise height and tread width will be uniform throughout any flight of stairs.

15.28. **Storage**

15.28.1. All materials stored in tiers will be secured to prevent sliding, falling or collapse

15.28.2. Aisles and passageways will be kept clear and in good repair.

15.28.3. Stored materials will not obstruct exits.

15.28.4. Materials will be sorted with due regard to fire characteristics.

15.29. **Tire Cages**

15.29.1. A safety tire rack, cage, or equivalent protection will be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

15.30. **Toilets**

15.30.1. Toilets will be provided according to the following: 20 or fewer persons one facility; 20 or more persons one toilet seat and one urinal per 40 persons; 200 or more persons one toilet seat and one urinal per 50 persons. Remember to provide facilities, with locks for female employees.

15.31. **Wall Openings**

15.31.1. Wall openings, from which there is a drop of more than 4 feet and the bottom of opening is less than 3 feet above working surface, will be guarded. When the height and placement of the opening in relation to the working surface is such that a standard rail or intermediate rail will effectively reduce the danger of falling. one or both will be provided.

15.31.2. The bottom of a wall opening, which is less than 4 inches above the working will be protected by a standard toeboard or an enclosing screen.

15.32. **Welding, Cutting and Heating**

15.32.1. Proper precautions (isolating welding and cutting, removing fire hazards from the vicinity, providing a fire watch, etc.,) for fire prevention will be taken in areas where welding or other "hot work" is being done.

15.32.2. No welding, cutting or heating will be done where the application of flammable paint or presence of other flammable compounds, or heavy dust concentrations, creates a fire hazard.

15.32.3. Equip torches with anti-flashback devices.

15.32.4. Arc welding and cutting operations will be shielded by non-combustible or flameproof shields to protect employees from direct arc rays.

15.32.5. When electrode holders are left unattended, electrodes will be removed and holder will be placed or protected so they cannot make electrical contact.

15.32.6. All arc welding and cutting cables will be completely insulated

15.32.7. There will be no repairs or splices within 10 feet of electrode holder, except where splices are insulated equal to the insulation of the cable.

15.32.8. Defective cable will be repaired or replaced.

15.32.9. Fuel gas and oxygen hose must be easily distinguishable and not interchangeable.

15.32.10. Inspect hoses at beginning of each shift and repair or replace if defective.

15.32.11. General mechanical or local exhaust ventilation or air line respirators will be provided, as required, when welding, cutting or heating hazardous materials or in confined spaces.

15.32.12. Always wear approved tinted eye protection when welding or when in areas where welding is being done.

15.32.13. Fire extinguishers must be within fifty feet (50') of any welding/cutting operation.

15.33. **Wire Ropes, Chains, Ropes and Other Rigging Equipment**

15.33.1. Wire ropes, chains, ropes and other rigging equipment will be inspected prior to use and as necessary during, use to assure their safety.

15.33.2. Remove defective rigging equipment from service immediately,

15.33.3. Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, or other such attachments will not be used.

15.33.4. When U-bolts are used for eye splices, the U-bolt will be applied so the "U" section is in contact with dead end of rope.

15.34. **Construction Equipment**

15.34.1. For the purpose of this procedure, construction equipment shall include all power-driven equipment or manually-operated equipment which, because of its size, nature of its work, or its method of operation, excludes it from the hand tool category (e.g. crane, trucks, forklifts, excavators, and manlifts).

15.34.2. Operators, regardless of other inspections, must make a daily check of brakes, horn, lights, clutch, steering, and other devices required for safe operation. It is each subcontractor's responsibility to ensure compliance with these requirements.

15.35. **Responsibilities**

15.35.1. Minimum standards, including all OSHA required equipment, will be established with the vendor by the subcontractor's person responsible for purchase or rental. This may be the construction equipment consultant, purchasing, or safety department.

15.35.2. The subcontractor's construction craft general foreman will assure that all major equipment and rental equipment is inspected with proper documentation. Upon arrival at the site prior to going into service

15.35.3. Monthly thereafter, according to inspection and maintenance guidelines as outlined on the major equipment inspection forms provided by the subcontractor.

15.35.4. Items for inspection are to be listed on the major equipment inspection form provided by each subcontractor. One (1) copy will be posted on equipment in a plastic envelope; the other will be kept on file with the Safety Manager.

15.35.5. The subcontractor's craft general foreman is responsible for insuring that all periodical maintenance functions are performed on schedule.

15.35.6. Subcontractor's craft general foreman will coordinate the inspection and maintenance functions.

15.35.7. Subcontractor's equipment shall be inspected and maintained by the subcontractor in accordance with OSHA regulations. The subcontractor must assure that this contractual requirement is fulfilled.

15.36. **Control**

15.36.1. Control of equipment includes, but is not limited to:

15.36.1.1. Maintenance and Repair

15.36.1.2. Fire protection

15.36.1.3. Field application

15.36.1.4. Certification of operator

15.36.2. The following lists important details for safe use of construction equipment:

15.36.2.1. Need for signal or person back-up alarm, or both

15.36.2.2. Drivers must leave truck cab during loading

15.36.2.3. Maintenance of inspection records

15.36.2.4. Live boom equipment not permitted

15.36.2.5. Lights, hoe, mirrors, brakes, windshields, etc., shall be clean, in good repair and operable.

15.36.2.6. Re-fueling and lubrication procedures and location established

15.36.2.7. All mobile equipment must have back-up alarms.

15.36.2.8. All heavy equipment operators must be trained and qualified to operate the equipment they are assigned.

15.36.2.9. Refer to ANSI Standard B30.5 for operation, inspection. and control for all cranes and to 29 CFR, 1926,952 for other mechanical equipment (i.e., forklifts, aerials lifts, back-hoes).

15.37. **Designation of Competent Person**

15.37.1. OSHA requires the designation of competent persons for certain tasks. Beta Engineering's subcontractors shall identify the competent persons assigned to each task. The competent persons shall be identified to Beta's Construction Managers.

16. Construction Safety Program

16. CONSTRUCTION SAFETY PROGRAM

16.1. General Safety Rules

16.1.1. This safety handbook is intended to be referred to as a guide for construction personnel and does not take precedence over any customer or Beta Engineering safety rules and regulations previously developed and enforced. All employees will receive an onsite safety orientation prior to any work assignment.

16.1.2. Employees must always wear appropriate safety equipment such as hard hats, safety glasses with permanently attached side shields, proper hearing protection,(if necessary) steel toed boots, class II safety vest or shirt and must also be fully clothed at all times. Shorts or cut-offs, “muscle man” shirts or tee shirts are not permitted.

16.1.3. All injuries are to be reported immediately.

16.1.4. Unsafe conditions or safety hazards are to be reported to the onsite safety engineer or your immediate supervisor.

16.1.5. All warning signs, safety signs, barricades, restricted areas, and areas roped or cordoned off to regular traffic or personnel shall be heeded at all times.

16.1.6. Work areas shall be kept clear and free of debris at all times. Good house keeping will be a requirement of all employees.

16.1.7. Employees working at a height of six (6) feet above floor or ground level will be secured with an approved body or safety harness and lanyard.

16.1.8. Scaffolds or work platforms erected more than ten (10) feet above floor or ground level will have guardrails and toe boards on all open sides. No wooden scaffolding or platforms will be permitted unless pre-approved by the site Safety Manager.

16.1.9. Employees are cautioned never to blow off dust from bare skin or clothing using compressed air, oxygen, nitrogen or any inert bottled gas.

16.1.10. Never walk or stand under a suspended load.

16.1.11. All employees must familiarize themselves with the location of safety equipment.

16.1.12. No one will be allowed to enter a confined area or space without proper authorization.

16.1.13. Under no circumstances shall anyone report for work under the influence of alcohol or drugs not prescribed by a physician. Any person doing so may be subject to immediate dismissal.

16.1.14. All floor openings shall be either guarded with adequate hand railing or covered to protect personnel.

16.1.15. Be aware of slipping hazards such as grease and oil and take every precaution to eliminate the problem by removing or cleaning up the substance.

16.1.16. Before entering a work area visually assess the surroundings and ensure that you are satisfied that the area is safe and free of any potential risk or danger.

16.1.17. Do not attempt to run or operate any machinery, powered tool or energized equipment unless qualified and authorized to do so.

16.1.18. Compressed air or gas cylinders are to be secured in an upright position in such manner that they cannot fall or be dislodged. The cylinder valve caps will be placed adjacent to the cylinders and shall be placed on the cylinders whenever they are moved, stored or the valve is exposed without a gauge in place for any length of time.

16.1.19. Horseplay of any kind will not be permitted and may be reason for immediate dismissal.

16.1.20. Anyone planning to work overhead will examine the area below and take all necessary action to restrict the area by roping or cordoning it off, placing necessary safety signs, and advising the site safety engineer that work is on going in that specific area.

16.1.21. Do not attempt to signal a crane or hoisting apparatus operated by a hoisting engineer unless you have been suitably trained and qualified to give hand signals.

16.1.22. Before using any hazardous materials, review the MSDS (material safety data sheet) to learn and understand the use and possible effects of the substance. Strictly obey all instructions on the MSDS literature and wear appropriate clothing and protection.

16.1.23. Never use a tool that has become defective or damaged in any way. Stop work immediately and have the tool repaired or replaced.

16.1.24. Always inspect your safety equipment, lanyards, safety harnesses, safety glass frames, gloves etc. making sure to correct or replace any item which is found to be defective or damaged.

16.2. **Unloading and Storage of Equipment**

16.2.1. Never stand behind a forklift or mobile crane while unloading or loading equipment. Always remain in full view of the operator.

16.2.2. Any item to be unloaded which exhibits a danger sign or hazard sign should be acknowledged and handled with extreme care.

16.2.3. Check rigging or lifting gear for wear or damage frequently and replace or repair as required.

16.2.4. Be familiar with weight capacities and limitations of cranes, hoists or forklifts used for unloading or loading equipment and never exceed the rated capacities.

16.2.5. Only one signal person is normally required during operations and the operator should not be required to make moves or lifts by other signal persons.

16.2.6. When loading or unloading in the vicinity of live electrical equipment or overhead high voltage cables always remain a safe distance of twenty (20) feet minimum from the source or stay in strict compliance with all rules pertaining to operations near power lines.

16.2.7. Be familiar with the capacities and safe working loads of all wire rope, fabric slings, shackles, sheaves, and blocks and never exceed the rated safe working loads.

16.2.8. Never use manila rope as a sling or choker to unload or load equipment. Rope is generally used as a tag line during hoisting operations.

16.2.9. Never use wire rope chokers or slings that have become frayed. Not only does this diminish the lifting capability of the wire rope but also presents a potential danger to the handler. Wire rope strands can easily penetrate both leather gloves and clothing.

16.2.10. Never ride the load from point to point under any circumstances.

16.2.11. All off loaded equipment or material will be placed on cribbing or blocking (min. 3”) to ensure that it remains off any floor or surface which may become wet or exposed to foreign substances which could cause damage. This will also facilitate future loading to installation site.

16.2.12. All storage areas whether under roof or outside must be maintained in a neat and orderly fashion and all items must be placed so that they are individually accessible. Cardboard, crating, packing materials, debris etc. must be removed from storage areas on a regular basis.

16.3. **Structural Steel and Casing Erection**

16.3.1. When erecting columns anchor bolts must be secure and nuts drawn tight. Columns are to be shimmed properly and guyed off to ensure they are safe and stable prior to unhooking or “cutting loose”.

16.3.2. The erection area will be restricted to all unauthorized personnel and the area will display the proper barricades, cordoning, signs etc.

16.3.3. Steel erectors are to comply with the “tie-off” rule when working on the structure and all workers are to use the approved harness and lanyard which will be introduced during safety orientation.

16.3.4. Never put yourself or others at risk by trying to walk a wobbly or un-stabilized beam. Check and make sure that the beam is properly connected at both ends then place both feet on the lower flange and both hands on the top flange and carefully walk or “coon” the beam.

16.3.5. Always check with the Beta Engineering Construction Manager before attempting to cut any structural item or casing section with a burning torch. If authorized to proceed make sure the proper burning goggles are worn and that the area has been checked for any hazardous material. If the burning operations are conducted above floor or ground level check the area below and make sure that there is no potential for injury to others and that the area is clear of combustibles such as wood, cardboard etc.

16.3.6. During bolting-up operations never drive a drift pin or bull pin in a hole and attempt to remove the connecting bolt or bolts. Always tighten the connecting bolts down after the pins have been driven then install the correct size bolts in the holes, snug them down with a spud wrench, change or tighten down the connecting bolts then remove the drift pins or bull pins.

16.3.7. Never swing the air impact wrench to another worker by using the compressed air hose as a line. Always use a rope secured to the tool to transfer or lift the impact wrench.

16.3.8. When using any air powered reamers or corner reamers always remember that this is a two-person operation and never try to operate a reamer alone.

16.3.9. If hanging or suspended scaffolds are required (floats, angel wings etc.) make sure that these items have been pre-approved for use by the site safety engineer prior to attempting to use them.

16.3.10. During welding operations make sure that all welding equipment and electrodes are dry and free from grease or oil and that proper eye protection is worn by both fitter and welder and that the surrounding area has been shielded from ultra-violet exposure to others working in the area.

16.3.11. Replace all cutting torch hose or welding cable that is damaged or worn and be sure that no cable is exposed through the insulation.

16.3.12. Whenever other trades or personnel are working in the area below the steel erectors and burning or welding is necessary the proper safety protection such as insulating fire blankets, barricades and a safety person will be required. The safety person will be responsible for monitoring the surrounding area for fire and for re-directing other workers from the area.

16.3.13. When working in close or confined quarters with a mobile or crawler crane the area where the crane is positioned must be restricted to unauthorized persons and should be flagged or barricaded to prevent anyone being caught between the swinging counter weight and nearby railings, structures or other machinery.

16.3.14. Keep hands away from sheaves, chokers, snatch blocks, etc. during lifting or hoisting operations.

16.3.15. The use of telescoping manlifts is highly recommended for overhead access and contractors are advised to consider their use whenever feasible.

16.4. **Electrical**

16.4.1. Always disconnect power to any equipment before servicing.

16.4.2. Any time a person has come in contact with an energized electrical circuit that person is considered part of the energized circuit. Do not attempt to remove that person from the circuit without de-energizing the circuit unless you are using approved insulated equipment.

16.4.3. All circuits must be considered live and dangerous unless previously de-energized and tagged. Make sure you check the termination point at the feed end.

16.4.4. When performing any construction repair work on any energized electrical equipment, circuits are to be disconnected by the person doing the work. Switches must be locked open, blocked or the fuses removed. A “danger - do not operate” tag bearing the name of the person doing the work and the current date must be attached also. To further insure safety the circuit should be grounded with a jumper cable. Any person or individual caught removing a “danger - do not operate” tag not authorized to do so may be subject to immediate dismissal.

16.4.5. Temporary lighting and power outlets will be required throughout the entire project. Install the temporary wiring and related equipment to the existing structural steel members as much as possible and do not allow temporary cable or wire to hang suspended and unsupported over distances greater than four (4) feet. Do not allow live cable or equipment to lay unprotected or loose on floors or access walkways.

16.4.6. Do not leave conduit sections unchecked and lying about loosely on floors. Contain your conduit and clean up any small pieces of conduit that may present a hazard.

17. Mobile Equipment Programs

17. MOBILE EQUIPMENT PROGRAMS

17.1. Powered Industrial Trucks

17.1.1. Workers operating powered industrial trucks must be properly trained and qualified on the equipment that they are operating.

17.1.2. Workers who must handle and store materials often use fork trucks, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electrical motors or internal combustion engines. Affected workers, therefore, should be aware of the safety requirements pertaining to fire protection, and the design, maintenance, and use of these trucks. Workers are not allowed to operate equipment without specific training to operate that equipment.

17.1.3. All new powered industrial trucks, except vehicles intended primarily for earth moving or over the-road-hauling, shall meet the design and construction requirements for powered industrial trucks established by the American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969. Approved trucks also bear a label or some other identifying mark indicating acceptance by a nationally recognized testing laboratory.

17.1.4. Modifications and additions that affect capacity and safe operation of the trucks shall not be performed by Beta Engineering or –its subcontractors without the manufacturer's prior written approval. In these cases, capacity, operation, and maintenance instruction plates and tags or decals must be changed to reflect the new information. If the truck is equipped with front-end attachments that are not factory installed, the user should request that the truck be marked to identify these attachments and show the truck's approximate weight, including the installed attachment, when it is at maximum elevation with its load laterally centered.

17.1.5. There are 11 different types of industrial trucks and tractors, some having greater safeguards than others. There are also designated conditions and locations under which the vast range of industrial-powered trucks can be used. In some instances, powered industrial trucks cannot be used, and in others, they can only be used if approved by a nationally recognized testing laboratory for fire safety. For example, powered industrial trucks must not be used in atmospheres containing hazardous concentrations of the following substances:

17.1.5.1. Acetylene

17.1.5.2. Butadiene

17.1.5.3. Ethylene oxide

17.1.5.4. Hydrogen (or gases/vapors equivalent in hazard to hydrogen, such as manufactured gas).

17.1.5.5. Propylene oxide

17.1.5.6. Acetaldehyde

17.1.5.7. Cyclopropane

17.1.5.8. Dimethyl ether

17.1.5.9. Isoprene

17.1.5.10. Unsymmetrical dimethyl hydrazine

17.1.6. These trucks are not to be used in atmospheres containing hazardous concentrations of metal dust, including aluminum, magnesium, and other metals of similarly hazardous characteristics or in atmospheres containing carbon black, coal, or coke dust. Where dust of magnesium, aluminum, or aluminum bronze dusts may be

present, the fuses, switches, motor controllers, and circuit breakers of trucks must be enclosed with enclosures approved for these substances.

17.1.7. There are also powered industrial trucks or tractors that are designed, constructed, and assembled for use in atmospheres containing flammable vapors or dusts. These include industrial-powered trucks equipped with additional safeguards to their exhaust, fuel, and electrical systems; with no electrical equipment, including the ignition; with temperature limitation features; and with electric motors and all other electrical equipment completely enclosed.

17.1.8. These specially designed powered industrial trucks may be used in locations where volatile flammable liquids or flammable gases are handled, processed, or used. The liquids, vapors, or gases should, among other things, be confined within closed containers or closed system from which they cannot escape.

17.1.9. Only powered industrial trucks that do not have any electrical equipment, including the ignition and have their electrical motors or other electrical equipment completely enclosed should be used in atmospheres containing flammable vapors or dust.

17.1.10. Powered industrial trucks that are either powered electrically by liquefied petroleum gas or by a gasoline or diesel engine are used on piers and wharves that handle general cargo.

17.1.11. Safety precautions the user may observe when operating or maintaining powered industrial trucks include:

17.1.11.1. That high lift rider trucks be fitted with an overhead guard, unless operating conditions do not permit.

17.1.11.2. That fork trucks be equipped with vertical load backrest extension according to manufacturers' specifications, if the load presents a hazard.

17.1.11.3. The battery charging installations be located in areas designated for that purpose.

17.1.11.4. That facilities be provided for flushing and neutralizing spilled electrolytes when changing and recharging a battery to prevent fires, to protect the charging apparatus from being damaged by the trucks, and to adequately ventilate fumes in charging area from gassing batteries.

17.1.11.5. That conveyor, overhead hoist, or equivalent materials handling equipment be provided for handling batteries.

17.1.11.6. That auxiliary directional lighting be provided on the truck where general lighting is less than 2 lumens per square foot.

17.1.11.7. That arms and legs not be placed between the uprights of the mast or outside the running lines of the truck.

17.1.11.8. That brakes be set and wheel blocks or that adequate protection be in place to prevent movement of trucks, trailers, or railroad cars when using trucks to load and unload materials onto train box cars.

17.1.11.9. That sufficient headroom be provided under overhead installations, lights, pipes, and sprinkler systems.

17.1.11.10. That personnel on the loading platform have the means to shut off power to the truck.

17.2. **Cranes**

17.2.1. Each subcontractor must submit their crane safety program for approval or adhere to this program.

17.2.2. Only thoroughly trained and competent persons are permitted to operate cranes. All crane operators must be certified by the "National Commission for the Certification of Crane Operators" (NCCCO). Operators should know what they are lifting and what it weighs. The rated capacity of mobile cranes varies with the length of the boom and the boom radius. When a crane has a telescoping boom, a load may be safe to lift at a short boom length and/or a short boom radius, but may overload the crane when the boom is extended and the radius increases.

17.2.3. All movable cranes must be equipped with a boom angle indicator, those cranes with telescoping booms must be equipped with some means to determine the boom length, unless the load rating is independent of the boom length. Load rating charts must be posted in the cab-operated cranes. All mobile cranes do not have uniform capacities for the same boom length and radius in all directions around the chassis of the vehicle.

17.2.4. Always check the crane's load chart to ensure that the crane in not going to be overloaded for the conditions under which it will operate. Plan lifts before starting them to ensure that they are safe. Take additional precautions and exercise extra care when operating around power lines.

17.2.5. Some mobile cranes cannot operate with outriggers in the traveling position. When used, outriggers must rest on firm ground, on timbers, or be sufficiently cribbed to spread the weight of the crane and the load over a large enough area. This will prevent the crane from tipping during use. Hoisting chains and ropes must always be free of kinks or twists and must never be wrapped around a load. Loads should be attached the load hook by slings, fixtures, or other devices that have the capacity to support the load on the hook. Sharp edges of loads should be padded to prevent cutting slings. Proper sling angles shall be maintained so that slings are not loaded in excess of their capacity.

17.2.6. All cranes must be inspected frequently by persons thoroughly familiar with the crane, the methods of inspecting the crane, and what can make the crane unserviceable. Crane activity, the severity of use, and environmental conditions should determine inspection schedules. Critical parts, such as crane operating mechanisms, hooks, air or hydraulic systems components and other load-carrying components, should be inspected daily for any maladjustment, deterioration, leakage, deformation, or other damage. In addition to regular crane inspections, all cranes must also have an "annual crane inspection/certification" performed by a qualified crane inspector and the certificate of inspection shall be provided to Beta prior to any work performed with that crane.

17.3. AERIAL LIFTS

17.3.1. Purpose

To define the procedures and standards that apply to the care, control, maintenance, inspection, and operation of aerial personnel lifts.

Applies to all Beta work sites, i.e., offices, jobsites, etc., requiring the use of aerial personnel lifts.

17.3.2. **Aerial personnel lift** means any vehicle-mounted device, telescoping or articulating, or both, which is used to position personnel. These include extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and a combination of any of the above. Also for the purposes of this Policy, powered work platforms and scissor lifts shall be considered as aerial personnel lifts.

17.3.3. **Articulating boom platform** means an aerial personnel lift with two or more hinged boom sections.

17.3.4. **Extension boom platform** means an aerial personnel lift (except ladders) with a telescopic or extension boom. Telescopic derricks with personnel platform attachments shall be considered to be extension boom platforms when used with a personnel platform.

17.3.5. **Insulated aerial device** means an aerial personnel lift designed for work on energized lines and apparatus.

17.3.6. **Platform** means any personnel-carrying device (basket or bucket) that is a component of an aerial personnel lift.

17.3.7. **Vertical tower** means an aerial personnel lift designed to elevate a platform in a substantially vertical axis.

17.3.8. **Requirements**

17.3.8.1. Equipment that is not designed for use as a personnel lift shall not be used as a personnel lift (e.g., front end loader buckets, backhoe buckets and cranes).

17.3.8.2. Only trained personnel who have been designated by their supervisor are authorized to operate aerial personnel lifts. Aerial lifts shall be inspected before use (reference sample Inspection Form, Section 8).

17.3.8.3. Lift controls shall be tested prior to use to determine that such controls are in safe working condition.

17.3.8.4. Review and follow electrical safety requirements for use of aerial personnel lifts as found in this manual.

17.3.8.5. Review and follow fall protection requirements for aerial personnel lifts as found in the Fall Protection section of this manual. Personnel should not be permitted to stand on the rails of aerial devices. A body harness shall be worn and a lanyard appropriately attached.

17.3.8.6. Personnel shall not be permitted to use an aerial personnel lift as a means of access. In the event that there are no other means of access, specific procedures including rationale (feasibly), duration, evacuation, fall protection, etc. shall be developed and reviewed with affected employees prior to implementation.

17.3.8.7. Large or excessive amounts of material, excluding tools, shall not be transported in an aerial personnel lift. Other material lifts would be necessary for such activities.

17.3.8.8. Load limits specified by the manufacturer shall not be exceeded.

17.3.8.9. Aerial personnel lifts that can operate horizontally shall set brakes and outriggers, when used, be positioned on pads or a solid surface, and chock wheels before using on an incline.

17.3.9. **Boom and Ladder Lift Units**

17.3.9.1. Before ladder trucks and tower trucks are moved from site to site, the aerial ladders shall be secured in the lower traveling position by the locking device above the truck cab, and the manually operated device at the base of the ladder, or by other equally effective means (e.g., cradles which prevent rotation of the ladder in combination with positive acting linear actuators).

17.3.9.2. An aerial lift truck may not be moved when the boom is elevated in a working position with personnel in the basket, except for equipment that is specifically designed for this type of operation.

17.3.9.3. Articulating boom and extendible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

17.3.9.4. The insulated aerial devices shall not be altered in any manner that might reduce its insulating value. The insulated boom of a lift shall be regularly maintained and certified to ensure the continued insulating properties.

17.3.9.5. Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position.

17.3.10. **References**

OSHA CFR 29 1926.453, .952(b), and .955(e)(12)

18. Man Basket Lift Check List

18. MAN BASKET LIFT CHECK LIST

All man baskets used on any Beta Engineering project shall meet all OSHA and manufacture requirements. All man baskets must have a capacity data plate on the basket and the basket shall be load/lift test prior to use. All of the following questions must be answered prior to using the man basket.

18.1. Is the load line capable of supporting at least seven times the maximum intended load?

18.2. Are the load and boom hoist drum brakes, swing brakes and locking devices engaged when the basket is in a stationary position?

18.3. Does the total weight of the loaded personnel platform and related rigging exceed 50 percent of the rated capacity for the radius and configuration of the crane?

18.4. Is the crane equipped with an anti-two-blocking device?

18.5. Does the crane hook have a safety clip which eliminates the hook throat opening?

18.6. Has a trail lift been made (immediately prior to placing personnel on the platform)?

18.7. Does the platform, when lifted, hang properly balanced and secure?

18.8. Has the platform been proof tested?

18.9. Has a pre-lift meeting been held?

19. Industrial Hygiene Programs

19. INDUSTRIAL HYGIENE PROGRAMS

19.1. HEARING CONSERVATION PROGRAM

19.1.1. Purpose

To ensure compliance with the Federal Occupational Safety and Health Act (OSHA) of 1970, specifically CFR 1910.95, entitled "Occupational Noise Exposure," Beta Engineering. will administer a continuing, effective hearing conservation program. The program will be used whenever employee noise exposures equal or exceed an eight (8) hour time-weighted average sound level (TWA) of 85 decibels (dba) (measured on the “A” scale) or a dose of 50%. The hearing conservation program implemented by BETA Engineering will consist of seven (7) basic components:

19.1.1.1. Employee Training

19.1.1.2. Noise Exposure Monitoring

19.1.1.3. Engineering and Administrative Controls

19.1.1.4. Audiometric Evaluation

19.1.1.5. Use of Hearing Protection Devices

19.1.1.6. Education and Motivation

19.1.1.7. Record-keeping

19.1.1.8. Program Evaluation

19.1.2. Noise Exposure Monitoring

19.1.2.1. Project Management will notify the Safety Department if Project Management suspects the noise levels may be near or exceed the level of 85 decibels.

19.1.2.2. The Safety Department will develop and implement a noise level monitoring program. The monitoring program will determine the level of employee exposure. If initial monitoring indicates levels are safely below the permissible exposure levels (PEL), there is no need to implement a hearing conservation program. If the noise levels are at or near the 85 dba level, the hearing conservation program must be initiated. Workers exposed at 85 dba or above will immediately be provided with, and required to wear, hearing protection until the noise levels can be reduced by engineering controls.

19.1.2.3. Monitoring will be repeated whenever there is a change in equipment, the work in progress or other conditions that may affect employees’ exposure to noise.

19.1.3. Engineering and Administrative Controls

19.1.3.1. The use of engineering controls should the first method used to reduce or eliminate noise exposure. To ensure results, Beta Engineering will specify low noise levels when purchasing new equipment.

19.1.3.2. The equipment operators will advise the project management team and the Safety Department when they suspect noise levels are at or near the 85 dba level. Equipment operators will use the equipment in a way to keep the noise level as low as possible.

19.1.3.3. In some instances, it may be necessary to limit the number of employees in an area when the noise levels are high.

19.1.4. Audiometric Evaluation

19.1.4.1. Audiometric tests will be made available to employees whose exposures equal or exceed the eight hour time weighted average of 85 dba. This test will be repeated at least annually, if the employee remains exposed to the noise levels. The initial testing will be performed to establish the baseline audiogram. The employee shall not be exposed to the identified workplace noise for a minimum of 14 hours prior to the audiometric test.

19.1.4.2. If there is an audiometric test that reveals a threshold shift in an employee's hearing the source of the workplace noise and hearing protection (PPE) will be re-evaluated by the safety department.

19.1.5. **Use of Hearing Protection Devices**

19.1.5.1. In the absence of feasible engineering or administrative controls, Beta Engineering and its subcontractors will provide all employees in the hearing conservation program with hearing protection devices. Each employee may react differently to the use of such devices; our program will respond to individual needs. Several different types of protectors will be made available for employees.

19.1.5.2. Employees will be trained in how to reduce their exposure to noise; how noise affects their hearing; the need for hearing protection; how to wear their hearing protectors correctly at all times; when to seek replacements; encouraging coworkers to use these devices; and communicating problems to their supervisor.

19.1.5.3. When employees are exposed to the 85 dba level, hearing protectors are not optional. OSHA requires Beta Engineering to enforce their consistent use by employees and subcontractors.

19.1.6. **Training and Motivation**

19.1.6.1. Beta Engineering believes that education and motivation are essential components to the success of our hearing conservation program. Education and motivation sessions are valuable for both the management team and employees so they will understand that a successful hearing conservation program takes commitment, communication and cooperation. All affected employees shall have access to information, training, monitoring records and their own personal information regarding the Hearing Conservation Program.

19.1.6.2. Employees exposed at or above 85 dba will be trained at least annually in the following:

- The effects of noise on hearing
- The purpose of hearing protectors
- The advantages, disadvantages and attenuation of various types
- Selection, care and fitting of various types
- The purpose of audiometric testing and test results

19.1.7. **Record-keeping**

Records to be retained include:

19.1.7.1. All employee exposure records, including the name of employee, date of test or exam, examiners' name, date of the last calibration of the audiometer and employee's most recent noise exposure assessment

19.1.7.2. Noise-exposure measurement

19.1.7.3. All audiograms

19.1.7.4. Records will be retained for the duration of employment plus two years

19.1.7.5. Safety personnel will see that the information entered into the records is accurate, legible, complete and self-explanatory. Also, they will also ensure that records are standardized, cross-referenced and properly maintained.

19.1.7.6. Employees shall have the right to inquire about their hearing status and access their records at any and all times they desire.

19.1.8. **Program Evaluation**

19.1.8.1. To determine the extent to which our hearing conservation program is working, Beta Engineering or its subcontractor will perform a thorough evaluation of all the hearing conservation program components.

19.1.8.2. In completing this task, Beta Engineering will evaluate the audiometric data. This approach will consist of evaluating the results of audiometric tests, both for individuals and for groups of noise-exposed employees.

19.1.8.3. The safety personnel will be responsible for the database analysis.

19.1.8.4. As with many other aspects of the Hearing Conservation Program, it is the employee's responsibility to provide feedback to safety personnel and the management team on the program's merits and shortcomings.

19.2. BLOODBORNE PATHOGENS

19.2.1. Purpose

Employees who have been identified as having a predetermined risk of occupational exposure to Bloodborne Pathogens shall be provided with appropriate procedural precautions and training. All employees that are identified and covered under this plan be issued a copy of the Exposure Control Plan and will have access to the Bloodborne Pathogens Program.

This program covers minimum performance standards applicable to all employees and locations. Local practices requiring more detailed or stringent rules, or local, state or other federal requirements regarding this subject can and should be added as an addendum to this procedure as applicable.

Applies to all office and work sites. (Note that applicability is limited to those few individuals whose job duties require them to have potential exposure to blood or other potentially infectious materials.)

19.2.2. **Approved Disinfectant** means a bleach/water solution in a ratio of 1:10 or any commercially available disinfectant such as Betacide or Madacide.

19.2.3. **Blood** means human blood, human blood components and products made from human blood.

19.2.4. **Bloodborne Pathogens** means pathogenic microorganisms that are present in human blood and can cause disease in humans. These Pathogens include, but are not limited to, Hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

19.2.5. **Contaminated** means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

19.2.6. **Decontamination** means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

19.2.7. **Engineering Controls** means any controls that isolate or remove the bloodborne pathogens hazard from the workplace.

19.2.8. **Exposure Incident** means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that result from the performance of an employee's duties.

19.2.9. **First Responder (Mandatory or Voluntary)** means any employee who has received accredited training in first aid and/or cardiopulmonary resuscitation (CPR). A "Mandatory" First Responder is someone who, as part of their job duties, has been designated to render first aid/CPR assistance to persons who require emergency assistance while on company property or jobsites. A "Voluntary" First Responder is someone who has been trained but whose job duties do not require them to render first aid/CPR. (Very few, if any, Beta employees will have first aid/CPR included as a required job duty.)

19.2.10. **Hand-washing Facilities** means a facility providing an adequate supply of running potable water, soap, and single use towels or hot air drying machines.

19.2.11. **HBV** stands for Hepatitis B virus.

19.2.12. **HIV** stands for Human Immunodeficiency Virus.

19.2.13. **Licensed Healthcare Professional** means a person whose legally permitted scope of practice allows him or her to independently perform the activities required by Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up.

19.2.14. **Occupational Exposure** means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

19.2.15. **Other Potentially Infectious Materials (OPIM)** includes the following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and body fluids in situations where it is difficult or impossible to differentiate between body fluids; any unfixed tissue or organ (other than intact skin) from a human (living or dead); and HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

19.2.16. **Parenteral** means piercing mucous membranes or the skin barrier through such events as human bites, cuts, and abrasions.

19.2.17. **Responsible Person (Personnel)** means any person or persons trained in the control of disinfection procedures and disposal procedures of equipment, product or materials suspected to be contaminated with Bloodborne Pathogens.

19.2.18. **Source Individual** means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee.

19.2.19. **Universal Precautions** means an approach to infection control. According to the concept of Universal Precautions, human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

19.2.20. **Work Practice Controls** means controls that reduce the likelihood of exposure by altering the manner in which a task is performed.

19.2.21. **Exposure Determination**: Job classifications shall be reviewed by the Safety Officer to determine activities that involve potential occupational exposure to bloodborne pathogens or OPIM. Very few (if any) jobs at Beta will involve such exposure as part of a designated job duty.

19.2.22. **Training**

19.2.22.1. Bloodborne Pathogen Exposure Control training shall be held within ninety (90) days of the effective date of hire, initially upon work site assignment, and annually for applicable employees. This training shall include employees who serve as Voluntary First Responders.

19.2.22.2. A hard copy of this Bloodborne Pathogens Exposure Control Program shall be provided to every applicable employee trained.

19.2.23. **Exposure Prevention**

Universal Precautions: Employees shall adhere to the Universal Precautions method, that is, all human blood and OPIM shall be treated as if known to be infectious for HIV, HBV (Hepatitis B Virus), HCV (Hepatitis C Virus) or other bloodborne pathogens. Where differentiation of types of body fluids is difficult or impossible, all body fluids are to be considered potentially infectious and appropriate personal protective equipment shall be utilized. See 19.2.25 of this program.

19.2.24. **Engineering Controls and Work Practice Controls**

19.2.24.1. Engineering controls and work practice controls are to be the primary methods used to prevent occupational transmission of HBV and HIV. Engineering Controls reduce employee exposure at the work site by either removing or isolating the hazard or isolating the employee from exposure. Engineering controls shall be examined and maintained or replaced on a scheduled basis. Proper work practice controls change the manner in which a task is performed.

19.2.24.2. Employees who come in contact with the blood of another person or other potential infectious materials shall wash their hands and any other skin with soap and water; if contact with eyes, mouth or nose, flush area with water immediately or as soon as possible following such contact. When hand-washing facilities are unavailable, employees shall use antiseptic cleanser and paper towels or antiseptic towelettes. Employees must know where the hand-washing facilities and other hand-washing supplies are located.

19.2.25. **Personal Protective Equipment**

19.2.25.1. If occupational exposures remain after instituting engineering and work practice controls, personal protective equipment (PPE) shall be used. PPE is considered appropriate only if it does not permit blood or other potentially infectious materials to pass through or reach employees' work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of the time that the PPE shall be used.

19.2.25.2. Types of PPE include gloves, gowns, masks, mouthpieces and resuscitation bags. If the PPE is reusable, it shall be repaired, replaced and/or cleaned when necessary.

19.2.25.3. First Responders and Responsible Personnel shall have an Infection Protection Kit in their possession. Contents of an Infection Protection Kit should include the following items:

- Antiseptic Towelettes
- Rubber latex gloves
- Face mask
- Disposable body gown and shoe covers
- Protective eye wear
- Biohazard bag with secure tie
- Area Control Biohazard warning tape and signs

19.2.25.4. Disposable PPE shall not be reused. If circumstances require the use of this equipment, it shall be properly disposed of after its use in the designated leak-proof container.

19.2.25.5. First Responders certified in CPR shall be provided with plastic mouth shields to protect a first responders' mouth area while performing Artificial Respiration or Cardiopulmonary Resuscitation (CPR).

19.2.25.6. First Responders and Responsible Personnel shall be required to use PPE when performing first aid on another person or decontaminating suspected contaminated equipment, products, or materials. It shall be the responsibility of each person rendering first aid assistance to use the appropriate degree of discretion and judgment necessary when deciding what type of PPE should be utilized for the given circumstances. However, when rendering immediate first aid to a bleeding person, First Responders shall use all appropriate PPE in their assigned Infection Protection Kits that offer protection from blood. If the First Responder makes a judgment in a given circumstance, that the use of PPE shall impede the delivery of first aid treatment or pose an increased hazard to the safety of the injured person or other employees, this judgment shall be documented.

19.2.26. **Housekeeping**

Any surface that has been exposed to potentially infectious materials shall be decontaminated.

19.2.27. **Vaccinations**

19.2.27.1. Hepatitis B vaccinations shall be made available to employees who have occupational exposure to blood within 10 working days of applicable work site assignment, at no cost, at a reasonable time and place, and under the supervision of a licensed physician/licensed healthcare professional, and according to the latest recommendations of the U.S. Public Health Service. Employees shall sign a declination form if they choose not to be vaccinated, but may later opt to receive the vaccine at no cost to the employee.

19.2.27.2. Employees identified as Mandatory First Responders or Responsible Persons, shall be immediately eligible to be prescreened for the presence of Hepatitis B virus antibodies and to receive a Hepatitis B Vaccine at no cost to the employee within ten (10) working days of their designation as a First Responder or Responsible Person. Employees who decline a Hepatitis B vaccination shall sign a Hepatitis B Vaccination Declination Form.

19.2.27.3. Employees shall be provided with a copy of the medical provider's written report within fifteen (15) working days of receipt.

19.2.27.4. If the U.S. Public Health Service recommends a routine dose(s) of Hepatitis B vaccine at a future date, such booster dose(s) shall be made available at no charge.

19.2.28. **Exposure Incidents**

19.2.28.1. An exposure incident may occur if an employee comes into contact with the blood of another person or some other potentially infectious material. If any exposure incident occurs, the construction manager (subcontractor safety representative) shall ensure that the area and/or equipment that has been contaminated by blood or other potentially infectious materials is secured from inadvertent exposure to others by placing warning tape and signs around the contaminated area. Signs shall not be removed until the area is thoroughly cleaned and disinfected with disinfectant solution by a Responsible Person wearing appropriate Personal Protective Equipment.

19.2.28.2. The construction manager (subcontractor safety representative) shall document the incident on the Blood and Body Fluid Exposure Report.

19.2.28.3. When any employee is subject to an exposure incident, regardless of whether or not that employee is a designated First Responder, the construction manager (subcontractor safety representative) shall:

- Immediately refer that employee to the designated medical provider
- Ensure that the employee subjected to the exposure incident receives a confidential medical evaluation and follow up
- Provide the designated medical provider with a copy of the completed Blood and Fluid Exposure Report as soon as possible following the investigation of the exposure incident
- Request the source individual voluntarily submit to serological blood test to screen for the presence of Hepatitis B (HBV) and human immunodeficiency (HIV) virus antibodies. If the source individual agrees to be tested, the person shall be directed to the designated medical provider
- Request the source individual provide the medical provider for the employee subjected to the exposure incident the results of blood tests conducted on the source individual

19.2.28.4. If the source individual refuses to voluntarily submit to blood testing, advise the medical provider that the source individual refused to be tested and document.

19.2.28.5. If the source individual declines a blood test to determine the presence of human immunodeficiency (HIV) virus antibodies, but does give consent for a blood test to determine the presence of Hepatitis B (HBV) antibodies, the medical provider shall be instructed to retain the source individual's blood sample for a period of ninety (90) days following the date the source individual's blood was drawn. The source individual may elect to have a blood test to detect HIV antibodies at a later date, in which case the medical provider can use the original sample provided by the source individual.

19.2.28.6. Request that the medical provider send a written report to the company documenting that the employee subjected to the exposure incident was

informed of the medical evaluation results and the need for any further follow up. A copy of the medical providers report is given to the employee subjected to the exposure incident shall be provided a copy of the medical provider's report within fifteen (15) days after receipt.

19.2.28.7. Post-exposure evaluation and follow-up plus laboratory tests conducted shall be available, in confidence, to each employee who has had an exposure incident. The evaluations and test shall be conducted by an accredited laboratory and provided at no cost to the employee. Follow-up shall include a confidential medical evaluation documenting the following information:

- Circumstances of the exposure
- Identifying and testing the source individual, if feasible
- Testing the exposed employee's blood if he/she consents
- Post-exposure prophylaxis
- Counseling and evaluation of reported illnesses

19.2.29. **Contaminated Materials and Labeling**

19.2.29.1. Any disposable contaminated materials shall be discarded by sealing within a plastic bag, which is then to be sealed in a red bag or one that is marked with a bio-hazard symbol.

19.2.29.2. Proper disposal of these items shall occur by coordinating with a local waste disposal company. Disposal of these items without such coordination is prohibited.

19.2.29.3. Work areas that contain processes where occupational exposure is known shall be marked with the biohazard symbol and include: Warning Biohazard Area.

19.2.29.4. The construction manager (subcontractor safety representative) for the applicable work area, or designee, shall ensure proper disposal.

19.2.30. **Recordkeeping**

19.2.30.1. The Safety Officer or his/her designee will be responsible for maintaining all documentation and records related to the Bloodborne Pathogen Program. Exposure and medical records shall remain confidential and be maintained for thirty (30) years past the exposed employee's last date of employment, as follows:

- The name and social security number of the employee
- A copy of the employees HBV vaccination status, including the dates of vaccination
- A copy of the results of examinations, medical testing, and follow-up procedures
- A copy of the information provided to the healthcare professional, including a description of the employee's duties as they relate to the exposure incident, and documentation of the routes of exposure and circumstances of the exposure

19.2.30.2. Training records shall be maintained and kept for three years from the date of training. Other documentation of this training is acceptable when multiple topics are covered. The following information shall be included with the documentation:

- The dates of the training sessions
- An outline describing the material presented
- The names and qualifications of persons conducting the training
- The names and job titles of persons attending the training sessions

19.2.30.3. Training records shall be available to employees or employee representatives upon request

19.2.30.4. The Safety Officer shall provide to any employee, Assistant Secretary and/or OSHA Director who so requests, a copy of the Bloodborne Pathogen Exposure Control Program and/or related applicable information / records no later than fifteen (15) working days from the date of a written request. A release of employee medical records must include the specific written consent of the employee.

19.2.31. **References**

OSHA 29 CFR 1910.1030

19.3. ASBESTOS AWARENESS

19.3.1. Purpose

This safety guideline is intended to provide safety information to all Beta employees its subcontractor's employees and visitors to the site regarding asbestos that adequate measures can be taken to limit exposures through controls in the workplace.

NOTE: If Beta or it's subcontractor's employees are to work in areas where the contracting company has identified asbestos, these areas will be disclosed to us and rendered safe before work will begin. Beta does not knowingly allow employees to work in areas where they will have exposure to asbestos. Any employee who knowingly enters a restricted asbestos area will be disciplined to their unsafe behavior.

19.3.2. General

19.3.2.1. Asbestos that may exist in project sites includes certain gaskets, brake linings, valve packing and old insulation.

19.3.2.2. Since non-asbestos insulation is being used in most jobsites on new work installations, the highest probability for exposure will come during demolition or old insulation removal. However, Asbestos-containing material may be encountered in the following forms:

- Valves, vessels, piping insulation, insulation cement, mastic, floor and roof tiling, transit wall siding, caulking, and automobile brake linings.

19.3.2.3. All asbestos removal within a project site must be done by certified people who are licensed to remove asbestos. No Beta employees nor its subcontractor's employees will perform work on any piping or vessel that contains "asbestos containing materials" unless properly protected and/or the material is encapsulated and will not fragmentize or peel off when working on it.

19.3.2.4. Asbestos is widely used, mineral-based material that is resistant to heat and corrosive chemicals. Depending of the chemical composition, fibers may range in texture from coarse to silky. The properties which make asbestos fibers so valuable to industry are its high tensile strength, flexibility, heat and chemical resistance, and good frictional properties.

19.3.3. Work Practices

19.3.3.1. No person shall work on equipment or materials containing asbestos. If employees become aware of any potential exposure to asbestos, they are to immediately stop work and notify their supervisor/foreman. The supervisor/foreman is then responsible to inform the office for further information, but in no case allow work to proceed until the exposure to asbestos has been abated.

19.3.3.2. Beta, its subcontractorsand visitors to the site should be aware of the following safe practices. To help reduce worker exposure to airborne fibers, asbestos must be handled, mixed, applied, removed, cut, scored or otherwise worked in a wet state. This “wet” method must also be used when products containing asbestos are removed from bags, cartons, or containers. If this is not possible, removal must be done in a non-enclosed or well-ventilated area.

19.3.3.3. Asbestos containing materials must not be applied by spray methods. Compressed air can be used to remove asbestos containing materials only if the compressed air is used in conjunction with an enclosed ventilated system designed to capture the dust cloud created by the compressed air.

19.3.4. **Health Hazards**

19.3.4.1. Asbestos fibers are carried into the body as airborne particles. These fibers can become embedded in the tissues of the lung and digestive system. Once the fibers become trapped in the lung’s alveoli (air sacs), they cannot be removed.

19.3.4.2. Years of exposure to asbestos can cause a number of disabling and fatal diseases. Among these is asbestosis, an emphysema-like condition, lung cancer; mesothelioma, a cancerous tumor that spreads rapidly in the cells of membranes covering the lungs and body organs; and gastrointestinal cancer which is caused by ingesting asbestos-contaminated food.

19.3.4.3. Recognizing the danger of asbestos levels in the workplace, the Occupational Safety and Health Administration developed a more protective regulation that reduces the permissible exposure limit and prescribes a separate standard for general industry and for construction.

19.3.5. **Short term affects (acute)**

May cause irritation and itching to the skin, coughing may occur.

19.3.6. **Long term effects**

Over exposure can result in lung cancer. Common symptoms include difficulty in breathing (if you climb a flight of steps and are out of breath) cough chest pains, clubbing of the fingers, (this common in advanced stages), risk for lung cancer is or multiplied if the worker exposed to asbestos also smokes.

19.3.7. **Housekeeping**

All surfaces must be maintained as free as practicable of accumulations of asbestos containing dust and waste. Floors and other surfaces contaminated with asbestos should only be cleaned by vacuuming and/or wet cleaning methods. Where vacuuming and/or wet cleaning is not feasible, shoveling, dry sweeping and dry clean-up of asbestos may be used. The use of compressed air for cleaning purpose is prohibited. Asbestos waste, scrap, debris, bags, containers, and equipment must be disposed of in sealed impermeable bags or containers.

19.3.8. **Methods of Compliance**

19.3.8.1. OSHA requires that to that extent feasible, engineering and work practice controls must be used to reduce employee exposure to Asbestos to within the PEL. Respirators may be used where engineering controls have been instituted but are insufficient to reduce exposure to the required level. Employers must establish and implement a written program to reduce employee exposure to or below the PEL by means of engineering and work practice controls and by the use of respirators.

19.3.8.2. OSHA also requires that a written asbestos safety program be available upon request to the Assistant Secretary for the Occupational Safety and Health Administration (OSHA), the Director of the National Institute for Occupational Safety and Health (NIOSH), employees and employee representatives. These plans must be reviewed and updated as necessary to reflect significant changes in the compliance program. Employee rotation cannot be used as a means to compliance with the permissible exposure limit.

19.4. BENZENE AWARENESS

19.4.1. Purpose

This safety guideline is intended to provide suitable information to all Beta employees its subcontractor's employees and visitors to the site regarding the potential toxic effects of Benzene so that adequate measures can be taken to limit exposures through controls in the workplace.

19.4.2. General

19.4.2.1. Of all the hydrocarbons, Benzene poses the most serious long-term threat. Exposure over time, to even low levels of Benzene can cause leukemia, blood changes and aplastic anemia.

19.4.3. Characteristics

19.4.3.1. Benzene is a colorless to light-yellow liquid with a pleasant sweet odor.

19.4.3.2. Formula (C_6H_6)

19.4.3.3. CAS No.: 71-43-2

19.4.3.4. Benzene is a flammable liquid that can accumulate static electricity. Benzene vapors are heavier that air and may travel to a source of ignition and flash back. The vapors are readily dispersed by wind movement and/or air currents. Liquid benzene tends to float on water and may travel to a source of ignition and spread fire. Benzene is highly reactive with no oxidizing materials.

19.4.4. Uses

Benzene is a component of gasoline, both in the manufacturing process and found naturally in crude oil; Benzene is also used as a feed stock for chemical manufacturing.

19.4.5. Heath Effects

WARNING

19.4.5.1. Benzene is a cancer-causing agent in humans. All contact should be reduced to the lowest possible level. The above exposure limits are for air levels only. Skin contact may also cause overexposure.

19.4.5.2. Benzene is one of the most hazardous of all petroleum products because of its adverse health hazards and high flammability.

19.4.5.3. At high concentrations (1000 PPM) Benzene has an acute effect on the central nervous systems causing headaches, dizziness, drowsiness, unconsciousness, and possible death. Acute exposure can also cause breathlessness, irritability, and giddiness.

19.4.5.4. **Chronic:** Benzene has the chronic exposure effect on bone marrow (aplastic anemia leukemia).

Chronic exposure can also cause convulsions, liver damage, heart damage, blood diseases (aplastic anemia), and cancer (leukemia). These symptoms can take months or years to surface and can develop without physical or visible indications.

19.4.5.5. Repeated skin contact leads to irritant contact dermatitis (rash); as with any petroleum solvent (which Benzene is also classified as), it will leach the natural oils out of the skin. Direct contact with the skin can cause erythema and/or blistering.

19.4.5.6. Benzene is irritating to eyes and mucous membranes.

19.4.5.7. Flammable/dangerous fire risk: benzene has a very low flash point making it dangerous to have any open flame, spark or source of ignition when vapors are present.

19.4.5.8. Explosive limits in air 1.5 to 8% by volume: benzene is highly flammable at low levels of vapor quantity in air.

19.4.6. **Personal Protective Measures**

No person shall be permitted to work in areas where there may be a potential for Benzene exposure. It is the responsibility of the Contracting Company's Project Manager and the on-site supervisor/foreman to see that any jobsite that may expose employees to Benzene is not manned with personnel until it is proven that it is safe to work within the acceptable OSHA limits without personal protective equipment.

19.4.7. **Special Measures**

If it is necessary to perform any work where the exposure to Benzene is about the OSHA acceptable limits, then Beta will implement a comprehensive OSHA mandated special safety policy and procedure that includes special elements of exposure monitoring, formal medical program, special personal protective equipment, and much more.

19.4.8. **Training**

All employees will be provided awareness training in this program in order to be familiar with the potential hazards and proper safe work procedures to follow if exposed to this health hazard.

19.5. **HYDROGEN SULFIDE AWARENESS**

19.5.1. **Purpose**

This program is intended to provide suitable information to all Beta employees its subcontractor's employees and visitors to the site regarding the potential toxic effects of H2S so that adequate measures can be taken to limit exposures through controls in the workplace.

19.5.2. **General**

19.5.2.1. Hydrogen sulfide is ever present in all refineries. In addition it is generated in many industrial processes as a by-product and also during the decomposition of organic matter containing sulfur.

19.5.2.2. Hydrogen sulfide (H2S) is a colorless gas that at low concentrations has the odor of rotten eggs. At high concentrations, it kills your sense of smell.

19.5.2.3. Formula H2S

19.5.2.4. CAS No.: 7783-06-04

19.5.2.5. H2S is a highly flammable and extremely toxic gas that can form an explosive mixture with air over a wide area.

19.5.3. **Characteristics of Hydrogen Sulfide**

19.5.3.1. When ignition occurs, the combustion produces irritants and toxic gases, including sulfur dioxide (SO2). SO2 has an irritating effect on the eyes and lungs and can be fatal at concentrations about 100PPM.

19.5.3.2. H2S is heavier than air, has a tendency to settle in low-laying areas, and is readily dispersed by wind movements or currents.

19.5.3.3. H2S attacks most metals, especially in the presence of water, forming sulfides that are usually insoluble precipitates. It is also very corrosive to plastics and tissue.

19.5.3.4. H2S dissolves in water forming a weak acid (hydro sulfurous acid).

19.5.3.5. H2S will be released when in water when agitated making it a dangerous hidden hazard.

19.5.4. **Health Effects**

The following information outlines the symptoms of hydrogen sulfide at specific concentrations.

19.5.4.1. PPM (0.001% H2S)

19.5.4.2. Obvious and unpleasant odor.

19.5.4.3. Burning eye irritation.

19.5.4.4. Permissible exposure limit is eight hours.

19.5.4.5. 200 PPM (0.02% H2S)

19.5.4.6. Kills smell quickly.

19.5.4.7. Stings eyes and throat.

19.5.4.8. Respiratory irritation.

19.5.4.9. Death after one to two hours of exposure.

19.5.4.10. 500 PPM (0.05% H2S)

19.5.4.11. Dizziness. Breathing ceases within a few minutes.

19.5.4.12. Requires prompt artificial respiration.

19.5.4.13. Loss of muscle control, making self-rescue impossible.

19.5.4.14. 1000 PPM (0.10% H2S)

19.5.4.15. Unconsciousness at once, followed by death within minutes.

19.5.5. **Exposure Warning**

H2S CAN PARALYZE THE SENSE OF SMELL. DO NOT USE THE SENSE OF SMELL TO DETECT H2S.

19.5.6. **H2S DETECTION AND ALARM SYSTEMS**

19.5.6.1. In most refineries emergency employee alarms are installed to meet the regulatory standards. The alarms provide warning for the necessary emergency action according to the site emergency action plan and provide time for employees to safely escape from the workplace or the immediate area.

19.5.6.2. Systems are also used on drilling locations, offshore platforms and produce H2S, and some plants. It is not readily used on land production leases. Signs are and should be posted stating the presence of poison gas and urging caution.

19.5.7. **Warning Conditions**

There are three conditions that you must be aware of when working around H2S. The following information identifies the level of danger and alarms associated with each condition.

19.5.7.1. Condition Green – Possible Danger; No Alarms

19.5.7.2. Condition Yellow – Moderate Danger; H2S to 50 PPM; Intermittent Audible Alarm and Yellow Flashing Light

19.5.7.3. Condition Red - Extreme Danger; H2S at 50 PPM or Above; Continuous Audible Alarm and a Red Flashing Light

19.5.8. **Hydrogen Sulfide Detection Devices**

19.5.8.1. Fixed H2S detection devices (monitor and indicator) are designed to detect H2S concentrations in air and established TWA (time weighted average) (10 PPM) and STEL (15 PPM).

19.5.8.2. The alarm should be capable of being perceived above the ambient noise or light levels in the affected area. The alarm should be distinctive and recognizable as a sign to evacuate the area and to start emergency status emergency procedures.

19.5.9. **Personal Monitors**

Personal monitors are also available in many types. They are also designed with the employee's safety in mind. Familiarize yourself with the equipment available at your current work assignment.

19.5.10. **Plant Monitors**

19.5.10.1. Plant monitors are available in many types and are designed with the employee's safety in mind. Familiarize yourself with the equipment available at your current work assignment.

19.5.10.2. In order to respond effectively in an emergency situation, every individual at the site should know their specific responsibilities. Whether or not an individual has an assigned duty, each individual should know what to do in the event of an emergency.

19.5.11. **Evacuation**

19.5.11.1. Follow these procedures in the event of a hydrogen sulfide release that requires evacuation:

19.5.11.2. Hold your breath and quickly leave the area containing H2S. Do not inhale.

19.5.11.3. Move quickly to the upwind "Safe Breathing Area" to receive instructions.

19.5.11.4. Always be conscious of the wind and constantly monitor wind direction. Wind socks and streamers show which direction the wind is blowing so that you can determine the proper safe breathing area.

19.5.12. **SCBA Escape**

19.5.12.1. When in an area, on some client's premises, which has required you to be trained to use or wear an escape respirator such as an SCBA, put on your SCBA and help anyone who appears to be affected by the gas.

19.5.12.2. Before taking off your make, ensure that the air you will breathe is safe.

19.5.12.3. Always be conscious of the wind and constantly monitor wind direction. Wind socks and streamers show which direction the wind is blowing so that you can determine the proper safe breathing area.

19.5.13. **Emergency Rescue and First Aid**

WARNING

19.5.13.1. To prevent risk and injury to other personnel, re-entry into an area of unknown concentration of H2S will require the use of self-contained breathing equipment and backup personnel.

19.5.13.2. Wear a full rescue unit (minimum 30-minute breathing apparatus) before attempting a rescue.

19.5.13.3. Remove the victim immediately to fresh air.

19.5.13.4. If breathing, maintain the victim at rest and administer respiration immediately.

19.5.13.5. If the victim is not breathing, start artificial respiration immediately.

19.5.13.6. Call an ambulance and get the victim medical treatment.

19.5.13.7. Keep the victim lying down with a blanket or coat under the shoulders to keep airway passage open. Conserve the victim's body heat and do not leave the victim unattended.

19.5.13.8. If the eyes are affected by H2S, wash them thoroughly with clear water. For slight eye irritation, cold compresses are helpful.

19.5.13.9. A victim should not return to work until authorized to do so by a physician, even if the victim has had minor exposure and has not completely lost consciousness.

19.5.14. **PPE (Personal Protective Equipment)**

19.5.14.1. Depending on the exposure i.e., the amount of gas in the air and the type of work, employees will be required to wear different levels of PPE.

19.5.14.2. When the exposure level is near or above 10 PPM, you will be required to wear self contained fresh air gear.

19.5.14.3. Wear chemical goggles or a face shield when eye contact with this material is possible.

19.5.14.4. Avoid skin contact. Wear proper clothing such as impervious gloves, long sleeves, apron, and boots.

19.5.15. **Ventilation (Indoor)**

Use adequate general and local exhaust ventilation to keep atmospheric vapor concentrations below the occupational exposure limits.

19.5.16. **Eyewash and Shower**

Safety showers and eyewash stations must be available in the vicinity of a potential exposure to the material. Familiarize yourself with the location of these facilities before starting the job.

19.5.17. **Training**

19.5.17.1. All Beta employees and its subcontractor's employees will be provided awareness training in this program in order to be familiar with the potential hazards and proper safe work procedures to follow if exposed to this health hazard. The training will be provided prior to working in any job with potential exposure to H2S operations.

19.5.17.2. The purpose of hydrogen sulfide training is to familiarize employees with the governmental regulations affecting H2S operations. Beta and its subcontractor's employees will learn the necessary skills to recognize, detect, and use the proper safety equipment in the event of an H2S incident.

19.6. LEAD AWARENESS

19.6.1. **Purpose**

This safety guideline is intended to provide suitable information to all Beta employees its subcontractor's employees and visitors to the site regarding the potential effects of Lead and where lead may be found so that adequate measures can be taken to limit exposures through controls in the workplace.

To understand why lead is so hazardous, it is important to know what it is, the hazardous effects on people, and which materials do or may contain lead. Once this is understood, employees will gain a respect for the safety guidelines set forth in this policy.

19.6.2. **General**

The objective of this guideline is to prevent absorption of harmful quantities of lead. The guideline is intended to protect Beta and its subcontractor's employees from the immediate toxic effects of lead and from the serious toxic effects that may not become apparent until years of exposure have passed.

19.6.3. **What Is It?**

Pure lead (Pb) is a heavy metal and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.

19.6.4. **Where Can It Be Found?**

19.6.4.1. Old glossy paints used on walls and pipe

19.6.4.2. Building and roof metal support frames

19.6.4.3. Report to the Contracting Company's Project Manager anytime you suspect lead-containing materials that may not have been disclosed:

19.6.4.4. Cracked or peeling paint

19.6.4.5. Visible paint dust, grindings, or shaving.

19.6.5. **Ways in which lead enters your body**

19.6.5.1. Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). When lead is scattered in the air it can be inhaled and absorbed through your lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed.

19.6.5.2. Hazards encountered with lead occur when inhaling lead as a dust, fume or mist and ingesting lead through food, cigarettes, and chewing tobacco when handled with contaminated hands.

19.6.5.3. Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume or mist it can be inhaled and absorbed through your lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up, which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion.

19.6.5.4. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood system, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

19.6.6. **Effects of overexposure to lead -(1) Short-term (acute) overexposure**

Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardio respiratory arrest. A short-term dose of lead can lead to acute encephalopathy. Short-term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead and chronic effects, which take longer to acquire. Lead adversely affects numerous body systems and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

19.6.7. **Long-term (chronic) overexposure**

19.6.7.1. Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain.

19.6.7.2. Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy.

19.6.7.3. Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible.

19.6.7.4. Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, or behavioral disorders or to die during the first year of childhood.

19.6.7.5. Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigue as a result of decreased oxygen-carrying capacity in the blood.

19.6.8. **Procedures**

The current OSHA lead standard is 50 µg/m3 as an 8-hour Time Weighted Average (TWA). The standard as it applies to construction is unique in that it groups tasks ***presumed*** to create employee exposures above the Permissible Exposure Limit (PEL) of 50 µg/m3 as an 8-hour TWA, as follows:

19.6.9. **Lead-Related Construction Tasks And Their 8-Hour TWA Exposure Levels**

> 50 to 500 µg/m^3	**> 500 µg/m^3 to 2,500 µg/m^3**	**> 2,500 µg/m^3**
Manual demolition	Using lead-containing mortar	Abrasive blasting
Dry manual scraping	Lead burning	Welding
Dry manual sanding	Rivet busting	Torch cutting
Heat gun use	Power tool cleaning without dust detection systems	Torch burning
Power tool cleaning with dust collection systems	Cleanup of dry expendable abrasive blasting jobs	
Spray painting with lead paint	Abrasive blasting enclosure movement and removal	

19.6.9.1. **Action Level** -The standard also establishes an action level of 30 micrograms per cubic meter of air (30 µg/m3), time-weighted average, based on an 8-hour workday. The action level initiates several requirements of the standard, such as exposure monitoring, medical surveillance, and training and education.

19.6.9.2. **Medical Surveillance** –If it is found that Beta or its subcontractor's employees have been exposed to lead levels above the OSHA PEL, they will be placed into a medical surveillance program. The medical surveillance program is part of the OSHA standard's comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard, which is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have effectively protected you as an individual. Compliance with the standard's provisions will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers:

- Who have high body burdens of lead acquired over past years,
- Who have additional uncontrolled sources of non-occupational lead exposure,
- Who exhibit unusual variations in lead absorption rates, or
- Who have specific non-work related medical conditions that could be aggravated by lead exposure (e.g., renal disease, anemia).
- In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those failures. Medical surveillance will also be important to protect your reproductive ability regardless of whether you are a man or woman.

19.6.10. **Evaluation Process** -The Contracting Company's Project Manager will provide Beta with results of any evaluation processes and a listing of lead containing material. The Contracting Company will provide all precautions and render the area safe for IPM employees before work begins

19.6.11. **Safety Measures**

19.6.11.1. Betaemployees nor its subcontractor's employees will be permitted to work in areas where there may be a potential for Lead exposure. If it is necessary to perform any work where the exposure to Lead is about the OSHA acceptable limits, then Beta must implement a comprehensive mandated safety policy and procedure that includes special elements of exposure monitoring, formal medical program, special personal protective equipment, and much more.

19.6.11.2. Hand scraping of lead-based paints involves the use of a hand-held scraping tool to remove paint from coated surfaces. The health hazards in this activity are caused by the lead dust and paint chips produced in the scraping process. Hand sanding can also produce excessive dust. These activities are typically performed during residential and commercial/institutional lead abatement projects

19.6.11.3. Controls that employers can implement to protect workers performing scraping and sanding of lead-based paints are:

- Use of wet-sanding and wet-scraping methods in conjunction with HEPA vacuuming or HEPA mechanical ventilation. Wet methods include misting of peeling paint with water before scraping, and sanding and misting of debris prior to sweeping or vacuuming.
- Use of shrouded power tools with HEPA vacuum attachments. The shroud must be kept flush with the surface
- Use of techniques with known low exposure potential, such as encapsulation and removal or replacement instead of hand scraping and hand sanding.

19.6.11.4. Welding and cutting activities that potentially involve exposure to lead can occur as part of a number of construction projects such as highway/railroad bridge rehabilitation (including elevated mass-transit lines), demolition, and indoor and outdoor industrial facility maintenance and renovation. Lead exposures are generated when a piece of lead-based painted steel is heated to its melting point either by an oxyacetylene torch or an arc welder. In this situation, lead becomes airborne as a volatilized component of the coating.

19.6.11.5. The amount of time a worker may spend actually welding or cutting can vary from only a few minutes up to a full shift. In addition, the coating being worked on may consist of several layers of lead-based paint, each of which could contain as much as 50% lead. Taken together, these factors suggest that a worker's exposure to airborne lead during welding or cutting activities can vary widely and may be exceedingly high. Lead burning, a process by which virgin or alloyed lead is melted with a torch or otherwise fused to another lead object, is typically performed in maintenance operations on electrostatic precipitators or during the installation of lead shot, bricks, or sheets in the walls or floors of health-care x-ray units or industrial sites. Lead health hazards in this operation, as in welding and torch cutting, are from lead that is superheated and released into the worker's breathing zone in the form of a fume.

19.6.11.6. The engineering controls that can be used, depending on feasibility, are:

- Local exhaust ventilation (LEV) that has a flanged hood and is equipped with HEPA filtration may be appropriate where the use of LEV does not create safety hazards. Use of a flexible duct system requires that the welder be instructed to keep the duct close to the emission source and to ensure the duct is not twisted or bent.
- A fume-extractor gun that removes fumes from the point of generation is an alternative to an exhaust hood for gas-shielded arc-welding processes. Such extraction systems can reduce breathing zone concentrations by 70% or more. These systems require that the gun and shielding gas flow rates be carefully balanced to maintain weld quality and still provide good exhaust flow.
- A longer cutting torch can be used in some situations to increase the distance from the lead source to the worker's breathing zone.

19.6.11.7. Hydraulic shears can sometimes be used to mechanically cut steel that is coated with lead based-paint. The use of this method is limited by the ability of the shears to reach the cutting area.

19.6.11.8. Whenever possible, pneumatic air tools should be used to remove rivets in lieu of burning and torch cutting.

19.6.11.9. The following work practice controls will help to reduce worker exposures to lead during welding, burning, and torch cutting:

- Strip back all lead-based paint for a distance of at least 4 inches in all directions from the area of heat application. Chemical stripping, vacuum-shrouded hand tools, vacuum blasting, or other suitable method may be used. However, in enclosed spaces, strip back or protect the workers with air-line respirators.
- Ensure that workers avoid the smoke plume by standing to the side or upwind of the cutting torch whenever the configuration of the job permits.
- Prohibit burning to remove lead-based paint. Paint should be removed using other methods, such as chemical stripping, power tools (e.g. needle guns) with vacuum attachments, etc.
- MANUAL SCRAPING AND SANDING OF LEAD-BASED PAINTS.

19.6.12. **Regulated Areas**

19.6.12.1. The Contracting Company will ensure a work plan is designed and implemented that will:

- Eliminate lead dust or fumes from exposing both work personnel and building occupants.
- Ensure that unauthorized persons cannot access the area.
- Use of signage - warning signs shall be provided and displayed at each regulated area, and is posted at all approaches to regulated areas.

19.6.13. **Training**

19.6.13.1. All Beta employees its subcontractor’s employees and visitors to the site will be provided awareness training in this program in order to be familiar with the potential hazards and proper safe work procedures to follow if exposed to this health hazard.

19.6.13.2. Training and information will be provided for all Beta employees its subcontractor’s employees and visitors to the site exposed to lead at or above the action level, or who may suffer skin or eye irritation from lead. The training will inform exposed employees of specific hazards associated with their work environment. protective measures which can be taken, danger of lead to their bodies (including their reproductive systems), and their rights under the standard.

20. Electrical Programs

20. ELECTRICAL PROGRAMS

20.1. Electrical Safety Program

20.1.1. Purpose

This program covers minimum performance standards applicable to all employees and locations. Local practices requiring more detailed or stringent rules, or local, state or other federal requirements regarding this subject can and should be added as an addendum to this procedure as applicable.

To establish the procedures that shall be followed in the safe performance of work activities involving general electrical hazards.

20.1.1.1. **Approved** means acceptable to the authorities.

20.1.1.2. **Authorized Person** means a person approved or assigned by Beta or its subcontractor to perform a specific duty or duties or to be at a specific location or locations at the jobsite.

20.1.1.3. **Cabinet** means an enclosure designed either for surface or flush mounting.

20.1.1.4. **Competent Person** means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

20.1.1.5. **Conductor (bare)** means a conductor having no covering or electrical insulation whatsoever.

20.1.1.6. **Conductor (insulated)** means a conductor encased within material of composition and thickness that is recognized as electrical insulation.

20.1.1.7. **Defect** means any characteristic or condition that tends to weaken or reduce the strength of the tool, object, or structure of which it is a part.

20.1.1.8. **Disconnect** means a device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

20.1.1.9. **Enclosed** means surrounded by a case, housing, fence or walls which shall prevent persons from accidentally contacting energized parts.

20.1.1.10. **Enclosure** means the case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage.

20.1.1.11. **Exposed** (as applied to live parts) means capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts not suitably guarded, isolated, or insulated.

20.1.1.12. **Guarded** means covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach to a point of danger or contact by persons or objects.

20.1.1.13. **Isolated** means not readily accessible to persons unless special means for access are used.

20.1.1.14. **Labeled** means equipment or materials to which has been attached a label, symbol or other identifying mark of a qualified testing laboratory

which indicates compliance with appropriate standards or performance in a specified manner.

20.1.1.15. **NEC** stands for National Electric Code.

20.1.1.16. **Qualified** means persons who are capable of working safely on equipment and are familiar with electrical properties, the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

20.1.1.17. **Receptacle** means a contact device installed at the outlet for the connection of a single attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is a single device containing two or more receptacles.

20.1.2. **Requirements**

20.1.2.1. Feasible engineering and administrative controls shall be applied to mitigate or minimize the risk of injury and illness from exposure to electrical hazards. Where such hazards still exist after application of these controls, local 'hot work' procedures (see local addendum to this section) shall apply and personal protective equipment shall be utilized. Such addenda shall comply with NFPA 70E.

20.1.2.2. Where feasible, employees shall not perform live electrical work. Branches that engage in live work are required to provide applicable safe work procedures, PPE, and equipment in Addendum to this manual section.

20.1.2.3. In existing installations, no changes in circuit protection shall be made to increase the load in excess of the load rating of the circuit wiring.

20.1.2.4. Worn or frayed electric cords or cables shall be removed from work areas for repair or disposal. Plugs equipped with a grounding prong must have the prong in place. Damaged plugs must be repaired. Repairing cords shall be limited to shortening only by an authorized person, as determined by the Site Safety Manager.

20.1.2.5. Working spaces, walkways, and similar locations must be kept clear of cords to eliminate hazards.

- Extension cords shall not be fastened with staples, hung from nails, or suspended by wire.
- Control equipment, utilization equipment, and busways approved for use in dry locations only shall be protected against damage from the weather during building construction.
- Metal raceways, cable armor, boxes, cable sheathing, cabinets, elbows, couplings, fittings, supports, and support hardware shall be of materials appropriate for the environment in which they are to be installed.
- Electrical switches shall be labeled to indicate the system, equipment, service, or tool they control. This includes switch boxes, cabinets, motor control cabinets, stationary equipment, control panels, and other such switches or disconnects.
- Persons who perform electrical work shall wear hard hats that are proof tested to 20,000 volts and shall not wear clothing with or without

PPE that could increase injury (100% cotton is better than blended materials).

- In work areas where the exact location of underground electric power lines is unknown, employees using jackhammers, bars, or other hand tools that may contact a line shall be provided with insulated protective gloves. Gloves must be rated to (or exceed) the voltage for which they may be exposed. The gloves shall be inspected before use and replaced as per the manufacturer's specifications.
- Wiring components and equipment in hazardous environments shall be maintained in a condition consistent with NEC requirements (e.g. There shall be no loose or missing screws, gaskets, threaded connections, seals, or other impairments to a tight condition).
- Hazardous locations are those locations where flammable vapors, liquids or gases, or combustible dusts or fibers may be present. There are six "classifications" for these types of locations, as follows:

  Class I Division 1 and Division 2

  Class II Division 1 and Division 2

  Class III Division 1 and Division 2

- Equipment, wiring methods, and installations of electrical equipment in hazardous (classified) locations must be designated as "intrinsically safe" or be approved for the classification location.

20.1.3. **Training**

Any person whose work may require them to face the potential risk of electrical shock that has not been eliminated or reduced to safe levels and are not considered a "qualified person" must be properly trained. The training shall educate employees on the following:

20.1.3.1. Safety related practices associated with electrical work

20.1.3.2. Safety related procedures associated with the specific job assignment

20.1.3.3. Define safe clearances and distances with the specific job assignment

20.1.4. **Energized Electrical Parts and Systems**

20.1.4.1. This section does not apply to power distribution or transmission lines. Refer to CFR Subpart "R" 1910.269 (servicing) and/or CFR Subpart "V" 1926.950 (construction) for overhead power transmission and distribution line requirements.

20.1.4.2. Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

20.1.4.3. Live parts to which an employee may be exposed shall be deenergized before the employee works on or near them, unless it can be demonstrated that deenergizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be deenergized

if there will be no increased exposure to electrical burns or to explosion due to electric arcs.

20.1.4.4. If the exposed live parts are not deenergized (i.e., for reasons of increased or additional hazards or infeasibility), other safety-related work practices shall be used to protect employees who may be exposed to the electrical hazards involved. Such work practices shall protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object. The work practices that are used shall be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts.

20.1.5. **Working on or near exposed deenergized parts**

20.1.5.1. This section applies to work on exposed deenergized parts near enough to expose employee/s to an electrical hazard.

20.1.5.2. While an employee is exposed to contact with fixed electrical equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out in accordance with the Lockout Tag Out Program, section (6).

20.1.5.3. The circuits and equipment to be worked on shall be disconnected from electrical energy sources (and locked out). Control circuit devices, such as push buttons, selector switches, and interlocks, shall not be used as the sole means for deenergizing circuits or equipment.

20.1.5.4. Procedures for the release of stored electric energy shall be covered in the Addendum to this policy section (as hot work).

20.1.5.5. When capacitors or associated equipment are handled, they shall be treated as energized.

20.1.5.6. Stored non-electrical energy in devices that could reenergize electrical parts shall be blocked or relieved to the extent that the parts could not be accidentally energized by the device.

20.1.6. **Working on or near exposed energized parts**

20.1.6.1. Every effort shall be made to preclude work on energized electrical parts. When this is not possible, the requirements of this section shall apply. Potential contact with live energized parts includes work performed on exposed live parts (involving either direct contact or contact by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

20.1.6.2. Only qualified persons shall work on electrical equipment that has not been deenergized.

20.1.6.3. If work is to be performed near overhead lines, the lines shall be deenergized and grounded, or other protective measures shall be provided before work is started.

20.1.6.4. If the lines are to be deenergized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to deenergize and ground them. If protective measures, such as guarding, isolating, or insulating are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

20.1.7. **Overhead electrical lines**

20.1.7.1. While conducting site activities near overhead lines, field personnel need to be aware of the location of the lines so as not to use conductive equipment (e.g., metal equipment to include: drill rigs; hand auger extensions; geoprobe units; excavators, etc.) in close proximity to power lines.

20.1.7.2. At a minimum of 48 hours prior to performing work within 10’ above, below, adjacent to, or near engergized overhead lines, the utility company, or company controlling the line, shall be notified in writing of the work to be performed. The automatic recloser shall be set to one-shot by the utility company, or controlling company. The utility company or controlling company, shall be invited to witness all work in the vicinity of their overhead lines.

20.1.7.3. OSHA 29 CFR 1926.550 requires that any vehicle or mechanical equipment (i.e., drill rigs) capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance distance of at least 10 feet is maintained.

20.1.7.4. When calculating clearance distances for a drill rig consider both the length of the derrick and the length of the rods. Position the rig such that if rods are ever fully extended from the top of the derrick, the rods will still be at least 10 feet away from the power lines. Note that rods can lean or sway when elevated so it may be necessary to maintain more than a 10-foot distance on the ground to ensure that there is a 10-foot horizontal distance between the rods and the power line.

20.1.7.5. Higher voltages require greater clearance distances. Contact the electrical utility company to verify line voltage. If the voltage is higher than 50kV, the clearance shall be increased 4 in. for every 10kV over that voltage.

Table 20.1-1	
Voltage	**Required Clearance**
0-50 kV	10 feet
50-200 kV	15 feet
200-350 kV	20 feet
350-500 kV	25 feet
500-750 kV	35 feet
750-1000 kV	45 feet

20.1.7.6. Under any of the following conditions, OSHA allows the required clearance to be reduced:

- If a vehicle is in transit with its structure lowered, the clearance shall be reduced to 4 ft. If the voltage is higher than 50kV, the clearance shall be increased 4 in. for every 10kV over that voltage
- If insulating barriers (boots) are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, OSHA allows the clearance to be reduced to a distance within the designed working dimensions of the insulating barrier. However, while this is permissible according to OSHA, some utility companies are recommending that safe distances, as described previously, be maintained in addition to the insulating barrier.
- If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in Table 20.1-2.

20.1.7.7. When an unqualified person is working in an elevated position near overhead lines, or working on the ground in the vicinity of overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the clearance distances indicated in Table 20.1-1.

20.1.7.8. For voltages normally encountered with overhead power lines, objects which do not have an insulating rating for the voltage involved shall be considered to be conductive.

20.1.7.9. When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person shall not approach or take any conductive object without an approved insulating handle closer to exposed energized parts than the clearance distances indicated in Table 20.1-2, unless:

- The person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be

insulation of the person from the energized part on which work is performed).

- The energized part is insulated both from other conductive objects at a different potential and from the person.
- The person is insulated from conductive objects at a potential different from that of the energized part.

Table 20.1-2	
Approach Distances for Qualified Employees - Alternating Current	
Voltage range (phase to phase) Kilovolt	**Minimum approach distance Phase to Ground Exposure**
Above 0.6 to 15	2ft. 1in.
Above 15 to 36	2ft. 4in.
Above 36 to 46	2ft. 7in.
Above 46 to 72.5	3ft. 0in.
Above 72.5 to 121	3ft. 4in.
Above 121 to 145	3ft. 7in.
Above 145 to 169	4ft. 0in.
Above 169 to 242	5ft. 3in.
Above 242 to 362	8ft. 6in.
Above 362 to 552	11ft. 3in.
Above 552 to 765	15ft. 0in.

20.1.7.10. If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance indicated in Table 20.1-2. However, employees standing on the ground shall not contact the vehicle or mechanical equipment or any of its attachments, unless:

- The employee is using protective equipment rated for the voltage or the equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in this section
- If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding shall not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and

fault currents, which can develop within the first few feet or more outward from the grounding point

20.1.8. **Illumination**

Employees shall not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees shall not perform tasks near exposed energized parts. Employees shall not reach blindly into areas which may contain energized parts.

20.1.9. **Confined Space or enclosed space work**

When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, protective shields, protective barriers, or insulating materials shall be used as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent swinging into an employee and causing the employee to contact exposed energized parts (reference the Confined Spaces section 5).

20.1.10. **Conductive materials and equipment**

20.1.10.1. Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts.

20.1.10.2. For instance, an employee should measure the length of a sledge hammer and the expected radius of his swing prior to using the hammer near an energized circuit. If such a circuit is present, a sign must be posted to warn the employees. The job supervisor must inform the employees of the location of the lines, the hazards involved, and the protective measures to be taken.

20.1.11. **Portable ladders**

Portable ladders shall have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized parts (reference Ladder section 4).

20.1.12. **Conductive apparel**

Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) shall not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping, or other insulating means.

20.1.13. **Housekeeping duties**

20.1.13.1. Where live parts present an electrical contact hazard, employees shall not perform housekeeping duties at such close distances to the parts that there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided.

20.1.13.2. Electrically conductive cleaning materials (including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) shall not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

20.1.14. **Interlocks**

Only a qualified person following the requirements of this section may defeat an

electrical safety interlock, and then only temporarily while working on the equipment. The interlock system shall be returned to its operable condition when this work is completed.

20.1.15. **Grounding, GFCIs and Assured Grounding Procedures**

Equipment, tools and cord sets shall be provided and utilized so as to protect employees from electrical shock and to prevent fire.

20.1.16. **Equipment and tools**

20.1.16.1. Note: Portable equipment which is "double insulated" and endorsed by a nationally recognized testing facility need not have a grounding conductor, but is subject to the inspection requirements of this section.

20.1.16.2. Tools and equipment subject to inspection and testing include:

- Portable Electrical Tools such as grinders, drills and stapling guns
- Stationary tools such as table saws, drill presses, and jig saws
- Portable electrical extension cords
- Portable and Temporary lighting systems and cords

20.1.16.3. Receptacles shall be of the grounding type and their contacts shall be grounded by connection to the equipment grounding conductor of the circuit supplying that receptacle in accordance with the NEC.

20.1.17. **Visual inspections**

20.1.17.1. Visual inspection of tools and equipment are required prior to each use and shall include general condition, plugs and caps, and presence of ground prong, electrical cord sets and external defects, and missing parts

20.1.17.2. Defective tools shall be tagged, taken out of service and placed in a secured location until they are repaired or destroyed.

20.1.18. **Testing**

The following tests shall be performed on all applicable equipment:

20.1.18.1. Equipment grounding conductors shall be tested for continuity and shall be electrically continuous

20.1.18.2. Receptacle and attachment cap or plug shall be tested for correct attachment of the equipment-grounding conductor. The equipment-grounding conductor shall be connected to its terminal

20.1.18.3. Required tests should be performed as indicated below:

- Before first use
- Before being returned to service following any repairs
- Before being used, after any incident that can be reasonably suspected to have caused damage (for example, when a cord set is run over)
- At intervals not to exceed 3 months
- Test equipment must be evaluated for proper operation immediately before and after tests are conducted.

20.1.19. **Removal from service**

Any equipment failing any test shall be taken out of service, shall be tagged with a “Danger, Do Not Use” tag, secured and repaired or destroyed.

20.1.20. **Ground Fault Circuit Interrupters (GFCI's)**

20.1.20.1. Ground Fault Circuit Interrupters (GFCI's) shall be used on receptacles >15 amps up to and including 30 amps for tool and equipment used in construction applications and potentially wet environments (either indoors or outdoors). Receptacles of temporary wiring systems and portable generators shall be protected with a GFCI.

20.1.20.2. The minimum requirements relative to the use of Ground Fault Circuit Interrupters are:

- Prior to use, and periodically thereafter, verify that the GFCI is in good working order. (e.g., Plug the GFCI in to an outlet, plug a power tool or light in to the GFCI, hit the "test" button and verify that it interrupts current flow). Periodically re-test the GFCI to ensure continued effectiveness.
- Remove from service any GFCI that has insufficient load capacity, is damaged or is ineffective for any reason. Affix a "Danger, Do Not Use" tag and store the GFCI in a secure location until it can be replaced or repaired. Destroy and discard any GFCI that cannot be repaired or re-used.
- Train employees in the provisions of this section as related to safe use of GFCIs. This training should include double insulated tools, defective cords and plugs, heavy moisture, and wet conditions and operation, selection, and use of GFCI's

20.2. **ASSURED GROUNDING PROGRAM**

20.2.1. **Purpose**

It is the responsibility of the subcontractor to submit for approval their Assured Equipment Grounding Conductor Program on construction sites covering all cord sets and receptacles which are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug which are available for use or used by employees. If a program is not submitted this program must be followed.

This policy shall apply to all construction sites not equipped with ground-fault circuit interrupters in accordance with OSHA Standards 1926.404(b).

20.2.2. **Assignment of Duties and Responsibilities**

20.2.2.1. The General Foreman is designated to implement the Assured Equipment Grounding Conductor Program.

20.2.2.2. The General Foreman must be capable of identifying existing and predictable hazards in the surrounding area or working conditions which are unsanitary, hazardous or dangerous to employees, and is authorized to take prompt corrective measures to eliminate them.

20.2.2.3. He will visually inspect each cord set (attachment cap, plug and receptacle on cord- set), and any equipment connected by cord and plug (except cord sets and receptacles which are fixed and not exposed to danger) for external defects, such as deformed or missing pins or insulation damage, and for indication of possible internal damage before use each day. Equipment found damaged or defective cannot be used until repaired.

20.2.2.4. Each employee is responsible for tests on all cord sets and receptacles which are not a part of the permanent wiring of the building or structure before using the cord set. Cord and plug connected equipment that is

repaired must have the ground wire checked. Tests shall be documented on the log for the Assured Equipment Grounding Conductor Program and shall be on the jobsite for inspection by OSHA officials and affected employees. Equipment that does not meet prescribed tests shall not be put into service.

20.2.3. **Procedure**

20.2.3.1. All equipment grounding conductors shall be tested for continuity and shall be connected to their proper terminals.

20.2.3.2. Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding shall be connected to its proper terminal.

20.2.3.3. In accordance with OSHA Construction Safety and Health Standards 1926.21, Safety Training and Education, Superintendents shall attend such training sessions as the company may deem necessary.

20.2.3.4. A copy of this policy shall be at the jobsite for inspection and copy by OSHA officials and any affected employee.

20.2.3.5. Management retains the authority to designate that certain jobs comply with Regulation 1926.404(b) by use of ground-fault circuit interrupters in lieu of -the program established above.

20.2.3.6. A copy of completed forms will be kept on each applicable jobsite for inspection purposes.

20.3. ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM

20.3.1. **Purpose**

This procedure describes the requirements to assure the installation and maintenance of equipment grounding conductors for temporary wiring on construction sites In accordance with Paragraph (c)(3) a(Pan 1910.309 of Occupational Safety and Health Standards and Paragraph (h)(3) of Part 1926.400 of Safety and Health Regulations for Construction.

20.3.2. Ground-fault circuit Interrupters (GFCI's) are not required for 120-volt, single-phase, 15- and 20-ampere receptacle outlets where all of the requirements of this procedure are implemented at the construction site. Employees shall not use any equipment which has not met the requirements of this procedure.

20.3.3. **Jobsite Information**

20.3.3.1. Name or description of jobsite

20.3.3.2. Employer abiding by this procedure

20.3.3.3. Person designated to implement the procedure

20.3.4. **Requirements**

20.3.4.1. Equipment grounding conductors shall be installed and maintained in accordance with this procedure.

20.3.4.2. Installation - equipment grounding conductors shall be installed as follows:

20.3.4.3. 120-volt single-phase, 15-and 20-amp-receptacles shall be of the grounding type and their contact shall be grounded by connection to the equipment grounding conductor of the circuit supplying the receptacles 'in accordance 'with the applicable requirements of the National Electrical Code.

20.3.4.4. All 120-volt cord sets (extension cords) shall have an equipment grounding conductor which shall be connected to the grounding contacts of the connectors on each end of the cord. The exposed non-current carrying metal parts of 120 volt cord-and plug-connected tools and equipment that are likely to become energized shall be grounded in accordance with the applicable requirements of the National Electrical Code.

20.3.4.5. Visual lnspection - Employees shall be instructed to visually inspect receptacles, flexible cord sets (extension cords), except those that are fixed and not exposed to damage, and equipment connected by cord and plug before each day's for external defects such as deformed of missing pins or insulation damage and for indication of possible interrupt damage. Where there is evidence of damage, the damaged item shall be taken out of service and tagged until tested and any required repairs have been made.

20.3.4.6. All 120-volt single-phase, 15-and 20-ampere - receptacles which-are not a part of the permanent wiring of the-building or structure, 120-volt flexible cord sets and 120- volt cord and plug-connected equipment required to be tested as follows: All equipment grounding conductors shall be tested for continuity and shall be electrically continuous grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

20.3.4.7. Testing schedule - All required tests shall be performed:

- Before first use
- Before equipment is returned to service following any repairs;
- Before equipment is used after any Incident which can be reasonably suspected to have caused damage (for example, when a card set Is run over);
- At Intervals not to exceed 3 months, except that cord sets and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

20.3.4.8. Test Record-Test verification shall be by means of numeric or color coded marking tape on the receptacle, cord set or equipment to identity that it has passed the test and to indicate the date (month or quarter) in accordance with Section 20.3.5 Coding Scheme. (If some system other than this color or numeric code is used, such as tags or loss, it should be specified here in lieu of the previous sentence.)

20.3.5. **Coding Scheme**

CODING SCHEMES FOR ASSURED EQUIPMENT GROUNDING CONDUCTOR TEST RECORD

Monthly or Quarter	Color Coding Scheme Quarterly	Color Coding Scheme Monthly	Numeric Coding Scheme Monthly
January February March	White	White White & Yellow White & Blue	1 2 3
April May June	Green	Green Green & Yellow Green & Blue	4 5 6
July August September	Red	Red Red & Yellow Red & Blue	7 8 9
October November December	Orange	Orange Orange & Yellow Orange & Blue	10 11 12
Repair or Incident	Brown	Brown	0

20.3.6. **Assured Equipment Grounding Conductor Program Kits**

20.3.6.1. If a record keeping system is used in lieu of a GFCI breaker program,

20.3.6.2. The following items should be contained in a field kit:

- 6" by 6" by 2" leather pouch or box (Tag: GFI Program Kit)
- Woodhead Model No. 1750 receptacle tester
- ITT Hotub Model No. 83 continuity tester
- Roll - 3/4" by 20 ft 0 in. Scotch No. 35 vinyl tape- white
- Roll - 3/4" by 20 ft 0 in. Scotch No. 35 vinyl tape- yellow
- Roll - 3/4" by 20 ft 0 in. Scotch No. 35 vinyl tape- blue
- Roll - 3/4" by 20 ft 0 in. Scotch No. 35 vinyl tape - green
- Roll - 3/4" by 20 ft 0 in. Scotch No. 35 vinyl tape - red
- Roll - 3/4" by 20 ft 0 in. Scotch No. 35 vinyl tape - orange
- Roll - 3/4" by 20 ft 0 in. Scotch No. 35 vinyl tape - brown

20.3.6.3. These items are required per each kit and are readily available from any local electrical supply house. The above is a very inexpensive means of complying with OSHA Standard No. 1926.32(f), and will remove from the construction jobsite the continuous ground fault nuisance tripping experienced with GFCI breakers.

20.3.7. **Temporary Wiring**

20.3.7.1. This section applies to temporary electrical power and lighting wiring methods that may be of a class less than would be required for a permanent installation.

20.3.7.2. Temporary wiring shall be removed immediately upon completion of work and when the purpose for which the wiring was installed no longer applies.

20.3.8. **General requirements for temporary wiring**

20.3.8.1. Feeders shall originate in a distribution center. The conductors shall be run as multi-conductor cord or cable assemblies or within raceways.

20.3.8.2. Branch circuits shall originate in a power outlet or panel board. Conductors shall be run as multi-conductor cord or cable assemblies or open conductors, or shall be run in raceways. Conductors shall be protected by over current devices at their ampacity.

20.3.8.3. Receptacles shall be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit shall contain a separate equipment-grounding conductor, and receptacles shall be connected to the grounding system. Receptacles shall not be connected to the same ungrounded conductor of multi-wire circuits that supply temporary lighting.

20.3.8.4. Disconnecting switches or plug connectors shall be installed to permit the disconnection of ungrounded conductors of each temporary circuit.

20.3.8.5. Lamps for general illumination shall be protected from accidental contact or breakage. Metal-case sockets shall be grounded.

20.3.8.6. The electric cords shall not be used to suspend temporary lights unless cords and lights are designed for this means of suspension. Temporary lighting shall be properly supported.

20.3.8.7. Portable electric lighting used in wet and/or other conductive locations, as for example, drums, tanks, and vessels, shall be operated at 12 volts or less. However, 120-volt lights may be used if protected by a ground-fault circuit interrupter.

20.3.8.8. A mounted box (with a cover) shall be used wherever a change is made to a raceway system or a cable system that is metal clad or metal sheathed. Non-metallic wiring system joints below seven foot (7') shall have mounted boxes and be covered. Exposed temporary joints shall have the wire nuts or other mechanical devices taped with black (electrical) tape to prevent them from falling off. Temporary joints including the ground wire shall have a mechanical connection.

20.3.8.9. Flexible cords and cables shall be protected from damage. Sharp corners and projections shall be avoided. Flexible cords and cables may pass through doorways or other pinch points, if protection is provided to avoid damage. Cords and temporary wiring passing through walls shall be properly protected (e.g. sleeved).

20.3.8.10. Extension cord sets used with portable electric tools and appliances shall be of three-wire type and shall be designed for hard or extra-hard usage. Flexible cords used with temporary and portable lights shall be designed for hard or extra-hard usage. See the NEC, ANSI/NFPA 70, in Article 400, Table 400-4 that lists various types of flexible cords, some of which are noted as being designed for hard or extra-hard usage. Note: SEU, SER or other similar cables cannot be laid on the floor despite their rating.

20.3.8.11. For temporary wiring over 600 volts, nominal, fencing, barriers, or other effective means shall be provided to prevent access of other than authorized and qualified personnel.

20.3.9. **Batteries**

20.3.9.1. Batteries of the unsealed type shall be located in enclosures with outside vents or in well ventilated rooms and shall be arranged so as to prevent the escape of fumes, gases, or electrolyte spray into other areas.

20.3.9.2. Ventilation shall be provided to ensure diffusion of the gases from the battery and to prevent the accumulation of an explosive mixture.

20.3.9.3. Appropriate face shields, aprons, goggles and rubber gloves shall be provided for workers handling acids or batteries. Contact lenses are prohibited while working with batteries, unless using a type of goggle that will not allow the transference of gases.

20.3.9.4. Facilities for quick drenching of the eyes and body shall be provided within 25 feet of battery handling areas. Facilities shall be provided for flushing and neutralizing spilled electrolyte and for fire protection in the areas of battery use.

20.3.9.5. Battery charging installations shall be located in areas designated for that purpose. When batteries are being charged, the vent caps shall be kept in place to avoid electrolyte spray. Vent caps shall be maintained in a functioning condition.

20.3.9.6. Battery manufacturer guideline and specifics shall be complied with.

20.3.9.7. Smoking, eating or drinking in areas where batteries are being stored, charged or worked with is prohibited.

20.3.10. **Handling and Transportation**

20.3.10.1. Packaging, markings and transportation of batteries shall be in accordance with Federal, State and local laws, regulations and standards.

20.3.10.2. After the packaging is removed, batteries shall be inspected for defect, including, but not limited to bulging, cracking and leaking

20.3.10.3. Batteries shall not be forced into equipment/locations.

20.3.10.4. Where feasible, old and new batteries shall not be intermixed.

20.3.11. **Storage**

20.3.11.1. Batteries shall be kept in their original packaging until they are ready to be used.

20.3.11.2. New and used batteries shall be kept separate for distinguishment.

20.3.11.3. Batteries should be stored separate from combustibles and flammables and protected from being crushed, punctured or exposed to incompatible environmental conditions.

20.3.11.4. Used batteries, not intended for re-use, shall be properly disposed.

20.3.12. **Disposal**

Batteries being disposed of shall be done so in accordance with Federal, State and local laws, regulations and standards. When possible, batteries should be recycled.

20.3.13. **Clearances in the Work Place**

20.3.13.1. Employees shall not be permitted to work in such proximity to any part of an electric power circuit that the employee could contact the electric power circuit in the course of work, unless the employee is protected against electric shock by deenergizing the circuit and grounding it (if appropriate) or by guarding it effectively by insulation or other means.

20.3.13.2. Supervisors and/or Competent Person(s) shall ascertain by inquiry, direct observation, or by instruments, whether any part of an energized electric or power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical or

electrical contact with the electric power circuit. The supervisor/Competent Person shall post and maintain proper warning signs where such a circuit exists. The supervisor/Competent Person shall advise employees of the location of such lines, the hazards involved, and the protective measures to be taken.

20.3.13.3. Barriers or other means of guarding shall be provided to ensure that workspace for electrical equipment will not be used as a passageway during periods when energized parts of electrical equipment are exposed.

20.3.14. **Fuses**

20.3.14.1. Installing or removing fuses shall be considered as work with live electrical energy and shall be covered in the Addendum to this policy section for operations conducting such activities.

20.3.14.2. Persons who perform work on high voltage fuses (over 600 volts) shall wear appropriate head, face, body flash suits, protective footwear and insulated gloves.

20.3.14.3. Insulating electrical gloves, sleeves, aprons, and other protective electrical clothing shall be tested for leaks and integrity prior to initial use and periodically. These tests shall meet the requirements of OSHA Standard 29 CFR 1910.137.

20.3.14.4. Protector gloves shall be worn over insulating gloves, except as defined in the above referenced standard.

20.3.14.5. Only manufacturer-qualified personnel shall inspect and make repairs to electrical insulating protective clothing.

20.3.15. **Work Space Clearances - <u>600 Volts</u>, nominal, <u>or less</u>**

Sufficient access and working space shall be provided and maintained about electric equipment to permit ready and safe operation and maintenance of such equipment.

20.3.16. **Working clearances**

20.3.16.1. Except as required or permitted elsewhere in this section, the dimension of the working space in the direction of access to live parts operating at 600 volts or less and likely to require examination, adjustment, servicing, or maintenance while live shall not be less than indicated in the table below.

20.3.16.2. In addition to the dimensions shown in the following table, workspace shall not be less than 30 inches wide in front of the electric equipment. Distances shall be measured from the live parts if they are exposed, or from the enclosure front or opening if the live parts are enclosed. Walls constructed of concrete, brick, or tiles are considered to be grounded.

20.3.16.3. Working space is not required in back of assemblies such as dead-front switchboards or motor control centers where there are no renewable or adjustable parts such as fuses or switches on the back and where connections are accessible from locations other than the back.

Minimum Depth of Clear Working Space in Front of Electric Equipment (feet)			
Nominal voltage to ground conditions*	**(a)***	**(b)***	**(c)***
0-150	3	3	3
151-600	3	3 1/2	4

*Conditions (a), (b), and (c) are as follows: (a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating material. Insulated wire or insulated bus bars operating at not over 300 volts are not considered live parts. (b) Exposed live parts on one side and grounded parts on the other side. (c) Exposed live parts on both sides of the workspace [not guarded as provided in Condition (a)] with the operator between.
Note: For International System of Units (SI): one foot=0.3048m.

20.3.16.4. Working space required by this in this section shall not be used for storage. When normally enclosed live parts are exposed for inspection or servicing, the working space, if in a passageway or general open space, shall be guarded.

20.3.16.5. At least one entrance shall be provided to give access to the working space about electric equipment.

20.3.16.6. Where there are live parts normally exposed on the front of switchboards or motor control centers, the working space in front of such equipment shall not be less than 3 feet.

20.3.16.7. The minimum headroom of working spaces about service equipment, switchboards, panel boards, or motor control centers shall be 6 feet 3 inches.

20.3.17. **Guarding of live parts**

20.3.17.1. Except as required or permitted live parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by cabinets or other forms of enclosures, or by any of the following means:

- By location in a room, vault, or similar enclosure that is accessible only to qualified persons
- By partitions or screens so arranged that only qualified persons will have access to the space within reach of the live parts. Any openings in such partitions or screens shall be so sized and located that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them
- By location on a balcony, gallery, or platform so elevated and arranged as to exclude unqualified persons

20.3.17.2. In locations where electric equipment could be exposed to physical damage, enclosures or guards shall be so arranged and of such strength to prevent damage.

20.3.17.3. Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter.

20.3.18. **Work Space Clearances - <u>over 600 volts</u>, nominal**

Conductors and equipment used on circuits exceeding 600 volts, nominal, shall comply with all applicable provisions of this section and with the following provisions that supplement or modify those requirements. The provisions of sections 20.1.7.5 and 20.1.7.6 do not apply to equipment on the supply side of the service conductors.

20.3.19. **Enclosure for electrical installations**

20.3.19.1. Electrical installations in a vault, room, closet or in an area surrounded by a wall, screen, or fence, access to which is controlled by lock and key or other equivalent means, are considered to be accessible to qualified persons only.

20.3.19.2. A wall, screen, or fence less than 8 feet in height is not considered adequate to prevent access unless it has other features that provide a degree of isolation equivalent to an 8-foot fence. The entrances to buildings, rooms or enclosures containing exposed live parts or exposed conductors operating at over 600 volts, nominal, shall be kept locked or shall be under the observation of a qualified person at all times.

20.3.20. **Installations accessible to qualified persons only**

Electrical installations having exposed live parts shall be accessible to qualified persons only and shall comply with requirements of this standard and applicable regulatory standards.

20.3.21. **Installations accessible to unqualified person(s)**

Electrical installations that are open to unqualified persons shall be made with metal-enclosed equipment or shall be enclosed in a vault or in an area, access to which is controlled by a lock. Metal-enclosed switchgear, unit substations, transformers, pull boxes, connection boxes, and other similar associated equipment shall be marked with appropriate caution signs. If equipment is exposed to physical damage from vehicular traffic, guards shall be provided to prevent such damage. Ventilating or similar openings in metal-enclosed equipment shall be designed so that foreign objects inserted through these openings will be deflected from energized parts.

20.3.22. **Workspace about equipment**

20.3.22.1. Sufficient space shall be provided and maintained about electric equipment to permit ready and safe operation and maintenance of such equipment. Where energized parts are exposed, the minimum clear workspace shall not be less than 6 feet 6 inches high (measured vertically from the floor or platform), or less than 3 feet wide (measured parallel to the equipment). The depth shall be as required in the table below. The workspace shall be adequate to permit at least a 90-degree opening of doors or hinged panels.

20.3.22.2. The minimum clear working space in front of electric equipment such as switchboards, control panels, switches, circuit breakers, motor controllers, relays, and similar equipment shall not be less than specified in the following table, unless otherwise specified. Distances shall be measured from the live parts if they are exposed, or from the enclosure front or opening if the live parts are enclosed.

20.3.22.3. However, working space is not required in back of equipment such as dead front switchboards or control assemblies where there are no renewable or adjustable parts (such as fuses or switches) on the back and where connections are accessible from locations other than the back. Where rear access is required to work on de-energized parts on the back of enclosed equipment, a minimum working space of thirty (30) inches horizontally shall be provided.

Minimum Depth of Clear Working Space in Front of Electric Equipment (feet)			
Nominal voltage to ground conditions*	**(a)***	**(b)***	**(c)***

601 to 2,500	3	4	5
2,501 to 9,000	4	5	6
9,001 to 25,000	5	6	9
25,001 to 75 kV	6	8	10
Above 75kV	8	10	12
*Conditions (a), (b), and (c) are as follows: (a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating materials. Insulated wire or insulated bus bars operating at not over 300 volts are not considered live parts. (b) Exposed live parts on one side and grounded parts on the other side. Walls constructed of concrete, brick, or tiles are considered to be grounded surfaces. (c) Exposed live parts on both sides of the workspace [not guarded as provided in Condition (a)] with the operator between.			
Note: For International System of Units (SI): one foot=0.3048m.			

20.3.23. **Lighting outlets and points of control**

The lighting outlets shall be so arranged that persons changing lamps or making repairs on the lighting system will not be endangered by live parts or other equipment. The points of control shall be so located that persons are not likely to come in contact with any live part or moving part of the equipment while turning on the lights.

20.3.24. **Elevation of unguarded live parts**

Unguarded live parts above working spaces shall be maintained at elevations not less than specified in the following table.

Elevation of Unguarded Energized Parts Above Working Space	
Nominal voltage between phases	**Minimum elevation**
601-7,500	8 feet 6 inches
7,501-35,000	9 feet.
Over 35kV	9 feet+0.37 inches per kV above 35kV
Note: For SI units: one inch=25.4 mm; one foot=0.3048 m.	

20.3.25. **Entrance and access to workspace**

At least one entrance not less than 24 inches wide and 6 feet 6 inches high shall be provided to give access to the working space about electric equipment. On switchboard and control panels exceeding 48 inches in width, there shall be one entrance at each end of such board where practicable. Where bare energized parts at any voltage or insulated energized parts above 600 volts are located adjacent to such entrance, they shall be guarded.

20.3.26. **References**

OSHA 29 CFR 1910 Subpart R

OSHA 29 CFR 1910 Subpart S

OSHA 29 CFR 1926 Subpart K

OSHA 29 CFR 1926 Subpart V

National Electric Code

American National Standards Institute, Z89.2-1971

21. Fire and Hot Work Programs

21. FIRE AND HOT WORK PROGRAMS

21.1. Welding and Cutting Responsibilities

All levels of management and wage rate employees shall be trained of the responsibilities associated with hot work activities such as welding and cutting per OSHA 1926.252:

21.1.1. **Management will**:

21.1.1.1. Establish approved areas for welding and cutting within the work area

21.1.1.2. Establish procedures for having management approve the work to be done (burn/weld permits)

21.1.1.3. Designate an individual responsible for authorizing any and all welding operations (with this person being aware of fire hazards involved)

21.1.1.4. Arrange for the use of approved apparatus, such as torches, manifolds and hoses

21.1.1.5. Make sure that welders or torch users and their supervisors have been suitably trained in the safe operation of their equipment, the safe use of the process and emergency procedures in the event of a fire

21.1.1.6. Advise all welders about flammable materials or hazardous conditions of which they may not be aware

21.1.2. **Superintendents will**:

21.1.2.1. Be responsible for the safe handling of the welding and cutting equipment and for the safe work practices of the workers

21.1.2.2. Assure welding leads and/or hoses are in good condition

21.1.2.3. Determine the combustible materials and hazards present or likely to be present in a work location

21.1.2.4. Protect combustibles from ignition by moving the work to a location free from dangerous combustibles

21.1.2.5. Have combustibles moved to a safe distance from the work or have combustibles properly shielded against ignition, if the work cannot be moved

21.1.2.6. Schedule welding and cutting so that operations that might expose combustibles to ignition are not started during such work

21.1.2.7. Make sure that workers have received approval before welding

21.1.2.8. Make sure that fire protection and extinguishing equipment is properly located near welding

21.1.2.9. Make sure that the welding area is inspected one-half hour after welding is completed to ensure that no sparks or smoldering fires are present

21.1.2.10. Assign fire watch as necessary

21.1.3. **Employees should**:

21.1.3.1. Handle equipment safely and use it so as to not endanger lives and property

21.1.3.2. Have supervisor’s approval before starting to weld or cut

21.1.3.3. Only weld or cut where conditions are safe and only continue so long as conditions are unchanged from those under which approval was granted

21.1.3.4. Advise management when equipment is in need of repair

21.1.3.5. Use necessary personal protective equipment for the project, such as respirators, leathers, gloves, correct shaded lenses, fire-resistant clothing and so forth

21.1.3.6. Use fall arrest systems as required

21.1.4. **Welding and Cutting in Confined Spaces**

21.1.4.1. All the normal procedures for confined space apply to welding and torch-cutting in confined spaces. In addition, the following applies:

21.1.4.2. When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space will be provided with airline respirators.

21.1.4.3. An employee outside the confined space will be assigned to maintain communication with those inside and to assist them in the event of an emergency. (See “Confined Space” section of this manual).

21.1.5. **Welding, Torch-Cutting or Heating Toxic Metals**

21.1.5.1. Toxic metals include zinc, lead, mercury, cadmium, chromium, beryllium and others. Galvanizing metals nearly always contain one or more of these toxic metals and require special attention.

21.1.5.2. Adequate mechanical ventilation or proper use of airline respirators is required.

21.1.5.3. Filter-type respirators may be acceptable in some instances if the work in performed in the open air, except for beryllium-containing metals. If beryllium is present in the metals, airline respirators are mandatory.

21.1.5.4. Contact the Safety Department for assistance if any toxic metals are present.

21.1.6. **Metals with Preservative Coatings**

21.1.6.1. Before any welding or heating is done on metals that have a protective coating (including paint) whose flammability is not known, a test will be done by a competent person to determine the flammability. (See OSHA Standard 1926.354 for details.)

21.1.6.2. In enclosed spaces, all coatings will be stripped from the metal at least 4 inches from the areas where heat will be applied, or the employees will be required to use an airline respirator.

21.1.6.3. If the work is to be done in the open air, filter-type respirators may be acceptable, depending on the material.

21.1.6.4. The Safety Department should be contacted before heating metals with protective coatings.

21.1.7. **Precautions**

21.1.7.1. Welding or cutting should not be permitted under the following conditions:

- In areas unauthorized by management
- In areas where there is no fire extinguisher in the immediate area
- In the presence of explosive atmospheres, as when flammable gases, vapors, liquids or dusts are in the air
- In areas near storage of large quantities of combustibles, such as paper, wood pallets and so forth

21.1.7.2. Before welding or cutting is permitted, the following should be done:

- The area should be inspected by the superintendent authorizing the welding or cutting
- Through the on-site permit system, the superintendent should inform the welder as to what precautions must be taken.

21.1.7.3. The permit should be signed and posted near the welding area by the authorizing supervisor once the welding and cutting equipment to be used is in satisfactory operating condition and in good repair.

21.1.7.4. When combustible materials—such as paper clippings, wood shavings or fibers—are on the floor, the floor is swept clean for a radius of 35 feet. Combustible floors should be kept wet (except wood on concrete), covered with damp sand or protected by fire-resistant shields. Where floors have been wet down, welders operating arc welding or cutting equipment should be protected from possible shock.

21.1.7.5. Where practicable, all combustibles are relocated at least 35 feet from welding site. Where relocation is impracticable, combustibles should be protected with flame-resistant covers. The edges of covers should be tight to the floor to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile.

21.1.7.6. Welding or cutting on pipes or other metal in contact with combustible walls, partitions, ceiling or roofs is not started if the work is close enough to cause ignition through direct contact.

21.1.7.7. Fully charged and operable fire extinguishers appropriate for the type of possible fire are available at the work area.

21.1.7.8. Nearby personnel are suitably protected from heat, sparks and so on. Personnel should not look into the welding arc.

21.1.7.9. Fire watches should be required by the authorizing individual if:

- There is a potential for a fire.
- There is an appreciable quantity of combustibles more than 40 feet away that can easily be ignited by sparks.
- There are combustible materials adjacent to the opposite side of metal partitions, walls, ceilings or roofs that are likely to be ignited by a heat build-up in that metal.

21.1.7.10. Fire watches should also include:

- Having a fire extinguisher readily available and having the person conducting the fire watch trained in its use, including practice tests on fires.
- Having the person conducting the fire watch be familiar with the procedures for fire notification.
- Watching for fires in all exposed areas, and trying to extinguish them first only within the capacity of the fire extinguisher or by notifying the proper authorities.
- Providing a fire watch for at least a half-hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

21.1.8. **Training**

21.1.8.1. A training program, as well as regular discussions at Safety Talks, should emphasize that welders or cutters can provide for their safety and the safety of all co-workers by observing the following safe practices:

21.1.8.2. For work at more than 5 feet above floor or ground level, use a platform with railings or a personal fall arrest system and lanyard.

21.1.8.3. After welding or cutting is completed, mark hot metal or post a warning sign to keep workers away from heated surfaces.

21.1.8.4. Follow safe housekeeping principles. Do not throw electrode or rod stubs on the ground; discard them in the proper waste containers. Keep tools and other tripping hazards off the floor by putting them in a safe storage area.

Gas Welding and Burning

21.1.9. Handling Cylinders

21.1.9.1. Only accept cylinders approved for use in interstate commerce for transportation of compressed gases.

21.1.9.2. Do not remove or change numbers or marks stamped on cylinders, especially warnings such as “FLAMMABLE” and "OXIDIZER."

21.1.9.3. Because of their shape, smooth surface and weight, cylinders are difficult to carry by hand. Cylinders may be rolled on their bottom edge but should never be dragged. Cylinders weighing more than 40 pounds should be transported on a hand or motorized truck and should be secured to keep them from failing.

21.1.9.4. Protect cylinders from cuts or abrasions.

21.1.9.5. Do not drop cylinders or let them strike each other violently.

21.1.9.6. Do not use cylinders for rollers, supports or any purpose other than to contain gas.

21.1.9.7. Do not tamper with safety devices in valves or on cylinders.

21.1.9.8. When in doubt about the proper handling of a compressed gas cylinder or its contents, consult the supplier of the gas.

21.1.9.9. When empty cylinders are to be returned to the vendor, mark them as “EMPTY” with chalk. Close the valves and, if the cylinder is designed to accept a cap, replace the valve protection caps.

21.1.9.10. Load cylinders to be transported to allow as little movement as possible. Secure them to prevent violent contact or upsetting.

21.1.9.11. Always consider cylinders as being full and handle them with care. Accidents have occurred when containers under partial pressure were thought to be empty. Keep empty cylinders stored in a separate area from full cylinders.

21.1.10. **Using Cylinders**

21.1.10.1. Use cylinders, particularly those containing liquefied gases and acetylene, in an upright position and secure them against accidentally being knocked over.

21.1.10.2. Unless the cylinder valve is protected by a recess in the head, keep the metal cap in place to protect the valve when the cylinder is not connected

for use. A blow on an unprotected valve might cause gas under high pressure to escape.

21.1.10.3. Make sure the threads on a regulator or union correspond to those on the cylinder valve outlet. Do not force connections that do not fit.

21.1.10.4. Open cylinder valves slowly. A cylinder not provided with a hand-wheel valve should be opened with a spindle key or a special wrench or another tool provided or approved by the gas supplier.

21.1.10.5. Do not use a cylinder of compressed gas without a pressure-reducing regulator attached to the cylinder valve.

21.1.10.6. Before connecting to a cylinder valve outlet, "crack" the valve for an instant to clear the opening of particles of dust or dirt. Always point the valve and opening away from the body and not toward anyone else. Never crack a fuel gas cylinder valve near other welding work or near sparks, open flames or other possible sources of ignition.

21.1.10.7. Do not attempt to repair or alter cylinders, valves or attachments. This work should be done only by the manufacturer.

21.1.10.8. Unless the cylinder valve has been closed tightly, do not attempt to stop a leak between the cylinder and the regulator by tightening the union nut.

21.1.10.9. Do not permit sparks, electric currents, excessive heat or flames to come in contact with the cylinder or attachments.

21.1.10.10. Never use oil or grease as a lubricant on valves or attachments of oxygen cylinders. Keep oxygen cylinders and fittings away from oil and grease and do not handle such cylinders or apparatus with oily hands, gloves or clothing.

21.1.10.11. Never use oxygen as a substitute for compressed air in pneumatic tools. Use it only for the purpose for which it is intended.

21.1.10.12. Never bring cylinders into tanks or unventilated rooms, confined spaces or other closed quarters.

21.1.10.13. Do not fill cylinders except with the consent of the owner and then only in accordance with the Department of Transportation (DOT) or other applicable regulations. Do not attempt to mix gases in a compressed gas cylinder or to use a cylinder for purposes other than those intended by the supplier.

21.1.10.14. Before a regulator is removed from a cylinder valve, close the cylinder valve and release the gas from the regulator.

21.1.11. **Handling Leaks in Cylinders**

21.1.11.1. Fuel gas cylinders in which leaks occur should be taken out of use immediately and handled as follows:

- Close the valve and take the cylinder outdoors, well away from any source of ignition. Properly tag the cylinder and notify the supplier. A regulator attached to the valve may be used temporarily to stop a leak through the valve seat.
- If the leak occurs at a fuse plug or other safety device, take the cylinder outdoors, well away from any source of ignition. Open the cylinder valve slightly, and permit the fuel gas to escape slowly. Tag the cylinder plainly. Post warning signs against approaching with lighted cigarettes or other sources of ignition. An authorized, properly

trained person, such as a member of the fire watch, should stay in the area until the cylinder is depressurized to make sure that no fire occurs. Promptly notify the supplier and follow the instructions for returning the cylinder.

21.1.12. **Hose and Hose Connections**

21.1.12.1. Do not use unnecessarily long hoses because it takes too long to purge. When a long hose must be used, make sure it does not become kinked or tangled and that it is protected from being run over by trucks or otherwise damaged. Where long hoses must be used in areas exposed to vehicular or pedestrian traffic, suspend it high enough overhead to permit unobstructed passage.

21.1.12.2. Repair leaks at once. Besides being a waste, escaping fuel gas may become ignited and start a serious fire; it may also set fire to the welder's clothing. Escaping oxygen is equally hazardous. Repair hose leaks by cutting the hose and inserting a splice. Do not try to repair leaky hose by taping.

21.1.12.3. Examine hose periodically and frequently for leaks and warm places, and check hose connections. Test for leaks by immersing the hose under normal working pressure in water. It would be a good idea to document any repairs or maintenance done on welding units.

21.1.12.4. Protect hose from flying sparks, hot slag, other hot objects, and grease and oil. Store hose in a cool place.

21.1.12.5. A single hose having more than one gas passage is not recommended because a wall failure would permit the flow of one gas into the other gas passage. When parallel links of oxygen and acetylene hose are taped together for convenience and to prevent tangling, not more than 4 inches of every 12 inches of hose should be taped.

21.1.12.6. Flashback devices between the torch and hose can prevent burn back into the hoses and the regulator. If a flashback occurs and burns the hose, discard the burned section. Purge new hose before connecting it to the torch and the regulator.

21.1.13. **Torches**

21.1.13.1. Select the proper welding head or mixer, tip or cutting nozzle (according to the charts supplied by the manufacturer), and screw it firmly into the torch.

21.1.13.2. Before changing torches, shut off the gas at the pressure-reducing regulators and not by crimping the hose.

21.1.13.3. Do not use matches to light torches. Use a friction lighter, stationary pilot flame or other suitable source of ignition. When lighting, point the torch tip so no one will be burned when the gas ignites.

21.1.13.4. Never put down a torch until the gases have been completely shut off. Do not hang torches from a regulator or other equipment so that they may come in contact with the sides of the gas cylinders. If the flame has not been completely extinguished or if a leaking torch ignites, it may heat the cylinder or even burn a hole through it.

21.1.13.5. When extinguishing the flame, close the acetylene and oxygen valves in the order recommended by the torch manufacturer. If the oxygen valve is closed first, carbon soot will be deposited in the air; however, this deposit ensures that the acetylene valve is closed tight when the flame is

extinguished. If the acetylene valve is turned off first, no soot is formed, but there is no assurance that the fuel gas valve is closed and that it is not leaking.

21.1.13.6. To discontinue welding or cutting for a few minutes, closing only the torch valves is permissible. If the welding or cutting is to be stopped for a longer period (during lunch or overnight), proceed as follows:

- Close the oxygen and acetylene cylinder valves.
- Open the torch valves to relieve all gas pressure from the hose and regulators.
- Close the torch valves and release the regulator pressure-adjusting screws.

21.1.13.7. Never merely turn off the gas supply at the torch. Doing so leaves the hose pressurized. Always cut the supply from the cylinder, bleed the lines, and, with the lines open, back off the regulator. The lines should then be coiled carefully, avoiding kinks.

21.1.14. **Arc Welding**

Arc welding is a process for joining metals by heating with an electric arc or arcs with or without the application of pressure, and with or without the use of filler metal. Either AC or DC may be used for arc welding or cutting of any kind. Some precautions for prevention of electric shock during arc welding are as follows:

21.1.14.1. Never change electrodes with bare hands or wet gloves, or when standing on wet floors or grounded surfaces.

21.1.14.2. Ground the frames of welding units, portable or stationary, in accordance with the latest edition of the National Electric Code, NFPA 70. With a small welding unit, a primary cable containing an extra conductor, one end of which is attached to the frame of the welding unit, may be used. By using a proper polarized plug, this ground connection can be carried back to the permanently grounded connection in the receptacle of the power supply.

21.1.14.3. Arrange receptacles of power cables for portable welding units so that it is impossible to remove the plug without opening the power supply switch, or use plugs and receptacles that have approved full-load circuit breakers.

21.1.14.4. If a cable (either work lead or electric lead) becomes warm, exposing bare conductors, cover the exposed portion with rubber, plastic or friction tape. The insulation repair on work lead cables should be equivalent in insulating character to the original cable covering.

21.1.14.5. Keep welding cables dry and free of grease and oil to prevent premature breakdown of the insulation.

21.1.14.6. Suspend cables on substantial overhead supports if the cables must be run some distances from the welding unit. Protect cables that must be laid on the floor or ground so that they will not interfere with safe passage or become damaged or entangled.

21.1.14.7. Take special care to keep welding cables away from power supply cables or high-tension wires.

21.1.14.8. Never coil or loop welding cable around the body.

21.1.15. **Personal Protection**

21.1.15.1. Only minimal health hazards generally exist in open-air welding or cutting in large, well-ventilated areas, where clean carbon steel is welded or cut with bare or coated carbon-steel electrodes and without inert gas shielding.

21.1.15.2. Oxides of nitrogen are always generated near the welding or cutting arc. An inert-gas shield, however, minimizes the introduction of air to the arc. Concentrations of these oxides are generally above their PELs or TLVs within a few inches of the arc, but they are diluted rapidly by air movements. Local exhaust or general ventilation should be used to keep the concentrations of oxides of nitrogen within safe limits.

21.1.15.3. Ultraviolet radiation from the welding or cutting arc may also decompose chlorinated hydrocarbons, such as trichloroethylene and perchloroethylene, to form highly toxic substances such as phosgene. Since this decomposition can occur even at a considerable distance from the arc, degreasing operations and other work using these chlorinated solvents should be located so that no solvent vapor will reach the welding or cutting area, or be exposed to arc radiation.

21.1.15.4. In spaces of 50,000 cubic feet and over, where welding is an essential part of the work, local exhaust or positive ventilation may not be required for the protection of welders on uncoated ferrous metals, provided that (a) welding bays are not structurally blocked so as to obstruct cross ventilation; (b) the work is not done inside tanks, boilers, or other closed iron or steel containers; (c) a space allowance of 10,000 cubic feet is assured each welder; (d) the ceiling heights are greater than 16 feet, and (e) the process involved is other than inert-gas-shielded arc welding.

21.1.15.5. When welding must be performed in a space screened on all sides, the screens should be so arranged that they do not seriously restrict ventilation. They can be mounted about 2 feet above the floor, unless the work is performed at so low a level that they must be nearer the floor to protect nearby workers from welding gas.

21.1.15.6. Local exhaust removal may be by means of movable hoods placed as near as practicable to the work being welded and provided with a rate of air flow sufficient to maintain a velocity in the direction of the hood of 100 feet per minute (fpm) at the point of welding when the hood is at its most remote distance from the point of welding.

21.1.15.7. Local exhaust may also be by a fixed enclosure with a top and not fewer than two sides, which surround the welding or cutting operations, and with an air flow sufficient to maintain a velocity away from the welder of not less than 100 fpm.

21.1.16. **Ventilation**

21.1.16.1. Welding and cutting may normally be done without mechanical ventilation or respiratory protective equipment except where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists. Suitable mechanical ventilation or respiratory protective equipment should be provided where an unsafe condition exists.

21.1.16.2. Mechanical ventilation should consist of either general mechanical ventilation systems or local exhaust systems.

21.1.16.3. General mechanical ventilation should be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain

welding fumes and smoke within safe limits, as defined in OSHA Subpart D, Occupational Health and Environmental Controls, Sections 1926.55, “Gases, Vapors, Fumes, Dusts and Mists,” and 1926.57, “Ventilation” (see Appendix C).

21.1.17. **Eye Protection**

Goggles, helmets and shields that give maximum eye protection for each welding and cutting process should be worn by operators, welders and their helpers. These items should conform to OSHA Subpart E, Section 1926.102 (see Appendix D).

21.1.18. **Transporting, Moving, and Storing Compressed Gas Cylinders**

21.1.18.1. Valve protection caps shall be in place and secured.

21.1.18.2. When cylinders are hoisted, they shall be secured on a cradle, sling board, or pallet. They shall not he hoisted or transported by means of magnets or choker slings.

21.1.18.3. Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.

21.1.18.4. When cylinders are transported by powered vehicles, they shall be secured in a vertical position.

21.1.18.5. Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

21.1.18.6. Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.

21.1.18.7. A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.

21.1.18.8. Cylinders containing oxygen or acetylene or other fuel-gas shall not be taken into confined spaces.

21.1.19. **Treatment of Cylinders**

21.1.19.1. Cylinders, whether full or empty, shall not be used as rollers or supports.

21.1.19.2. No person other than the gas supplier shall attempt to mix gases in a cylinder.

21.1.19.3. No one except those persons authorized by Beta or it’s subcontractor shall refill a cylinder. No one shall use a cylinder's contents for purposes than those intended by the supplier- All cylinders used shall meet the Department of Transportation requirements published in 49 CFR Part 178, Subpart C.

21.1.20. **Specification for Cylinders.**

No damaged or defective cylinder shall be used.

21.1.21. **Use of Fuel Gas**

The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

21.1.21.1. Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

21.1.21.2. Before a regulator to a cylinder valve is connected, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to dear the valve of dust or dirt that might otherwise enter the regulator.)

21.1.21.3. Where a welder must enter a confined space through a small opening means shall be provided for quickly removing him in case of emergency. When safety belts and lifelines are used for this purpose they shall be so attached to the welder's body that his body cannot be jammed in a small exit opening. An attendant with a pre-planned rescue procedure shall be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.

21.1.22. **Welding, Cutting or Heating of Metals of Toxic Significance**

21.1.22.1. Welding, cutting, or heating in any enclosed spaces involving the following metals shall be performed with adequate mechanical ventilation as described above:

- Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.
- Lead base metals.
- Cadmium-bearing filler materials.
- Chromium-bearing metals or metals coated with chromium-bearing materials.

21.1.22.2. Welding, cutting, or heating in any enclosed spaces involving the following metals shall be performed with adequate local exhaust ventilation as described above or employees shall be protected by air line respirators in accordance with the requirements of 29 CFR 1910.134 Respiratory Protection:

- Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.
- Cadmium-bearing or cadmium-coated base metals.
- Metal coated with mercury metals.

21.1.22.3. Welders and the employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and highly reflective surfaces.

21.1.22.4. When inert-gas metal-arc welding is being performed on stainless steel, adequate local exhaust ventilation as described above or air line respirators in accordance with the requirements of 29 CFR 1910.134 Respiratory Protection shall be used to protect against dangerous concentrations of nitrogen dioxide.

21.1.23. **Cadmium Awareness Statement:**

Cadmium is used frequently as a rust-preventive coating on steel and also as an alloying element. Acute exposures to high concentrations or cadmium fumes can produce severe lung irritation, pulmonary edema, and in some cases, death. Long-

term exposure to low levels of cadmium in air can result in emphysema (a disease affecting the ability of the lung to absorb oxygen) and can damage the kidneys. Cadmium is classified by OSHA, NIOSH, and EPA as a potential human carcinogen. If you have any further questions or concerns contact the safety department for assistance.

21.1.24. **General Welding Cutting, and Heating**

Welding, cutting, or heating not involving conditions or toxic materials described above may normally be done without mechanical ventilation or respiratory protective equipment. These protections shall be provided, however, where an unsafe accumulation of contaminants exists because of unusual physical or atmospheric conditions. Employees performing any type of welding, cutting, or heating shall be protected by suitable eye protective equipment in accordance with the requirements of 29 CFR 1910.134 Respiratory Protection.

21.2. **Fire Protection And Prevention Requirements**

21.2.1. **Purpose**

Each subcontractor shall implement and enforce fire protection and prevention measures in accordance with Attachment “A” (“SDG&E East County Construction Fire Prevention Plan” dated August 14, 2012), Attachment “B” (“SDG&E Wildland Fire Prevention and Fire Safety Plan”), all federal, state, and local governmental agencies and in accordance with the following Beta Engineering requirements:

Temporary fire protection measure, such as the installation of fire extinguishers, near hazardous locations will be provided by each subcontractor as required:

21.2.2. **Fire Protection Training**

21.2.2.1. All employees will receive Fire Protection Training prior to site access and annually thereafter.

21.2.2.2. All employees who are designated through the emergency response procedures to use firefighting equipment, such as, a fire extinguisher shall be trained in the proper use of equipment.

21.2.2.3. All employees who are working in areas where portable fire extinguisher are positioned for employee use shall be trained on the proper use of fire extinguishers.

21.2.3. **Fire Extinguisher**

Stand 6 to 8 feet away from the fire and follow the four-step **PASS** procedure. If the fire does not begin to go out immediately, leave the area at once. Always be sure the fire department inspects the fire site.

21.2.3.1. **P**ull the pin: This unlocks the operating lever and allows you to discharge the extinguisher.

21.2.3.2. **A**im low: Point the extinguisher nozzle (or hose) at the base of the fire.

21.2.3.3. **S**queeze the lever below the handle: This discharges the extinguishing agent. Releasing the lever will stop the discharge.

21.2.3.4. **S**weep from side to side: Moving carefully toward the fire, keep the extinguisher aimed at the base of the fire and sweep back and forth until the flames appear to be out.

21.2.4. **Fire Extinguishers**

21.2.4.1. Every 3,000 square feet (or more where required)

21.2.4.2. Inspected monthly and tagged

21.2.4.3. protected against freezing, anti-freezing type extinguishers will be used (only if required)

21.2.4.4. One portable fire extinguisher (not rated less than 10B) is to be provided within fifty (50) feet of welding/cutting operations or where flammable liquids are used.

21.2.4.5. One fire extinguisher (not rated less than 10B) is to be provided within five (5) feet of wherever gasoline operated equipment is being used.

21.2.4.6. Access shall be maintained at all times to existing or newly activated fire hydrants and/or fire department connections. Access to excavation and structures for Fire Department entry shall be maintained at all times.

21.2.4.7. Emergency Fire Department phone numbers will be conspicuously posted.

21.2.5. **Fire Prevention Requirements**

21.2.5.1. Good housekeeping will be maintained at all times. A general clean-up is to be performed by each subcontractor as needed to ensure good housekeeping. Each subcontractor shall conduct daily safety/housekeeping inspections.

21.2.5.2. Combustible refuse from construction operations shall not be burned nor dumped on the construction site. Such refuse shall be removed at frequent intervals by each subcontractor as needed.

21.2.5.3. Storage of large quantities of construction debris shall be in heavy metal dumpster-like containers on the site.

21.2.6. **Flammable Liquids**

21.2.6.1. Portable fuel tanks will be installed in accordance with federal, state, and local requirements. It is the subcontractors responsibility to secure all required permits and provide proof of the same.

21.2.6.2. Flammable liquids may be stored outside, away from buildings, in a safe and secure location in standard approved storage containers or tanks.

21.2.6.3. Portable containers are not to be nearer than twenty (20) feet from any building under construction.

21.2.6.4. Portable tanks must be protected against physical damage.

21.2.6.5. Storage shall be away from open flames.

21.2.6.6. Storage shall not present exposure to any structure.

21.2.6.7. Storage areas are to be kept free of weeds, debris, and other unnecessary combustibles.

21.2.6.8. Engines are to be shut off during fueling.

21.2.6.9. Funnels are to be used for fueling.

21.2.6.10. Not more than 25 gallons of flammables may be stored inside tool trailers.

21.2.6.11. Approved metal safety containers will be used for indoor storage and handling.

21.2.6.12. Containers are to be kept in good condition and inspected regularly. Any defective containers are to be disposed of immediately.

21.2.6.13. Absolutely no smoking is permitted near any flammable liquid storage area. “No Smoking” signs will be posted.

21.2.6.14. Storage of compressed gasses (oxygen, acetylene, etc.) shall be in accordance with nationally recognized safety practices and OSHA regulations. Gas cylinders (acetylene, oxygen, and LP gas) to be:

21.2.6.15. Stored on solid base with valve caps in place.

21.2.6.16. Secured to rigid support to prevent tipping.

21.2.6.17. Separated by 20 feet or 1/2 hour rated wall when stored.

21.2.6.18. Empty cylinders to be separated from full cylinders and conspicuously marked.

21.2.6.19. Temporary Heating Devices:

- Temporary heating devices shall be utilized and maintained in accordance with all federal, local, and state rules and regulations.
- Solid fuel (wood/coal) salamanders and open drum/barrel fires are prohibited by Beta Engineering.
- Adequate insulation must be provided on combustible floors.
- Adequate fresh air will be provided to maintain worker health and safety. When fresh air supply is inadequate, some form of mechanical ventilation shall be provided.
- Temporary heaters will not be used in confined spaces.
- Temporary heaters will be checked for correct operation prior to being put into service each day. Heaters will not be modified or altered.

Fire Prevention and Protection Plan Checklist

1. What type of fire alarm system does the facility have or is available to use? How is it activated? Is the fire department notified?
2. How are people in the facility / site made aware of a fire or other emergency?
3. Does the facility have smoke detectors or an automatic sprinkler system? Is it operational?
4. Are all sprinkler shut-off valves identified and accessible? Do designated employees know their location and operation?
5. What flammable / combustible materials are being stored on the premises and where?
6. Are an adequate # and type of fire extinguishers available?, are they inspected both monthly internally and annually by a vendor?, are extra extinguishers needed to perform welding or other hot work operations?
7. Are there people designated for extinguishing fires?
8. Have these people received the necessary training?
9. Describe the housekeeping and storage arrangements?
10. Are there procedures for evacuating employees I guests?
11. List possible ignition sources?.
12. What phone numbers need to be called in the event of a fire? Are these numbers posted in key areas?

Additional Comments:

21.3. Emergency Action Plan & Fire Escape Procedures

21.3.1. Purpose

21.3.1.1. The purpose of this program is to provide Beta employees its subcontractor's employees and visitors to the site with a written, comprehensive plan for fire or other emergencies at the work place. This program was written in compliance with the federal OSHA standard 1910.38.

21.3.1.2. This plan will outline emergency fire-fighting measures for Beta Engineering and its subcontractors.

21.3.1.3. This plan will describe the location and proper use of fire extinguisher.

21.3.1.4. This plan will outline employee education and training.

21.3.1.5. This plan will describe emergency escape routes and roll call stations.

21.3.1.6. This plan will incorporate a testing schedule for fire drills and fire extinguisher/smoke alarm testing and inspection.

21.3.1.7. By becoming familiar with this program the overall goal of making Beta Engineering a safer place to work will be achieved.

21.3.2. Fire Protection Training

21.3.2.1. Fire Protection Training shall be conducted initially at employment and annually thereafter.

21.3.2.2. All employees who are designated through the emergency response procedures to use firefighting equipment, such as, a fire extinguisher shall be trained in the proper use of the specific equipment.

21.3.2.3. All employees who are working in areas where portable fire extinguisher are positioned for employee use shall be trained on the proper use of fire extinguishers.

21.3.3. Fire Extinguisher

Stand 6 to 8 feet away from the fire and follow the four-step **PASS** procedure. If the fire does not begin to go out immediately, leave the area at once. Always be sure the fire department inspects the fire site.

21.3.3.1. **P**ull the pin: This unlocks the operating lever and allows you to discharge the extinguisher.

21.3.3.2. **A**im low: Point the extinguisher nozzle (or hose) at the base of the fire.

21.3.3.3. **S**queeze the lever below the handle: This discharges the extinguishing agent. Releasing the lever will stop the discharge.

21.3.3.4. **S**weep from side to side: Moving carefully toward the fire, keep the extinguisher aimed at the base of the fire and sweep back and forth until the flames appear to be out.

21.3.4. Emergency Fire-Fighting Procedures

21.3.4.1. Office

- The emergency escape routes for the office buildings are posted by the fire extinguishers. All employees should become familiar with these escape routes.
- There are fire extinguishers throughout the building. All employees should become familiar with the location and use of them.

- In the event of a fire in the office building, the following procedures should be followed:
- Warn all personnel in the building.
- Call the Fire Department by dialing 911, no matter how small the fire appears to be.
- If the fire is small enough, put it out. If the fire is out of control, immediately evacuate the building. If it is possible, shut all doors to help contain the fire and smoke.
- Remember, heat and smoke rise, leaving cleaner air near the floor. If you must escape through smoke, crawl low.
- If possible, use a building exit to exit and through office windows as a last resort.
- After exiting the building, all personnel should meet in front of the building. At this point a roll call will be taken. The receptionist should know who all was in the building. If it is determined that there is possibly someone still in the building, notify the fire department immediately. Do not re-enter the building. Stay clear of the driveway and out of the way of all fire apparatus and personnel.

21.3.4.2. Jobsite

- All employees should become familiar with the location and use of fire extinguishers. Obtain Fire Department Emergency Number prior to the start of a job.
- In the event of a fire on the jobsite, the following procedures should be followed.
- Warn all personnel on the jobsite.
- Call the Fire Department, no matter how small the fire appears to be.
- If the fire is small enough, put it out. If the fire is out of control, leave the area immediately.
- In the event of an emergency affecting the safety of persons and/or the work at the jobsite, the Construction Manager or site safety supervisor is to act without special instruction or authorization to minimize or prevent further damage, injury, or loss. They shall immediately notify the Safety Department and the Customer Site representative of the problem and resolution.

21.3.5. **Fire Prevention**

21.3.5.1. Smoking is permitted in designated areas.

21.3.5.2. Replace any electrical cord that has cracked insulation or a broken connector.

21.3.5.3. Do not run extension cords across doorways or where they can be stepped on or chafed. Do not plug one extension cord into another and avoid plugging more than one extension cord into an outlet.

21.3.5.4. Leave space for air to circulate around heaters and other heat producing equipment such as the copy machines and computer terminals.

21.3.5.5. Turn off and unplug space heaters before leaving the building at the end of the day.

21.3.5.6. Turn off the coffee machine before leaving the building at the end of the day.

21.3.5.7. Do not clutter hallways and doorways.

21.3.5.8. All flammable materials will be properly stored. Safety gas cans are required for fuel storage.

21.3.5.9. Note: By knowing what to do in case of a fire, possible personnel injury or death will be prevented and will contribute to the goal of making Beta Engineering a safer place to work.

22. Blasting Plan Safety Protocol

22. Blasting Plan Safety Protocol

22.1. Blasting Protocols (Currently under review by CPUC)

22.2. Blasting Safety Protocols

22.2.1. Blasting Subcontractor

Should blasting be required, Beta will contract a certified Blasting Sub-contractor and provide the following information prior to the start of work:

22.2.1.1. Blasting Subcontractor

22.2.1.2. Certificate of Liability Insurance

22.2.1.3. Responsible Blasters

22.2.1.4. Contact Person for Project Blasting

22.2.1.5. Blast Plan Designer

22.2.1.6. Safety Officer

22.2.1.7. Local Fire and Law Enforcement Agencies Responsible for Project Blasting

22.2.1.8. Explosive Storage Plan

22.2.1.9. Subcontractors Blasting Procedures

22.2.1.10. Material Safety Data Sheets and Manufacturer Data Sheets

22.2.1.11. Demonstration of Capability

22.2.2. Effective Exclusion Zone

The effective Exclusion Zone shall be a minimum of fifty feet from loading and blasting operations.

22.2.3. Blast warning signals

The blasting subcontractor will provide an audible warning signal and guards in sufficient numbers to assure that people, property and improvements will not be endangered during blasting operations. Blasting signals will be posted at one or more conspicuous locations at the project. The blasting signals will be as specified in section 5291 of the General Industry Safety Orders. Job site personnel will be made aware of the blasting signals during the job site safety meeting. Blasting area warning signs and cones will be used in the area when the shot is being loaded.

22.2.4. Lightning Protection Procedures

Prior to commencing the loading of a blast, the blaster will determine if lightning is forecasted. If there is a possibility that an electrical storm may interfere with the loading schedule, loading will either be rescheduled or be accomplished in such a sequence that, should an electrical storm approach loading could be terminated, the area secured, traffic controlled and the loaded portion of the blast fired safely prior to the arrival of the storm.

22.2.5. Emergency Evacuation Procedures

The blasters in charge will determine if circumstance require the evacuation of personnel from the vicinity of a blast site. The blaster will immediately notify project management and the project engineer and coordinate with them the steps he will be taking to properly clear the blast site. The blasting crew members will instruct job site personnel to move to a safe location away from the blast site. .Project management will notify the highway patrol (or traffic authority) if traffic will be either routed away from the area or halted until the emergency issue is resolved. While this is being accomplished the blast site will remain guarded.

22.2.6. Misfires

After each shot the blast area will be examined for misfires. Only the blaster and his minimum necessary crew should be present. Some signs of a misfire could be:

- Unexploded shock tube or remnants.
- Undetonated surface delay detonators.
- Undetonated explosive residue.
- Results of a shot not as expected.
- Shot didn't sound as expected.

It is possible that a misfire could be discovered during three separate phases of the operation;

- A misfire that is obvious during the detonation of the blast
- A misfire that is discovered during inspection of the blast site, before the "All Clear" signal is given, and
- A misfired hole or undetonated explosive discovered during some subsequent operation following the blast and the "All Clear" signal.
  To assist in the discovery of misfires and to assure that they are properly cleared without undue hazards to persons or property, the following procedures will be followed by project personnel involved in the blasting operation:

  a. <u>Obvious misfire during detonation of the blast:</u>

  During the detonation of each blast, the blaster will carefully evaluate the blast detonation timing. If the blaster suspects that a misfire has occurred, he will immediately notify project management who will notify the project engineer and the Highway Patrol (or traffic authority) of the likelihood of a misfire and the following steps will be taken:
  The "All Clear" signal will not be given, traffic will not be released and the blast site will continue to remain guarded. Following a minimum mandatory 30-minute wait after the blast, the blaster and only those personnel necessary to the task will approach and investigate the suspected misfire.

  - If **<u>no misfire is found</u>** to exist after adequate inspection by the blaster, he will so notify project management and will give the order to sound the "All Clear" signal, after which traffic can be released.

  - If **<u>a misfire is found</u>** to exist, the blaster will immediately notify project management and the project engineer and coordinate with them the steps he will be taking to properly clear the misfire. If the blaster determines that the area of potential hazard has increased beyond that of the original blast, the area will be cleared to the new limits. The blaster will not proceed to clear the misfire until the area

has been secured. He will the take the steps necessary to safely clear the misfire. While this is being accomplished, the blast site will remain guarded.

Following successful clearing of the misfire and a subsequent inspection of the blast site by the blaster, he will give the order to sound the “All Clear” signal, after which traffic can be released.

b. Misfire discovered during inspection of the blast site:

After a minimum mandatory wait of 5-minutes after the blast, the blaster will conduct a thorough inspection of the blast site to be certain that no misfire exist.

- If **no misfire is found** to exist after adequate inspection by the blaster, he will so notify project management and will give the order to sound the “All Clear” signal, after which traffic can be released.

- If **a misfire is found** to exist, the blaster will immediately notify project management and the project engineer and coordinate with them the steps he will be taking to properly clear the misfire. The “All Clear” signal will not be given, traffic will not be released and the blast site will continue to remain guarded. Following a minimum mandatory 30-minute wait after the blast, the blaster and only those personnel necessary to the task will approach and investigate the misfire.

  If the blaster determines that the area of potential hazard has increased beyond that of the original blast, the area will be cleared to the new limits. The blaster will not proceed to clear the misfire until the area has been secured. He will the take the steps necessary to safely clear the misfire. While this is being accomplished, the blast site will remain guarded. Following successful clearing of the misfire and a subsequent inspection of the blast site by the blaster, he will give the order to sound the “All Clear” signal, after which traffic can be released.

c. Misfire discovered in subsequent operation:

In the event that an unexploded charge is discovered during some subsequent operation following blasting (such as excavating, loading, hauling, etc.), the following steps will be taken:

- The person discovering the undetonated charge will immediately notify the Licensed Blaster, project management and the project engineer, and take steps to guard the charge.

- Excavating, loading, hauling and other activities in the immediate vicinity of the blast zone will be suspended.

- The Licensed Blaster will proceed to the area and will evaluate the problem and determine the likelihood of additional explosive

charges being involved. After this inspection, safe remediation procedures will be developed.

If the inspection reveals that one or more individual cartridges of explosive require removal from the site, the explosive supplier will be notified and the explosives will be returned to storage or destroyed as determined by the supplier.

If the inspection reveals that explosives will have to be fired in place or removed from the drill hole, the Licensed Blaster will advise project management and the project engineer of the steps necessary to properly clear the misfire.

The Licensed Blaster will determine the area surrounding the misfire that needs to be cleared and secured for safety. Steps will be taken to properly secure this area, including notification of the Highway Patrol (or traffic authority).

The blaster will then proceed to clear the misfire. If clearing the misfire involves detonating the explosives, all provisions of the Explosive Safety Orders pertaining to the firing of blasts will be followed.

Following successful clearing of the misfire and a subsequent inspection of the blast site by the blaster, he will give the order to sound the “All Clear” signal, after which traffic can be released.

Equipment requirement that may be needed to resolve misfire includes the following:

- Backhoe or excavator
- Dozer
- Track drill
- Hand held shovel

22.2.7. Blasting Zone Signage

A sign with the blasting warning signals printed on it will be posted at one or more conspicuous locations near the blast site. Signs that identify the blasé area and to keep out of that area will be posted in ingress and egress areas to the blasting site and at a minimum distance of 50 feet from the perimeter of the blast area. Warning cones with blasting area keep off printed on them will be displayed and blast warning area tape will be used at a distance of 50 feet from the perimeter of the blast site. The blaster in charge will assign a member(s) of the blasting crew to place the signage prior to the loading of each shot.

22.2.8. Traffic Control

Traffic will be routed at least 50 feet from blast loading operations, Traffic will be stopped at a safe distance at the time the “5 Minute Warning” signal is given. Traffic will remain stopped at a safe distance until the blast has been detonated and the “All Clear” signal has been given, after which traffic can be released.

22.2.9. Traffic Control in the Event of a Misfire or Blast Related Phenomenon

The blaster in charge will immediately notify project management who will notify the project engineer and the Highway Patrol (or traffic authority.) All project activity in the vicinity of the blast zone will be suspended and traffic will be stopped or routed at a safe distance from the incident. Following a successful clearing of the misfire or resolving other blast related safety issues the blaster will sound the “All Clear” signal after which traffic can be released.

22.2.10. Postblast Fumes

The following is a list of safe guards to protect employees, and the public from exposure to postblast fumes.

- Proper priming of the explosives column
- Sufficient in hole explosives confinement
- The use of explosives with sufficient water resistance when wet blast hole conditions are encountered
- Only explosives with an IME “Fume Class 1” classification will be used for project blasting.
- Sufficient time will be allowed after the blast for the fumes to be dispersed before any personnel are allowed to return to the blast area.

22.3. **PUBLIC LIAISON**

As stated in MM-LU-1a, SDG&E will provide a public liaison and a toll-free hot line, to respond to concerns of neighboring property owners related to construction disturbances. Contact information for the public liaison will be included in the construction notices. SDG&E will respond to complaints in a timely manner. SDG&E will log the complaint, notify the CPUC of the complaint, and provide documentation to the CPUC that the complaint was effectively resolved.

23. Security

23. SECURITY

23.1. Purpose

23.1.1. Prevent the exposure of unauthorized, unprotected people to site hazards. Avoid the increased hazards from vandals or persons seeking to abandon other wastes on the site.

23.1.2. Employ security guard(s) as necessary to prevent theft and vandalism to site and equipment.

23.1.3. Avoid interference with safe working procedures.

23.1.4. To maintain site security during working hours.

23.1.5. Maintain security in the support zone and at access control points.

23.1.6. Assign responsibility for enforcing authority for entry and exit requirements.

23.1.7. Mark the area with caution tape, or erect a fence if required.

23.1.8. Post caution/warning signs around perimeter to emphasize special hazards identified with the site.

23.1.9. Have Site Supervisor log in all visitors to the site on the Visitor's Log Form. Visitors shall go through a site orientation and provide proof of any specialized training which may be required at the site in order to enter the site. Trained site personnel shall accompany visitors at all times. If personal protective equipment is not available for all visitors, they will not be permitted on the jobsite.

23.1.10. Traffic and Pedestrian Protection

23.1.10.1. OSHA regulations do not address the protection of the general public on a jobsite. However, the activities of most construction projects can present serious and significant exposure to pedestrian and vehicles.

23.1.10.2. Besides protecting employees each subcontractor also has a reasonable responsibility to provide a jobsite that is free of recognizable hazards which have caused or are likely to cause possible exposure or loss to the general public.

23.1.10.3. All traffic signs or devices used for protection of the public shall conform to America National Standards Institutes, D6- 1, Manual of Uniform Traffic Control Devices for Streets and Highways.

23.1.10.4. Barricades, cones, and/or similar protective devices shall be used whenever employees or the public are exposed to traffic or similar hazards.

23.1.10.5. When traffic patterns are closed or altered due to work activity, instructional or warning signs shall be used.

23.1.10.6. When used, flagmen and signalmen shall be properly trained in the proper procedures for safely moving, and processing vehicle traffic around construction activities.

23.1.10.7. Employees working adjacent to traffic shall wear a reflectorized vest (except when working inside barricaded areas).

Public walkways and roadways shall be kept clean and free of construction related hazards and/or materials at all times.

24. Administrative Programs

24. ADMINISTRATIVE PROGRAMS

24.1. Record Keeping

Beta Engineering requires its Construction Manager and subcontractors to maintain the documentation of all safety and health requirements. This includes the following:

24.1.1. Daily pre-task planning evaluations - submit weekly

24.1.2. New hire orientation sign in sheets- submit weekly

24.1.3. Daily jobsite inspection - submit weekly

24.1.4. Weekly safety meetings - submit weekly

24.1.5. All Safety and Health Training - submit weekly

24.1.6. Material Safety Data Sheet inventory - submit weekly

24.2. Safety Meetings

Beta Engineering requires its Construction Manager and its subcontractors to hold safety meetings on a weekly basis, at minimum. Documentation of topics covered and those in attendance must be maintained.

Site Specific Safety Plans

A Safety Review will be held regarding the job prior to the start of the job. Safety issues and concerns will be reviewed at this time. These issues and concerns will be addressed and corrected before the start of the job.

Weekly toolbox meetings shall be held and documented on the Beta Engineering Safety Meeting Form by each work crew on site. These meetings shall be reported to the Site Superintendent, who shall incorporate these items into his daily report.

24.3. Safety Inspections

24.3.1. Purpose

Beta Engineering requires its on site management, employees, and subcontractors to inspect work areas on a daily basis to ensure that all safe procedures are being followed and that equipment is being maintained to ensure safe operation and safe working conditions exist at all times.

In addition to the above requirement, the Construction Manager will conduct daily safety inspections of the work area and document these inspections.

24.3.2. Reporting and Investigations

24.3.2.1. All accidents and injuries must be reported to your immediate supervisor immediately. All subcontractors must report all accidents and injuries to Beta Engineering's Construction Manager immediately.

24.3.2.2. Accident and injury investigations must be conducted by the immediate supervisor and a written report provided to the Beta Engineering Construction Manager by the end of the shift. The report will include the following:

- Name of employee
- Name of contractor
- Date of accident/injury
- Detail explanation of what happened
- Nature of injuries
- What corrective actions will be taken to prevent a reoccurrence.

24.3.3. **Usual Procedure for Injury or Accident**

24.3.3.1. Report all injuries or occupational related illnesses immediately to your immediate supervisor and the Construction Manager.

24.3.3.2. Seek appropriate medical care. Report all injuries to the Site Safety Department designated authority, Safety Director, and the Project Manager within 24 hours on Beta Engineering Accident Illness/Injury Report.

24.3.3.3. Accidents and/or injuries require a post accident Drug/Alcohol screening test.

24.3.3.4. Accident with any of the consequences listed below shall be immediately reported to the Safety Manager, the Project Manager, and others as may be required. These accidents will be investigated in depth to identify all causes and to recommend hazard control measures. OSHA must be notified when:

- Fatal injury
- Serious injury
- Three or more persons admitted to the hospital, or
- Property damage in an amount specified by the customer designated authority or as specified in Corporate Drug/Alcohol Policies.

24.3.3.5. Except for rescue and emergency measures, the accident scene shall not be disturbed until it has been released by the investigating official.

24.3.3.6. A daily record of all first aid treatments (first aid is defined as any medical care rendered on site by the workers, but does not require the care of a physician, nurse or other health care professional,) not otherwise reportable shall be maintained on the proper form, Daily Safety Checklist and furnished to the Customer's designated authority. All OSHA reportable injuries shall be logged on an OSHA 200 form and placed in a visible location at the jobsite.

24.3.3.7. In addition, Beta Engineering and its subcontractors shall maintain records of all chemical exposure and accident experience incidental to the work (as described above) on the **Accident Injury/Illness Form** by our employees and subcontractors as well. Beta Engineering and its subcontractors will maintain records of employee exposure to toxic materials and harmful physical agents. Beta Engineering and its subcontractors will maintain access to the Worker Compensation Claims Report which details the accidents experienced by the division and their cost.

24.3.3.8. Emergency Treatment

Any exposure to hazardous materials through inhalation, ingestion, absorption through the skin, or eyes, requires evaluation by the nearest medical facility. This exposure is to be reported and treated as an injury or accident.

24.3.3.9. Property Damage

Any accident which results in property damage, but no injury, shall fill out an "**Accident Illness/Injury Report**" and submit the report to the Safety Department.

24.4. **Modified Duty Program**

In order to reduce lost time injuries and better manage worker compensation costs, Beta Engineering has developed and requires subcontractors to utilize the Modified Duty Program for injured employees. The Construction Manager will coordinate this program for Beta Engineering and its subcontractors.

24.5. **Posting Requirements**

Beta Engineering and its subcontractors are required to comply with all Worker's Compensation Statutes, Occupational Safety and Health Administration regulations. Other Federal, State, and local governmental agencies require certain notices, signs, or posters to be placed in conspicuous places where employees can readily see them. This requirement extends to all subcontractors as well. The minimum posting requirements include the following:

24.5.1. OSHA Jobsite Safety and Health Poster

24.5.2. Emergency Phone Number Listing

24.5.3. MSDS Notice to Employees - This notice advises employees that MSDS for a particular jobsite are located in the job trailer along with the written HAZCOM program.

24.5.4. OSHA Annual Summary- The summary is actually the last page of the OSHA 200 form with totals listed for all OSHA recordable cases.

24.5.5. Workers Compensation Notices

24.5.6. Equal Employment Opportunity Poster

24.5.7. Employer Polygraph Protection Act Poster.

24.5.8. Family and Medical Leave Act of 1993 Poster

24.5.9. Each subcontractor shall be responsible for the posting of all applicable safety danger/warning signs pertaining to the hazards associated with its work.

24.6. **Action Plan For Osha Visits**

If you are approached by an OSHA Compliance Officer, you should refer to Beta Engineering's Construction Manager. If the Beta Engineering Safety Manager is absent, contact the Site Safety Department.

24.7. **Discipline**

In order to ensure compliance and commitment to Beta Engineering's Safety and Health Program the following disciplinary action will be followed.

24.7.1. 1st violation - verbal warning and retraining.

24.7.2. 2nd violation - written warning and retraining.

24.7.3. 3rd violation - warning, suspension or termination (management decision).

NOTE: Based on the severity of the violation, suspension or termination may occur for the first or second violation.

24.8. **Problem Solving Procedure**

To have an effective safety program, communication must take place on all rungs of the corporate ladder. When a safety problem arises, everyone in the company must know where and to whom to turn. Employees must know that each safety problem will be corrected.

It is the intent of Beta Engineering to provide a safe work place for all employees. Supervisory personnel have been instructed to watch for and correct all unsafe conditions immediately. Construction sites are complex and items are easily overlooked. It is important that all employees be on the lookout for unsafe conditions. If you observe a condition that is unsafe, the following actions are to be taken:

24.8.1. If possible, correct the condition immediately. Many safety hazards, such as a piece of missing guardrail, are easy to correct.

24.8.2. If you are not able to take corrective action, report the condition to your immediate supervisor for correction.

24.8.3. All company employees with any supervisory responsibilities have been instructed to take corrective action or contact someone who can when a safety concern is raised. In the event corrective action is not begun in a reasonable length of time, the employee is requested to contact Beta's Construction Manager or Project Manager.

We appreciate your cooperation in reporting all safety problems. If we all work together, we can all work safely.

24.9. **Statistical Information Requirements**

Beta Engineering requires weekly accident statistical information to include the following:

24.9.1. Number of man-hours

24.9.2. Number of OSHA recordable injuries

24.9.3. Number of restricted workday cases

24.9.4. Number of lost-time injuries

24.9.5. Number of non-recordable (first aid) injuries

24.9.6. Number of lost time days

24.9.7. Recordable Incident Rate

24.9.8. Lost Time Incident Rate

24.9.9. Severity Rate

This information must be reported to Beta Engineering Construction Manager weekly. It must be cumulative weekly, monthly, and year to date.

25. Jobs Safety Analyses

JSA Index

JSA Index (Continued)

JSA Index (Continued)

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	ARC Flash

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1.Train Electrician	Electrician trained in the safe execution of the task	Use this AHA and other formal and informal training to train Electricians.			
2. Communication and preparatory instructions	Lack of coordination between electricians and resulting mistakes	Before work is begun the person in charge will explain what they are to do and how it will proceed.			
3. Always work with a partner	Left unattended without proper medical care	Use the buddy system, never work on 120V and above alone			
4. Verify Energy Source	Electrocution, burns, hearing loss, explosions	Lock-out, Tag-out or disconnect any alternate energy source (i.e. Emergency generator and/or U.P.S system)			
		Lock-out, Tag-out at main panel, and if not possible, at main lock-out, tag-out feeder panel or transformer location			
		If lock-out, tag-out cannot be performed and work must be done hot see step 5			
5. Working on Energized lines or equipment	Electrocution, burns, hearing loss, explosions	Conduct risk/hazard analysis			
		a) Establish the proper PPE, including rubber shoes, fire retardant shirt, fire retardant pants, face shield and hot line tools insulated for the proper voltage being worked on			
		b) Determine the flash hazard protection boundary prior to approaching any electrical conductor or circuit that is energized.			
		c) At least two persons shall be assigned to work together. One person shall be trained to recognize the situations that are dangerously close to live conductors or performance of unsafe arts. This person shall be delegated to watch the movements of the other's) doing the work so that he/she can warn them if they get dangerously close to live conductors or perform other unsafe acts.			
6. Provide safe work zone	To protect unauthorized entrants from electrocution, burns, hearing loss, explosions	Provide suitable barriers for the work space (no public access)			
		Provide insulated mat or platforms and other barriers so persons in the vicinity cannot touch live parts unless standing on mats, platforms or insulated floors.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	ARC Flash

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
7. Put on your Personal Protection Equipment	Prevent exposure to the hazards of performing Arch Flash work.	120 Volts to Ground: Cotton underwear, Fire-resistant shirt and pants (or coveralls), hard hat, safety glasses or goggles, Arc-Rated Face shield (or Flash suit hood), hearing protection, leather gloves and shoes.			
		150 Volts to Ground: Cotton underwear, Fire-resistant shirt and pants PLUS coveralls, hard hat, safety glasses or goggles, Flash suit hood, hearing protection, leather gloves and shoes.			
		600 Volts to Ground: Cotton underwear, Fire-resistant shirt and pants (or Fire-resistant coveralls), hard hat, safety glasses or goggles, Full Flash suit with hood, hearing protection, leather gloves and shoes.			
		Respond quickly and decisively in case of an accident. Call 911 immediately.			
8. Responding to an emergency	Delayed emergency response - further injury or loss of life.	Know where the emergency numbers are posted, where the first aid kit is located, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Core Drilling

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers	Workers not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
2. Put on your personal protective equipment.	Head, eye, hand or foot injury	You must wear a hard hat, safety glasses, long pants, and work boots at all times while onsite.			
		Wear gloves to protect hands			
3. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use GFCI protected outlet			
		Make sure plugs are protected from water			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief connectors.			
		Check that the ground prong is in tact.			
4. Layout cores, mark utilities	Damage to utilities and possible electrocution	Make sure cores are straight and in correct location.			
		Indentify energized and/or pressurized utilities			
5. Roll out hoses and cords and set up equipment	Tripping - Hoses, Cords, Compressor	Keep corridors and high traffic areas free of hoses and other equipment.			
		Arrange hoses and cords in an orderly fashion.			
	Pulls and Strains from lifting	Know how much you can lift. Get help when moving heavy equipment.			
		Convert lifting and lowering tasks to pulling and pushing. (use a ramp)			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Bound drill bit, twisting machine	Anchor base, Make sure clutch is working properly			
6. Core drill	Hazardous noise- hearing loss	Wear foam ear plugs. When coring for more 30 minutes, ear muffs shall be worn in addition to the ear plugs.			
	Crushed or pinched, cuts and abrasions	Keep fingers, hands, and other body parts away from pinch points and moving machine parts.			
	Burns and abrasions	Do not touch a hot blade or exhaust pipes			
	Falling Cores	Use safety tape to secure area below. Use Catch container			
	Flying particles	Wear safety glasses with side shields or wrap-around type when coring.			
7. Coring in enclosed spaces	Hazardous levels of concrete dust or fumes in the work area	Use wet coring if possible. If wet methods are not feasible, use respiratory protection and/or forced air or exhaust ventilation. Dust masks do not protect against silica exposure.			
	Falling Cores	Use safety tape to secure area below. Use Catch container			
	Flying particles	Wear safety glasses with side shields or wrap-around type when coring.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Core Drilling

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
8. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
	Fires, explosions- burns	Store fuel in an approved metal safety can.			
9. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
10. Clean up	Trips, slips, falls	Clean up water and mud that might create a slip hazard as soon as possible.			
		Roll up hoses and cords and remove equipment to designated laydown areas.			

Equipment to be Used	Inspection Requirements	Training Requirements
Coring machine	Inspect tools and equipment	AHA training of each operator
Water hose		
Dewatering equipment		
Electrical cords		
Sledge hammer, pick		

Inspect. Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Descriptions
	East County Substation Project	Electrical Installations

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electricians	Electricians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Electricians.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Stay clear of material that may move or shift when breaking bands.			
	Excessive material handling	Stage material as close to its final destination as possible.			
	Puncture wounds	Clean up and remove protruding nails from lumber			
3. Roll out cords and tools, set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of traffic lanes. Completely unroll all cords to avoid tangles			
		Clean up scrap materials and debris (especially short pieces of conduit) before and after working in an area.			
	Falls through floor openings	Floor openings, holes must be covered with plywood or other covering that will prevent workers or equipment from falling through the opening. The cover should be marked "hole or opening"			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
5. Lock-out and tag-out all sources of electrical energy.	Electrocution	Except for work that must be performed on energized equipment, all circuits or equipment that are energized or may become energized must be locked out and tagged before beginning work on those circuits or equipment.			
		Make sure the locking device is installed correctly.			
		The lock should be your personal lock and the tag should have your name, the date and time on it (a pager or cell phone number is also helpful).			
		Make sure that the right circuit or equipment has been locked-out. Double check that there are no hot wires or equipment at the location of the work.			

JOB SAFETY ANALYSIS

	Project Description	JSA Descriptions	Activity Safety Inspection		
	East County Substation Project	Electrical Installations			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
6. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
7. Use power tools	Sprains, cuts, bruises	Use tools for their intended use.			
		Never disable the built in safety features on a tool.			
		Hand tools to coworkers handle first; do not throw them.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade			
	Flying particles- Eye injury	Wear goggles or a safety glasses with side shields for work which creates flying particles or dust such as hammers, chipping tools, grinders, or drills.			
8. Lift and move material, tools, or equipment	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			
		Never move materials over or suspended above workers unless positive means have unless positive precautions have taken to protect workers.			
9. Inspect ladder before use	Falling from ladder- Ladder failure	Ladders must be inspected regularly and tagged “do not use” and removed from the jobsite when found defective.			
		All step and extension ladders are equipped with ladder shoes.			
10. Working from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Choose the correct size of ladder for the job			
		Set up ladders on firm level footing			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
		Do not use step ladders to hold planks to form a work platform.			
	Electric shock	Always use a nonconductive ladder.			
11. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			

JOB SAFETY ANALYSIS

	Project Description	JSA Descriptions
	East County Substation Project	Electrical Installations

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
12. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels exceed 85 dB(A).			
13. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
14. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Report all accidents to your supervisor immediately.			
15. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
16. Working around asbestos-containing materials	Asbestos Inhalation	Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
17. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
18. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			

JOB SAFETY ANALYSIS

	Project Description	JSA Descriptions	Activity Safety Inspection		
	East County Substation Project	**Electrical Installations**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
19. Working with combustible materials	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your working area.			
		Know how to operate the fire extinguisher			
		Always heed “No Smoking or Open Flame” warning signs.			
		Remove combustible scrap and debris from work areas daily. Store combustibles in approved locations/containers.			
		Use approved metal safety cans used for handling and use of flammable liquids.			
20. Working from an elevated position	Falling	Whenever you are working on open-sided floor, platform, or other location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		For guardrail requirements see scaffolding			
		The personal fall arrest system, which consists of a body harness and shock absorbing lanyard, must prevent the user from falling more than 6', or from contacting any lower level			
		Secure lifelines to a structural member capable of supporting a dead weight of 5400 lbs.			
		100% tie off is required when working at or above 25'. This requires the use of 2 lanyards.			
21. Inspect fall protection equipment prior to use	Equipment failure- falling	Lanyard, harness, D-rings, and other personal fall arrest equipment is in good condition and suitable for use			
		Remove equipment from service that has sustained a fall.			
22. Working on or around scaffolding	Falling from the scaffold, or workers below scaffold struck by falling objects	Maintain the top rails, midrails, and toeboards on the scaffold from which you are working. Top rails must be 42" high ± 3" and capable of withstanding a lateral force of 200 lbs., midrails are midway between floor surface and top rail.			
		Toe boards at least 3 1/2" high are installed on scaffolds where there is not some alternate form of falling object protection such as barricades, debris nets, or canopies.			
		Ensure that scaffolds platforms are fully planked with no spaces between planks greater than 1"			
		Do not horse play on or around scaffolding.			
		Be careful to not drop tools or material from the scaffold			
23. Working with rolling scaffolding	Falling due to scaffold racking unexpectedly	All diagonal & horizontal bracing is in place to square the scaffold & prevent racking.			
	Falling due to scaffold moving unexpectedly	Wheel brakes are set whenever the scaffold is stationary.			
	Scaffold failure- falling	Forklifts, trucks, or other motor vehicles are not used to push the scaffold			
	Falling from scaffold, crushed by tipping scaffold.	**Never ride on the scaffold except under the following conditions:**			

JOB SAFETY ANALYSIS

	Project Description	JSA Descriptions
	East County Substation Project	Electrical Installations

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		The floor across which the scaffold is moved is within 3 degrees of level, and is clean and free of all obstacles, such as cords, debris, holes, depressions ect.			
		When pushing scaffold force is applied as close to the base as possible			
		Height to width ratio is 2 to 1 or less. (ie. a 10' high scaffold is 5' wide)			
		No employee shall ride on any part of the scaffold that extends beyond the wheels.			
		Castor stems are pinned/secured to the scaffold legs.			
		Before the scaffold is moved all riders are made aware of the move.			
25. Getting on and off the scaffold	Falling while getting on or off the scaffold	Always use a ladder to gain access to scaffold work platforms			
		Ladders rails extend 3' above the platform and are tied off securely			
28. Operating a forklift	See Job Hazard Analysis on forklift operation				
29. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
30. Working from an scissor lift	See Job Hazard Analysis on operating a scissor lift				
31. Working with Powder Actuated Tools	See Job Hazard Analysis on Powder Actuated Tools				
32. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
		AHA training of each Electrician	
			Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Temporary Lighting Installations**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Workers	Workers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train workers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy when the work requires extra protection.			
3. Roll out lighting cords and tools, set up workplace	Slipping, tripping, or falling, and delayed egress	Keep light cords & other equipment clear of traffic lanes. Completely unroll all lighting cords to avoid tangles			
	Poor illumination	Set up temporary lighting in location in such a manner at provides required illumination and so that it will not fall.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for heavy or extra-heavy usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief			
		Check that the ground prong is in tact.			
	Electric shock from defective tools.	Use only GFCI protected outlets and test electrical devices before each use. Temporary electrical distibution systems shall be tested monthly.			
5. Inspect ladder before use	Falling from ladder-ladder failure	Ladders must be inspected regularly and tagged “do not use” and removed from the jobsite when found defective.			
		All step and extension ladders to be equipped with ladder shoes.			
6.. Working from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Choose the correct size of ladder for the job.			
		Set up ladders on firm level footing.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
		Do not use step ladders to hold planks to form a work platform.			
	Electric shock	Always use a nonconductive ladder.			
7. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are working on it.			
		Do not move ladder with tools on it.			
		Report all accidents to your supervisor immediately.			
8. Working from an elevated position	Falling	Whenever you are working on open-sided floor, platform, or other location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		For guardrail requirements see scaffolding.			
		The personal fall arrest system, which consists of a body harness and shock absorbing lanyard, must prevent the user from falling more than 6', or from contacting any lower level			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Temporary Lighting Installations

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Secure lifelines to a structural member capable of supporting a dead weight of 5400 lbs.			
		100% tie off is required when working at or above 25'. This requires the use of 2 lanyards.			
9. Inspect fall protection equipment prior to use	Equipment failure- falling	Lanyard, harness, D-rings, and other personal fall arrest equipment are to be in good condition and suitable for use.			
		Remove equipment from service that have sustained a fall.			
10. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
11. Working from an scissor lift	See Job Hazard Analysis on operating a scissor lift				
12. Installation	Unless designed for suspension, temporary lights shall not be suspended by there electrical cords.	Do not use metalic wire to suspend lights. Secure lights using manufacturers connection point at fixtures using non-conductive material such as zip ties or string rope. Exposed empty light sockets, protective cages and broken bulbs shall be replaced immediately.			
13. Clean up	Waste materials.	Clean up work area at the end of light installation.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Ladders	Inspect cords daily and power sources monthly.	AHA training of each worker	
PPE			Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Hot Work

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electricians	Electricians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to Train Electricians.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving spools of wire keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
4. Roll out cords and tools, set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Clean up scrap materials and debris before and after working in an area.			
	Falls through floor openings	Floor openings, holes must be covered with plywood or other covering that will prevent workers or equipment from falling through the opening. The cover should be marked "hole or opening"			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your work area.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Layout, communication, and preparatory instructions	Lack of coordination between Electricians- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
		Check two way radios other communication equipment to ensure proper operation.			
7. Lock-out and tag-out all sources of electrical energy.	Electrocution	Except for work that must be performed on energized equipment, all circuits or equipment that are energized or may become energized must be locked out and tagged before beginning work on those circuits or equipment.			
		Make sure the locking device is installed correctly.			
7. Lock-out and tag-out all sources of electrical energy.	Electrocution	The lock should be your personal lock and the tag should have your name, the date and time on it (a pager or cell phone number is also helpful).			
		Make sure that the right circuit or equipment has been locked-out. Double check that there are no hot wires or equipment at the location of the work.			
8. Inspect tools (wire tugger)	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from the jobsite.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Hot Work

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Electric shock from defective tools.	Use only GFCI protected outlets			
9. Set up wire tugger	Machine anchorage breaking- unexpected movements	Set up the machine on a firm level surface out of high traffic areas.			
		Make sure that the tugger is securely anchored to a substantial structural member or surface.			
	Crushed or pinched body parts	Keep fingers and hands away from all pinch points			
10. Lift and move spools of wire, tools, or equipment	Pulls and Strains from lifting	Know how much you can safely lift, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Struck or crushed by	Be aware of your surroundings; keep feet clear of the rolling edge of large spools.			
		Never move materials over or above other workers.			
	Sprains, cuts, bruises	Use tools for their intended use.			
11. Pull Wire	Electrocusion	Protect all live areas/equipment when pulling into a hot gear.			
		Make sure your fish tape is not going into a live panel or box.			
	Slipping and falling	Clean up spilled wire pull soap (lube) immediately.			
12. Cut wire	Cuts	Keep fingers several inches from cutting blades.			
		Never disable the built in safety features on a tool.			
		Hand tools to coworkers handle first; do not throw them.			
13. Pull wire from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
	Electric shock	Use only nonconductive ladders.			
14. Move the ladder	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Pull wire on a Scaffold	See AHA on Scaffold Erection and Use				
16. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Hot Work

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Report all accidents to your supervisor immediately.			
17. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
18. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
19. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
20. Working from a scissor lift	See Job Hazard Analysis on operating a scissor lift				
21. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Wire tugger	Tools and equipment - prior to use	AHA training of each Electrician	
cable cutters			Inspector's Signature
fish tape			
hand tools			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Underground Electrical Installations

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electricians	Electricians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to Train Electricians.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Locate utilities, layout excavation	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
		Pot-hole for utilities to locate the exact location before beginning a full excavation. Hand excavate when nearing the utility so that it is not damaged.			
	Explosions of buried munitions, or military ordnance	Contact Explosive Ordnance Disposal (EOD) before commencing excavations in areas where there may be unexploded munitions or military ordnance.			
4. Saw cut pavements and/or slabs	See AHA on Saw Cutting				
3. Make a soil analysis	Failure to use the proper protection for the soil type	Analyze the soil through which the excavation will be made. Based on those observations, determine the required sloping/benching and/or shoring required for protection of workers in the excavation.			
5. Set up barricades and caution-off area.	People or vehicles falling into the excavation	Set up warning barricades and caution off area where trenching is ongoing to prevent the entry of equipment or unauthorized personnel.			
		Do not allow persons other than construction workers near an excavation. If this is infeasible a guardrail with a midrail and toe board is required.			
		When vehicles are operated adjacent to an excavation set up stop logs, jersey barriers, or similar protection.			
	Overloading excavation- cave-in	Keep material (excavated spoils) and equipment a minimum of 2 ft. from the edge of the trench.			
6. Dig ditches, place sand bags for water control	Water undermining or overloading the walls of the excavation	Where there is a danger of surface water entering the excavation dig ditches or place sand bags to prevent the water from reaching the excavation.			
7. Begin excavating- using power equipment	Striking and injuring co-workers with equipment or material	Be aware of the location of workers in and around the excavation at all times.			
		Never move excavated material, or shoring system components over or above workers.			
		Stand away from equipment that is loading or unloading excavated material.			
		Wear a hard hat at all times			
	See the AHA for Backhoe Operation				
	Cave-in, crushed by	In trenches less than 5 ft. deep when it is determined by competent soil analysis that there is no potential for cave-in a protective system is not mandatory.			
7. Begin excavating- using power equipment	Cave-in, crushed by	When sloping or benching is used as the method of protection in an excavation the maximum slope shall be 1 1/2 horizontal to 1 vertical.			
		Sloping or benching shall be done following the design of a licensed engineer.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Underground Electrical Installations

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
8. Install shoring	Failure of shoring system- cave-in	Install the shoring system and components in accordance with the manufactures' recommendations. If you don't know, read the owner's manual, call the manufactures' rep. or ask your supervisor. Don't guess.			
	Crushed or pinched by, or falling	Do not ride or allow co-workers to ride in or on a trench box when it is raised or lowered into position.			
	Crushed by cave-in	Do not enter an unprotected trench to install shoring.			
		Make sure the excavation is never deeper than 2' below the base of the shoring system.			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
9. Lock-out and tag-out all sources of electrical energy.	Electrocution	Except for work that must be performed on energized equipment, all circuits or equipment that are energized or may become energized must be locked out and tagged before beginning work on those circuits or equipment.			
		Make sure the locking device is installed correctly.			
		The lock should be your personal lock and the tag should have your name, the date and time on it (a pager or cell phone number is also helpful).			
		Make sure that the right circuit or equipment has been locked-out. Double check that there are no hot wires or equipment at the location of the work.			
10. Inspect the excavation	An unsafe excavation due to subsidence, water, or failure of shoring components.	Inspect the excavation, the adjacent areas, and all protective systems (shoring) before each shift and after each hazard-increasing occurrence such as rain.			
		Correct any unsafe conditions or prevent workers from entering the excavation.			
11. Excavating adjacent to buildings or retaining walls	Collapse of the adjacent structure or retaining wall	Never excavate below the level of the footing of an adjacent building or retaining wall except under the direction of an approved engineered plan with engineered controls in place.			
12. Hand excavation, digging	Pulls and strains from digging	Don't be too aggressive when moving heavy or wet material.			
		Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Foot or leg injuries	Wear work boots and long pants			
13. Entering and exiting the excavation from a ladder	Delayed egress	In trenches more than 4 ft. deep set up a ladder within 25 ft. of each worker in the excavation.			
	Ladders tipping or shifting- falling	Set up ladders on firm level footing. Level and compact the soil under the base of the ladder.			
		Set up extension ladders so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. Tie off the top of the ladder and extend the side rails 36" above the excavation.			
		Set up two ladders for every trench over 5 ft. deep.			
	Ladder failure- Falling from ladder	Inspect ladders regularly. Do not use a defective ladder. Remove defective ladders from the jobsite.			
	Electric shock	Always use a nonconductive ladder.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Underground Electrical Installations

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
14. Cut conduit	Sprains, cuts, bruises	All saws and grinders have properly functioning manufacture installed guards.			
		Saws are equipped only with a constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
	Burns	Be careful not to touch a hot grinding wheel, or saw blade			
	Flying particles- Eye injury	Wear goggles or a safety glasses with side shields for work which creates flying particles or dust such as hammers, chipping tools, grinders, or drills.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels exceed 85 dB(A).			
	Burns, fires	Use approved metal safety cans used for handling and use of flammable liquids.			
15. Bend conduit	Burns, fires	When using a propane torch wear gloves			
		Check the propane tank to make sure there are no leaks and valves and regulators are functioning properly.			
		Have a portable an ABC rated fire extinguisher immediately adjacent to your working area.			
		When using a conduit iron wear gloves and be careful not to touch any hot surfaces.			
16. Join conduit install fittings	Dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
17. Lift and move conduit, tools, or equipment	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			
		Never move materials over or suspended above workers unless positive means have unless positive precautions have taken to protect workers.			
18. Stake down conduit	Smashed fingers or hands	Keep body parts several inches from anything you are hitting with a hammer.			
19. Pour slurry- stage concrete trucks	Struck or crushed by moving equipment	Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Cave-in.	Keep concrete trucks and other equipment several feet back from the edge of open trenches.			
20. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Report all accidents to your supervisor immediately.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Underground Electrical Installations

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
21. Working in a trench classified as a confined space	Engulfment, asphyxiation, or impairment of ability to self rescue.	An excavation becomes a confined space under the following conditions: there is only one point of egress, there is the potential of a hazardous atmosphere developing, or there is a potential for engulfment (example water is accumulating in the trench, or			
		Never enter a confined space except in accordance with the requirements of the AHA Working In Confined Spaces			
22. Remove shoring system and backfill trench	Cave-in, crushed by	Backfilling and removal of shoring systems should progress together unless it is possible to remove the shoring from outside the excavation.			
		Begin removal of shoring at the bottom of the excavation and proceed towards the top.			
		Release jacks or braces slowly and note any possible kick-in of the bottom of the excavation or failure of the remaining supports.			
		When feasible pull out jacks or braces from above using a rope or other means.			
23. Backfill and compact	Cave-in, crushed by	Mechanical vibration increases the likelihood of a cave-in. Do not operate a compactor in an unprotected trench.			
24. Clean up	Tripping or falling into an open excavation	Clean up work area at the end of each shift. Caution off area as needed.			

Equipment to be Used	Inspection Requirements	Training Requirements
Backhoe		AHA training of each Electrician
shoring system, trench box		
PVC saw, hand tools		
Propane torch		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Raceway and Junction Box Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electricians	Electricians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to Train Electricians.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Stay clear of material that may move or shift when breaking bands.			
	Excessive material handling	Stage material as close to its final destination as possible.			
	Puncture wounds	Clean up and remove protruding nails from lumber			
4. Roll out cords and tools, set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of traffic lanes. Completely unroll all cords to avoid tangles			
		Clean up scrap materials and debris (especially short pieces of conduit) before and after working in an area.			
	Falls through floor openings	Floor openings, holes must be covered with plywood or other covering that will prevent workers or equipment from falling through the opening. The cover should be marked "hole or opening"			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your work area.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Lock-out and tag-out all sources of electrical energy.	Electrocution	Except for work that must be performed on energized equipment, all circuits or equipment that are energized or may become energized must be locked out and tagged before beginning work on those circuits or equipment.			
		Make sure the locking device is installed correctly.			
		The lock should be your personal lock and the tag should have your name, the date and time on it (a pager or cell phone number is also helpful).			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Raceway and Junction Box Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Make sure that the right circuit or equipment has been locked-out. Double check that there are no hot wires or equipment at the location of the work.			
7. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
8. Set anchors and hangers (hammer drill or powder actuated fastener)	Flying particles- Eye injury	Wear goggles or a safety glasses with side shields for work which creates flying particles or dust such as hammers, chipping tools, grinders, or drills.			
	Twists or impact injuries due to drill bit catching	Hold the tool steady with arms flexed, and drill as straight a hole as possible.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade			
	See AHA on Using Powder Actuated Tools				
9. Cut uni-strut and/or conduit	Cuts and scrapes	Saws are equipped only with constant pressure switch.			
		Keep fingers several inches from all saw blades.			
		Never disable the built in safety features on a tool.			
	Sharp edges, burrs	File the edges of cut unistrut and ream cut pieces of conduit.			
10. Bend conduit- hand or machine bender	Crushed or pinched body parts	Never use a hydralic or electric conduit bender unless you have been trained to operate it safely.			
		Keep fingers and hands away from all pinch points			
		Set up the machine on a firm level surface out of high traffic areas where it will not move or shift.			
11. Lift and carry conduit, tools, or equipment	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			
		Never move materials over or above other workers.			
12. Install conduit or other raceway	Sprains, cuts, bruises	Use tools for their intended use.			
		Hand tools to coworkers handle first; do not throw them.			
13. Install the raceway from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Raceway and Junction Box Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged "do not use" if defective. Remove defective ladders from the jobsite.			
	Electric shock	Use only nonconductive ladders.			
14. Move the ladder	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Install the raceway from a Scaffold	See AHA on Scaffold Erection and Use				
16. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Report all accidents to your supervisor immediately.			
17. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
18. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
19. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
20. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
21. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Raceway and Junction Box Installation**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
22. Working from a scissor lift	See Job Hazard Analysis on operating a scissor lift				
23. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
		Clean up all scraps of conduit that could create a slip hazard.			

Equipment to be Used	Inspection Requirements	Training Requirements
Ladders	Ladders- daily	AHA training of each Electrician
Port-a-band saw	Tools and equipment - prior to use	
Powder Actuated Tools		
Hammer drill		
Screw gun		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Device and Fixture Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electricians	Electricians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to Train Electricians.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Stay clear of material that may move or shift when breaking bands.			
	Excessive material handling	Stage material as close to its final destination as possible.			
	Puncture wounds	Clean up and remove protruding nails from lumber			
4. Roll out cords and tools, set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of traffic lanes. Completely unroll all cords to avoid tangles			
		Clean up scrap materials and debris (especially short pieces of conduit) before and after working in an area.			
	Falls through floor openings	Floor openings, holes must be covered with plywood or other covering that will prevent workers or equipment from falling through the opening. The cover should be marked "hole or opening"			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your work area.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
6. Lock-out and tag-out all sources of electrical energy.	Electrocution	Except for work that must be performed on energized equipment, all circuits or equipment that are energized or may become energized must be locked out and tagged before beginning work on those circuits or equipment.			
		Make sure the locking device is installed correctly.			
		The lock should be your personal lock and the tag should have your name, the date and time on it (a pager or cell phone number is also helpful).			
7. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from the jobsite.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Device and Fixture Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
8. Set anchors, hangers, or backing plates	Flying particles- Eye injury	Wear goggles or a safety glasses with side shields for work which creates flying particles or dust such as hammers, chipping tools, grinders, or drills.			
	Twists or impact injuries due to drill bit catching	Hold the tool steady with arms flexed, and drill as straight a hole as possible.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade.			
9. Strip wires	Electrocusion	Double check that there are no hot wires or equipment at the location of the work.			
	Sharp edges, burrs- cuts and scrapes	Avoid sharp edges.			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
10. Install device or fixture	Crushed or pinched body parts	Keep fingers and hands away from all pinch points			
		Hand tools to coworkers handle first; do not throw them.			
		Never disable the built in safety features on a tool.			
11. Lift and fixtures, tools, or equipment	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			
		Never move materials over or above other workers.			
12. Install the fixture from a ladder.	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
13. Install the fixture from a ladder.	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
	Electric shock	Use only nonconductive ladders.			
14. Move the ladder	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Install the fixturs from a Scaffold	See AHA on Scaffold Erection and Use				

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Device and Fixture Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
16. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Report all accidents to your supervisor immediately.			
17. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
20. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
21. Working from a scissor lift	See Job Hazard Analysis on operating a scissor lift				
22. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Ladders	Ladders- daily	AHA training of each Electrician	
Tick tracer	Tools and equipment - prior to use		Inspector's Signature
Misc. hand tools			
Screw gun			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Exothermic Welding

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electrician	Electrician trained in the safe execution of the task	Use this AHA and other formal and informal training to train Electricians.			
2. Communication and preparatory instructions	Lack of coordination between electricians and resulting mistakes	Before work is begun the person in charge will explain what they are to do and how it will proceed.			
3. Personal Protective Equipment	Injury resulting from not utilizing required PPE.	Hard hat, safety glasses, face shield, non-synthetic long sleave shirt, leather gloves, and any other PPE that is required for the job site.			
4. Provide safe work zone	Sparks and Burns to people in the area.	Clear work area, define work area with caution tape or other suitable method.			
	Sparks and fire.	Assess work area for flammable substances and combustible materials.			
		Remove or isolate flammable substances and combustible materials.			
		Provide at least one fire extinguisher in work area.			
5. Exothermic Welding	Touching hot metal with hands, causing burns.	Wear gloves and be aware of accidental contact with mold.			
	Exploding molds, Sparks flying and burns to the body.	Dry out cable and Mold so it does not explode. Cover cables and equipment that could be damaged with a fire blanket.			
		Warn people in the area before you fire a shot.			
	Pinching fingers in mold.	Make sure hands and clothing are clear when closing and/or chaining mold.			
6. Responding to an emergency	Delayed emergency response - further injury or loss of life.	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is located, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Final Cleaning			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Workers	Workers not trained in the safe execution of the activity.	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Whenever cleaning operations create harmful fumes, dusts, or mists you must wear a dust mask or respirator.			
3. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
4. Inspect tools prior to use	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
	Struck struck by a spinning floor buffer	Make sure floor buffers are equipped only with a constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
5. Cleaning- from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Use step ladders only in fully open position.			
6. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it.			
		Do not move a ladder with tools or a bucket on it.			
7. Scrape windows or other surfaces	Cuts	Be careful when handling razor blades. Don't pull the blade towards you.			
8. Lift and move fixtures and equipment.	Pulls and Strains from lifting	Get help when moving heavy items, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
9. Apply cleaners, clean surfaces.	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every cleaning agent that you will be using. Don't assume that a chemical is not hazardous, just because it doesn't produce any immediate effects.			
		Use the appropriate signage and warning labels			
	Eye injury, airway irritation	Wear the personal protective equipment required by the MSDS when handling the chemical. In many cases this will include rubber gloves, goggles, and possibly a half face respirator.			
10. Wiping down surfaces.	Cuts and abrasions	Avoid sharp edges and abrasive surfaces.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Final Cleaning

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
11. Clean floors	Slipping, Tripping, or falling	Place warning signs on wet floors or dry the floor. Remove cleaning equipment from hallways and stairways			
12. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. vats, tanks, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
13. Using compressed air	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
14. Working around other trades	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound levels are high.			

Equipment to be Used	Inspection Requirements	Training Requirements
Floor buffer	Inspect tools prior to use	AHA training of each laborer
Vacuum		
Air cleaner/Vac		
Carpet shampooer		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Final Cleaning**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Laborer	Laborers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train laborers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Pick up and move equipment to storage locations.	Crushing or pinching hands or feet	When moving equipment keep hands and feet clear of pinch points.			
	Struck or crushed by machinery	Stay clear of moving machinery, heed backup alarms and get out of the way.			
4. Pick up and move material to storage locations.	Struck by falling material	Stack materials in designated lay down areas, in such a manner that they will not tip, or be blown over.			
	Tripping - improperly stored materials	Keep material out of traffic lanes or corridors.			
	Pulls and Strains from lifting	Get help when moving heavy material, equipment, or debris. Use a mechanical lift such as a wheelbarrow, handtruck, or wheeled container when possible.			
		Convert lifting and lowering tasks to pulling and pushing (use ramp).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
5. Move material with a forklift	See Activity Hazard Analysis on Forklift Operation				
6. Pick up and/or load out large debris and waste	Cuts, scraps, abrasions	Be careful when handling sharp objects such as broken glass, twisted or cut light gauge steel, or splintered or broken plastic.			
		Wear gloves			
	Striking and injuring co-workers with debris	Be aware of your surroundings while moving debris, watch where you are going.			
		Never move materials over or above workers.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			
7. Load and move debris using a bobcat.	Explosion or fires- flammable liquids	Use approved metal safety cans used for handling and use of flammable liquids.			
	See Activity Hazard Analysis on Bobcat Operation				
8. Load and move debris using a backhoe.	Accidental movement the machine, buckets, booms, or stabilizers.	Never load material or debris into the cab or onto other portions of the machine other than the bucket			
	Falling from the machine	Do not allow workers to hitch a ride on the backhoe.			
	See Activity Hazard Analysis on Backhoe Operation				
9. Clear debris by dropping it to a lower level.	Debris striking and injuring workers below	Barricade off drop area onto which scrap is thrown from the upper level. Have someone on the ground, a safe distance from the drop zone to prevent anyone from entering this area.			
10. Drop debris through openings in the floor (no chute)	Falling through the floor opening	The floor opening must be protected by a guardrail so as not to create a fall hazard.			
	Being struck or crushed by falling debris	The area onto which the material is dropped shall be enclosed with barricades at least 42" high and 6' back from the projected edge of the opening.			
		Post warning signs on the barricades that read, "Danger, Falling Debris Hazard"			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Final Cleaning			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
11. Sweep and/or shovel up small debris	Airway irritation, silicosis	Wear a dust mask.			
	Splinters	Make sure wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
12. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Stand up wind from the air nozzle.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
13. Fire-hose down walks and pavements	Impact injuries	Hold the hose and nozzle of a fire hose securely before turning on the water			
		Get help as needed to move the hose.			
14. Scrape windows or other work from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Clean floors or surfaces with a Shop-Vac or vacuum	Hazardous noise, hearing loss	Wear foam ear plugs when working in noisy areas or using noisy equipment.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
16. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
17. Use solvents or other cleaning agents	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
18. Scraping or cutting with a razor knife.	Cuts	Cut away from yourself. The blade should always be pointed away from any body parts.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Final Cleaning			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
19. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
20. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
21. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
22. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
23. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Final Cleaning**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
Ladders	Tools and equipment prior to use	Activity hazard training for each laborer
compressors		
hoses		
Backhoe or bobcat	Backhoe prior to each shift	
shovels, brooms	Bobcat prior to each shift	

Y | N | N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Labor Safety

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1.Train Laborer	Laborers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train laborers			
2. Put on your personal protective equipment	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material.	Crushing or pinching hands or feet.	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to it's final destination as possible.			
4. Roll out tools and set up workplace.	Slipping, Tripping, or Fallinng, and Delayed Egress.	Keep corridors and high traffic areas free of cords, hoses, and other equipment. Completely unrool all cords to avoid tangles and tripping hazards.			
		Clean up scrap materials and debris before and after working in an area.			
	Poor illumination.	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
5. Check electrical cords.	Electrocution - faulty electrical cords.	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords reated for hard or extra hard usage.			
		Use factory assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized.			
		Check that the ground prong is intact.			
6. Inspect tools.	Injuries from defective or broken tools.	Tag defective tools/equipment as unsafe, and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saw blades have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills, etc) equipped only with constant pressure switches.			
	Electric Shock	Use only GFCI protected outlets.			
7. Use hand and power tools.	Sprains, cuts, bruises.	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
		Never disable the built in safety features on a tool.			
		Hand tools to co-workers hanle first; do not throw them. Make sure power is off before handing tools to co-workers.			
8. Use power and pneumatic tools.	Puntcture wounds.	Pneumatic nailer s have a functioning safety device on the muzzle to prevent ejection unless muzzle in contact with work surface.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Labor Safety

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Impact injuries.	Use a wire or toher locking device to prevent air hoses from being accidentally disconnected.			
	Cuts, abrasions.	Take your finger off the switch when carrying a plugged in tool.			
	Electric Shock.	Do not carry or hoist tools by their power cords.			
9. Use power and pneumatic tools.	Flying particles - Eye injury.	Wear safety goggles or safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes.			
10. Lift and moving materials and equipment.	Pulls and Strains from lifting.	Get help when moving heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials.	Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers.			
11. Working from a ladder.	Ladder tipping, shifting, or sliding causing the worker to fall.	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing.			
		Don’t work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from Ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job.			
	Ladder failure - Falling	Ladders must be inspected regularly and tagged "do not use" if defective. Remove defective ladders from the jobsite.			
12. Moving ladders.	Tools or Materials falling from ladders.	Do not move a ladder while you are on it.			
		Do not move laddre with tools on it.			
	Electric shock.	Nonconductive laddres used when working near energized electrical lines or equipment.			
13. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss.	Wear foam ear plugs when working in an area where sound pressure levels are between 85dB (A) and 115 dB (A) time weighted average over 8 hours. When sound levels exceed 115 dB (A), foam ear plugs and ear muffs shall be worn.			
14. Administering First Aid.	Exposure to Blood born pathogens.	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
15. Responding to an emergency.	Delayed emergency response - further injury or loss of life.	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the first aid kit is, and who is trained in first aid.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Labor Safety

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Only persons trained in first aid should be allowed to administer first aid.			
	Failure to abate a hazard.	Report all accidents to your supervisor immediately.			
16. Working in hot weather.	Heat Stroke.	Make sure you always have an adequate supply of cold water available. If you water supply is running low, talk to your supervisor.			
		Take scheduled cool down breaks.			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn.	Use sunscreen, wear hard hats that provide some shading of the head.			
17. Working with combustible materials.	Fires and explosions - burns.	Ensure that a portable ABC fire extinguisher is always within 100 ft of your working area.			
		Know how to operate the fire extinguisher.			
		Always heed "No Smoking" or "Open Flame" warning signs.			
		Remove combustible scrap and debris from work areas daily. Store combustibles in approved locations/containers. Insure fire mitigation measures are in place.			
		Use approved metal safety cans for handling and use of flammable liquids.			
18. Clean up.	Tripping - waste materials, improperly stored materials.	Clean up work area at the end of each shift. Stack materials in a designated lay down area.			
	Burns - fires due to combustibles.	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements

Inspect. Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Ground Grid Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electrician	Electrician trained in the safe execution of the task	Use this AHA and other formal and informal training to train Electricians.			
2. Communication and preparatory instructions	Lack of coordination between electricians and resulting mistakes	Before work is begun the person in charge will explain what they are to do and how it will proceed.			
3. Personal Protective Equipment	Injury resulting from not utilizing required PPE.	Hard hat, safety glasses, and any other PPE that is required for the job site.			
4. Provide safe work zone	Sparks and burns to people in the area. Open trenches and uneven surfaces	Clear work area, define work area with caution tape or other suitable method. Cover or barricade all open trenches as required.			
	Sparks and fire.	Assess work area for flammable substances and combustible materials.			
		Remove or isolate flammable substances and combustible materials.			
		Provide at least one fire extinguisher in work area.			
5. Trenching and excavation	Release of energy from contacting underground utilities.	Locate all underground utilities prior to starting.			
	Falls or slips	Maintain barriers around excavation and inform workers in the area of the hazard.			
6. Ground Rod Installation	Injury while using jackhammer	Verify that the tool is in proper working condition and is plugged into a GFCI receptacle. If needed use additional personal while moving and using the tool.			
	Exposure to excessive noise	Provide hearing protection to all workers in the immediate area.			
	Injury while driving ground rods manually	Inspect tool for any damage. Stretch frequently, wear gloves, hard hat, and safety glasses.			
	Falls from elevated work area.	Make sure ladders are not damaged. Make sure ladders are positioned on stable ground to prevent falling over. Tie off or secure ladders as required.			
7. Installing Ground Rods to an existing grid	Exposure to step potential and fault	Prior to making connections to an existing ground grid, structures and equipment use a meter to check for voltage. Make connections to existing grid last and wear gloves.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Ground Grid Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
8. Responding to an emergency	Delayed emergency response - further injury or loss of life.	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is located, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Metal Doors

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Installers	Installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Installers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive deliveries, store out doors	Crushing or pinching hands or feet	When moving doors keep hands and feet clear of pinch points.			
		Store doors in shipping crates or stack doors on end in a location where they will not be blown or knocked over.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Communicate clearly with coworkers.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move crates or doors with a forklift.	Struck by machinery, impact injuries	See AHA for forklift operation.			
5. Spread doors, move material, and equipment	Pulls and Strains from lifting	Get help when moving heavy doors or equipment, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Dropping the door, crushed or pinched body parts	Get the right door to the right opening. Mistakes in spreading the doors increases the handling time.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while carrying door, watch where you are going.			
		Never move material over or above workers.			
	Struck by falling door	Place the door near the opening in such a way so that it will not be blown or knocked over.			
	Falling through a wall or floor opening	When receiving/stocking doors through a wall or floor opening do not stand in front or above the opening where you could fall to a lower level.			
6. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
	Strains from bending or kneeling, struck by falling door	Set up saw horses or use a door stand to make the door easier to work on			
7. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
8. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Metal Doors

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		All saws and grinders have properly functioning manufacture installed guards.			
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
9. Install hinges and prep jamb to receive door	Pulls and strains	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
		Avoid binding the drill bit, causing the drill body to spin. Hold the drill steady, don't try to drill too quickly.			
	Hearing loss	Wear foam ear plugs when working in noisy areas or with loud tools such as a hammer drill, or grinder.			
10. Hang the door	Pulls and Strains from lifting	Get sufficient help to lift and hold heavy doors in position.			
	Crushed or pinched body parts	Use a pry bar or other mechanical means to help position the door. to prevent the door from falling.			
		Get at least one screw in the top hinge as soon as possible.			
		Keep fingers and hands clear of pinch points			
		Communicate clearly with co-workers			
11. Make adjustments	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work involving hammers, hammer drills, grinders, saws, or pneumatic tools.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
12. Entering and exiting the work area via a ladder	Ladders tipping or shifting- falling from the ladder	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		All ladders must be equipped with ladder shoes, and set up on a firm level footing.			
13. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. ie. old paint.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
14. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
15. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Metal Doors

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
16. Clean up	Tripping and falling	Clean up work area at the end of each shift.			
	Impact injuries	Do not store doors in a location or in such a manner that they can fall over and injure workers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
	Tools and equipment- prior to each shift.	Activity hazard training	

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Set Steel Doors Frames

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Installers	Installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Installers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive deliveries, store out frames	Crushing or pinching hands or feet	When moving frames keep hands and feet clear of pinch points.			
		Store frames in shipping crates or stack doors on end in a location where they will not be blown or knocked over.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Communicate clearly with coworkers.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move frames with a forklift.	Struck by machinery, impact injuries	See AHA for forklift operation.			
5. Spread frames and move equipment	Pulls and Strains from lifting	Get help when moving heavy frames; use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Dropping the frame, crushed or pinched body parts	Get the right frame to the right location. Mistakes in spreading frames increases the handling time.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while carrying a frame, watch where you are going.			
		Never move material over or above workers.			
	Falling through a wall or floor opening	When receiving/stocking frames through a wall or floor opening do not stand in front or above the opening where you could fall to a lower level.			
6. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
7. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
8. Inspect tools	Defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
	Electrocution	Use only GFCI protected outlets			
9. Fasten blocks for bracing to the deck or floor	Impact injuries, pulls, or strains	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Set Steel Doors Frames

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Avoid binding the drill bit, causing the drill body to spin. Hold the drill steady, don't try to drill too quickly.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade.			
	Hearing loss	Wear foam ear plugs when working in noisy areas or with loud tools such as a hammer drill.			
10. Set the frame	Pulls and Strains from lifting	Get help lifting heavy frames into position.			
	Crushed or pinched body parts	Use a pry bar or other mechanical means to help position the frame.			
		Keep fingers and hands clear of pinch points			
		Communicate clearly with co-workers			
10. Fasten the frame to the floor	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work involving hammers, hammer drills, grinders, saws, or powder actuated tools.			
	Struck by falling frame	Secure the frame as soon as possible.			
		See the AHA for Using Powder Actuated Tools			
10. Plumb and brace frame.	Smashed fingers	Keep free hand several inches away from whatever you are hitting with a hammer.			
	Trip hazard	Do not run braces into a hallway.			
11. Adjust or brace frame from a ladder.	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
	Ladder tipping, shifting, or sliding.	Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
11. Cut shims	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
12. Entering and exiting the work area via a ladder	Ladders tipping or shifting- falling from the ladder	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		All ladders must be equipped with ladder shoes, and set up on a firm level footing.			
14. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
15. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Set Steel Doors Frames

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
16. Clean up	Tripping and falling	Clean up work area at the end of each shift (especially lumber with protruding nails).			

Equipment to be Used	Inspection Requirements	Training Requirements
powder actuated nail gun	Tools and equipment- prior to each shift.	Activity hazard training
step ladders		
worm drive saw		
hammer drill		
hand tools		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Metal Windows

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Glaziers	Glaziers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Glaziers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Spread Windows, move material	Pulls and Strains from lifting	Get help when moving/heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Dropping the window, shattered glass	Get the right window right opening. Mistakes in spreading the windows increase the handling time.			
7. Drill holes in window frame, grind and cut steel	Eye injury	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade			
8. Drill holes and set anchors	Twists and pulls	Avoid binding the drill bit, causing the drill body to spin. Hold the drill steady, don't try to drill too quickly.			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work involving hammers, chipping tools, grinders, saws, or pneumatic tools.			
	Hearing loss	Wear foam ear plugs when working in noisy areas or with loud tools such as a hammer drill.			
9. Set window in the opening	Pulls and Strains from lifting	Get sufficient help to lift and hold the window in position, use a mechanical lift when possible.			
		Secure the window			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Metal Windows

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Window falling through the opening to a lower level	Have a helper hold the window until it is secured or use some mechanical means to prevent the window from falling.			
		Secure the window as soon as possible.			
	Crushed or pinched body parts	Keep fingers and hands clear of pinch points			
		Communicate clearly with co-workers			
10. Secure window by welding or weld window parts.	See Job Hazard Analysis on Welding and Cutting				
11. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
12. Working from a scissor lift	See Job Hazard Analysis on operating a scissor lift				
13. Lift and moving materials and equipment	Striking and injuring co-workers with materials	Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers unless precautions have been taken to protect workers.			
14. Move materials using a forklift	See Job Hazard Analysis on forklift operation				
15. Working from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size ladder for the job			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
	Electric shock	Nonconductive ladders are recommended.			
16. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
		Do not move ladder with tools on it			
17. Prep and clean surfaces prior to caulking.	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using (especially MEK). Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
18. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. ie. old paint.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
19. Caulk in window frames	Damage due to long term occupational exposure	Wear the personal protective equipment required by the MSDS when handling the chemical.			
20. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Install Metal Windows**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
21. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
22. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
			Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Door Hardware

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Installers	Installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Installers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, inventory hardware	Crushing or pinching hands or feet	When moving hardware keep hands and feet clear of pinch points.			
		Store hardware in shipping crates/packages or store in a location where it will not be damaged.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Communicate clearly with coworkers.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move material with a forklift.	Struck by machinery, impact injuries	See AHA for forklift operation.			
5. Spread hardware, move material, and equipment	Pulls and Strains from lifting	Know how much you safely lift, use a mechanical lift such as a wheelbarrow or hand truck when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Get the right hardware to the right opening. Mistakes in spreading the hardware increases the handling time.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving material, watch where you are going.			
6. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
	Strains from bending or kneeling	Set up saw horses or use a door stand to make the door easier to work on, if the hardware installation requires the removal of the door.			
7. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
8. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Door Hardware

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
9. Prep door to receive hardware	Impact injuries, pulls and strains	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
		Avoid binding the drill bit, causing the drill body to spin. Hold the drill steady, don't try to drill too quickly.			
	Hearing loss	Wear foam ear plugs when working in noisy areas or with loud tools such as a saw, or grinder.			
10. Install the hardware	Crushed or pinched body parts	Keep fingers and hands clear of pinch points			
		Communicate clearly with co-workers			
11. Make adjustments	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work involving hammers, drills, grinders, saws, or pneumatic tools.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
12. Install hardware or other work from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size ladder for the job			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in fully open position.			
	Electric shock	Nonconductive ladders are recommended.			
13. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
		Do not move ladder with tools on it			
14. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. ie. old paint.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Install Door Hardware**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
17. Clean up	Tripping and falling	Clean up work area at the end of each shift.			
	Impact injuries	Do not store doors in a location or in such a manner that they can fall over and injure workers.			

Equipment to be Used	Inspection Requirements	Training Requirements
Saw horses	Electrical cords	AHA training of each installer
Screw gun/cordless drill	Tools and equipment	
Reciprocating saw		
Porta-band saw		
hammer drill		
Grinders		
Chop saw		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Glazing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Glaziers	Glaziers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Glaziers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, and other equipment.			
		Clean up scrap materials and debris before working in an area.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		All manufacture installed safety features are in place and functioning.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Remove old glazing (for remodel work only)	Shattered glass- cuts	Before breaking glass for removal apply strips of duct tape, spray adhesive and visqueen, or some other membrane to catch and hold most of the shattered glass			
		Use a drop cloth to catch loose shards of glass			
		Clean up all broken glass in the work area as soon as possible.			
	Eye injury	Wear safety goggles or a safety glasses with side shields, gloves, and gauntlets.			
7. Clean and prep openings to receive glazing, install glazing tape.	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using (especially MEK). Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
8. Receive deliveries, spread glass	Shattered or broken glass- cuts	Schedule deliveries so that when the glass arrives it can be installed in its final location.			
		Wear gloves and gauntlets when moving or handling glass (especially annealed glass and mirrors). Small pieces of tempered glass may be handled safely without gloves.			
		Do not set a sheet of glass on flat or on edge on hard surface.			
		Get the glass to the right opening. Mistakes in spreading the glass increase the handling time.			
	Crushing or pinching hands or feet	When moving loose or crated glass keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Glazing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Excessive material handling	Stage material as close to its final destination as possible.			
9. Cut glass to size	Shattered or broken glass- cuts	Properly support and cushion the glass you are cutting.			
		Dip your glass cutter in oil before making the cut.			
		Be careful not to touch the sharp edges of cut glass			
10. Cut holes in glass, drill holes	Flying particles- Eye injury, or broken glass	Build a small oil damn around the hole you plan to drill (with duct tape for example). Use oil while drilling.			
11. Set and position glass	Pulls and Strains from lifting	Get help when moving large or heavy glass.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers glass	Be aware of your surroundings while moving glass, watch where you are going.			
		Never move glass over or above workers.			
	Crushed or pinched fingers	Keep fingers and hands clear of pinch points			
	Breaking or shattering the glass	Use glass vacuum cups to move and hold glass in place.			
		Communicate clearly with co-workers			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields when setting glass.			
12. Secure the glass, install glass stops	Breaking or shattering the glass	Secure the window as soon as possible.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade			
	Twists and pulls	Avoid binding the drill bit, causing the drill body to spin. Hold the drill steady, don't try to drill too quickly.			
13. Working around other trades	Hearing loss	Wear foam ear plugs when working in noisy areas or with noisy tools.			
	Falling glass striking workers below	Do not install glass above workers at a lower level. Caution off the area below glazing operations.			
14. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
15. Working from a scissor lift	See Job Hazard Analysis on operating a scissor lift				
16. Working from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size ladder for the job			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
	Electric shock	Nonconductive ladders are recommended.			
17. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
		Do not move ladder with tools on it			
18. Caulking	Damage due to long term occupational exposure	Wear the personal protective equipment required by the MSDS when handling hazardous caulks.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Glazing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
19. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
20. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
21. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
22. Clean up shards of broken glass	Cuts	Wear gloves and gauntlets when cleaning up shards of glass. Use a shovel or dust pan to scoop up glass.			
		Clean up broken glass as soon as possible.			
23. Clean up work area	Tripping falling	Clean up work area at the end of each shift. Keep corridors and stairways clear of material or equipment.			

Equipment to be Used	Inspection Requirements	Training Requirements
Glass cutter, misc. hand tools		AHA training of each glazier
Glass vacuum cup		
rubber mallet		
screw gun		
pry bar		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Roll-up Doors

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Workers	Workers not trained in the safe execution of the task	Train Workers			
2. Put on your personal protective equipment.	Head or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, store roll up door	Crushing or pinching hands or feet	When moving roll up door keep hands and feet clear of pinch points.			
		Store roll up door in a location where they will not be blown or knocked over, or create a tripping hazard.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Communicate clearly with coworkers.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of traffic lanes. Completely unroll all cords to avoid tangles			
		Clean up scrap materials and debris before and after working in an area.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is intact.			
6. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
7. Set up and use ladders	Ladders tipping or shifting while in use causing worker to fall	Set up ladders on firm level footing			
	Falling from ladder	Use the proper size of ladder for the job			
		Do not work from the top two steps of the ladder			
		Do not work from a step ladder leaned against a wall.			
8. Move ladders	Tools or Materials falling from ladders	Do not move ladder while you are on it			
		Do not move ladder with tools on it			
9. Move Roll Up Door	Strains from lifting	Get help when moving/heavy materials, use a mechanical lift if necessary.			
	Cuts and abrasions	Wear gloves			
10. Lift Roll Up Door into place- overhead	Falling from ladders/scaffolds	Set up ladders/scaffolds at the correct distance from work and at proper height			
	The roll up door falling and injuring worker	Set all hangers and make other necessary preparations prior to lifting door into place.			
		Use a mechanical/hydraulic lift for large sections. Learn how the lift works before using it.			
		Lock wheels to mechanical lift and make sure ground is clear of debris			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Install Roll-up Doors**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
11. Secure Roll Up Door	Injuries to eyes	Wear safety glasses with side shields when using a screw gun or hammer.			
	The door falling and injuring worker	Make sure the piece is adequately supported until it is permanently fastened into place.			
	Smashed fingers	Keep hands and fingers clear of any pinch points			
13. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements
Powder Actuated Tools	Tools and equipment- prior to each shift.	AHA training of each installation worker
Ladders		
Hand tools		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Electrical Equipment

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Technicians	Technicians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Technicians.			
2. Put on your personal Head, foot, or eye injury and/or protective equipment hearing loss	Head, foot, or eye injury and/or hearing loss	You must wear a hard bat and work boots at all times.Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught be equipment or machinery.			
3. Roll out cords and tools,set up workplace	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to it's final destination as possible.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoes, & other equipment. Completely unrollall cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
	Poor Illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
5. Check electrical cords	Electrocution - faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra hard usage.			
		Use factory assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is intact.			
6. Inspect tools	Injuries from defective or broken tools	Tag Defective tools/equipment as unsafe, and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saw blades have properly functioning manufacturer installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric Shock	Use only GFCI protected outlets.			
7. Drill holes and set anchors, and/or brackets	Twists or sparngs due to drill bit catching	Hold the tool steady with arms flexed, and drill as straight a hole as possible.			
		Never disable the built in safety features on a tool.			
	Cuts, abrasions, impact injuries	Hand tools to co workers handle first; do not throw them.			
	Flying particles - Eye injury	Wear safety goggles or safety glasses with side shields for the following types of work; hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes.			
	Impact injuries	Use a wire or other locking device to prevent air hoses from being accidentally disconnected.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Electrical Equipment

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Cuts, abrasions	Always ues the right tool for the job. If you don't have the right tool or don't know what to use, ask your supervisor.			
		Take your finger off the switch when carrying a plugged in tool.			
		Unplug all tools before making any repairs or adjustments.			
	Electric Shock	Do not carry or hoist tools by their power cords.			
8. Make modifications or adjustments	Hazardous noise, hearing loss	Wear foam ear plugs when using tools or when working in an area where sound pressure leveles are greater than 85 dB(A) time weighted avg. over 8 hours.			
	Cuts	Be careful while handling edges that are sharp or burred.			
9. Move equipment into position	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers.			
	Crushed or pinched body parts	Use a pry bar or other mechanical means to help position the equipment or to prevent it from shifting.			
		Keep fingers and hands clear of pinch points.			
		Communicate clearly with co-workers.			
10. Fasten equipment in place	Impact injuries, or crushed or pinched injuries	Make sure the equipment is adequately supported until it is permanently fastened into place.			
11. Installing equipment from a ladder	Ladder tipping shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Setup ladders on firni level footing.			
		Don’t work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job.			
	Ladder failure - falling	Ladders must be inspected regularly and tagged "do not use" if defective. Remove defective ladders from the jobsite.			
12. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it.			
		Do not move a ladder with tools on it.			
	Electric Shock	Nonconductive ladders used when working near energized electrical lines or equipment.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Installing Electrical Equipment**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
13. Administering First Aid	Exposure to Bloodborne pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
	Exposure to Bloodborne pathogens	Dispose of soiled material ina labeled leak proof container.			
		Clean up accident area including tools.			
14. Responding to an emergency	Delayed emergency response - further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
	Failure to abate a hazard	Report all accidents to your supervisor immediately.			
15. Confined Spaces	Asphyxiation, incapacitation , or impairment of ability to self rescue	Never enter a confined space ie, manholes, vats, silos, vaults, tunnels, ductwork, etc., except as directed by your supervisor and only in accordance with the requirements of the AHA "Working in Confined Spaces".			
		Always heed wrning signs for confined spaces.			
17. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read throug the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signeage and warning labels.			
18. Working In Hot Weather	Heat stroke	Make sure you always have an adequate supply of cold water available. If you water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks.			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen.			
19. Hot work - welding, cutting, soldering, brazing	Fires and explosions, burns	Always have an ABC rated fire extinguisher adjacent to where the work is being performed.			
		Remove all combustibles from your work area prior to beginning and during hot work.			
	See AHA for Welding and Cutting				
20. Cleanup	Tripping - waste materials improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns - fires due to combustibles	Place combustibles in approved containers.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Installing Electrical Equipment**

Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**
Equipment to be Used	Inspection Requirements	Training Requirements
Ladders, scaffolding	Tools & equipment prior to use	Activity Hazard training for each laborer
Drills		

Activity Safety Inspection

Y	N	N/A

Inspect. Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Laying Reinforced CMU**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train masons	Masons not trained in the safe execution of their tasks	Train masons			
2. Put on your personal protective equipment.	Head or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, and store material.	Crushing or pinching hands or feet	When moving block keep hands and feet clear of pinch points.			
		Communicate clearly with coworkers.			
		Leave pallets of block bundled until ready to use.			
	Crushed by moving machinery	Stay clear of moving machinery, heed backup alarms and get out of the way.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before working in an area.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
6. Set up scaffolding	See the AHA for Scaffold Erection and Use				
	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points, especially when setting up scaffolding and moving planking.			
7. Stock Block	Pulls and Strains from lifting	Get help when moving heavy material or equipment, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
	Striking and injuring co-workers	Be aware of your surroundings and watch where you are going while carrying block.			
		Never move materials over or above workers.			
	Falling through a wall or floor opening	When receiving/stocking block through a wall or floor opening do not stand infront or above the opening where you could fall to a lower level.			
	Tripping, falling	As much as possible place stacks of block where it will not become a trip hazard or get in the way of scaffolding.			
	Excessive material handling	Stock block as close to its final destination as possible.			
8. Move material and equipment with a forklift	See the AHA for Forklift Operation.				
9. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from the jobsite.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Laying Reinforced CMU

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All Saw blades have properly functioning manufacture installed guards.			
	Impact injuries from spinning tool	Hand held power tools (chipping hammer, saws, grinder) are equipped only with constant pressure switch. This means the tool stops when the trigger is released.			
	Impact or eye injuries	Devices provided on air power tools to prevent tools from becoming accidentally disconnected from hose.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
10. Entering or exiting the work area via a ladder	Ladder shifting or tipping- Falling	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		The ground beneath the base of the ladder must be leveled and compacted.			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
11. Clean surfaces with compressed air	Airway irritation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Stand up wind from the air nozzle.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
12. Layout walls and preparatory instructions	Lack of coordination between masons and resulting mistakes	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
13. Mix mortar	Crushed or pinched, or caught between machine parts	Do not place body parts near or between pinch points on the machine.			
		Do not wear loose clothing that could get caught in the machine.			
	Airway irritation, silicosis, eye injury	Wear a dust mask and safety glasses or goggles in addition to the standard PPE when mixing mud.			
	Silicosis, or similar damage due to long term occupational exposure	Read through the MSDS for every material that you will be using, portland cement in particular.			
	Mortar splashing- Eye injury	Wear safety goggles or a safety glasses.			
14. Cut block with a wet saw	Cuts, abrasions	Keep fingers several inches away from the blade at all times. Use a clamp to hold the block if necessary.			
		Hold the long end of block.			
	Hazardous noise, hearing loss	Wear foam ear plugs and ear muffs.			
	Dust inhalation- silicosis	Wear a dust mask			
15. Move mortar or grout	Pulls and Strains from lifting	Use a mechanical lift such as a wheelbarrow or forklift whenever possible.			
		Balance your load by carrying two partially full buckets one in each hand instead of one full bucket.			
		See safe lifting techiques above.			
16. Lay block	Impalement from falls on rebar	All rebar which is below the level where block laying operations is ongoing onto which workers could fall must be protected with rebar caps.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Laying Reinforced CMU

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Scrapes and cuts from contacting sharp ends of cut rebar	Where it is feasible to do so, install caps on the cut ends of rebar that do not present an impalement hazard to guard against scrapes and cuts.			
	Falling from the scaffold	Maintain the top rails, midrails, and toeboards on the scaffold from which you are working.			
		Do not horse play on or around scaffolding.			
		Always use a ladder to gain access to scaffold work platforms			
	Tripping, falling	Remove material and bebris from the work platform at least twice per shift.			
	Workers below scaffold struck by falling objects	Be careful to not drop tools or material from the scaffold			
17. Laying block at an elevated location	Falling	Never work on open-sided floor, or other location where you can fall more than 6’ to a lower level unless you are protected from falling by either a guardrail system or a personal fall arrest system.			
		For guardrail requirements see scaffolding			
		The personal fall arrest system, which consists of a body harness and shock absorbing lanyard, must prevent the user from falling more than 6', or from contacting any lower level			
		Secure lifelines to a significant structural member or other safe anchorage point.			
	Falling during overhand bricklaying operations	During overhand bricklaying operations the wall on which the masons are working is not considered an open end. However, extreme caution should be exercised during such operations especially while joining the far side of the wall			
18. Make cut-outs in the block	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields.			
	Cuts and abrasions	Do not pin back the guard on a worm drive or circular saw.			
	Dust inhalation- silicosis	Wear a dust mask or respirator			
	Hazardous noise, hearing loss	Wear foam ear plugs.			
19. Cut rebar	Cuts, crushed or pinched body parts	Keep fingers away from pinch points.			
	Flying particles- Eye injury	Wear safety glasses with side shields			
20. Move and set rebar	Impact injuries	Be aware of your surroundings and watch where you are going.			
	Cuts and abrasions	Wear gloves			
21. Grout walls	Strains from lifting or pulling	Get as many masons as needed to move the material hose safely.			
	Shooting grout co-workers	Never point the material hose at yourself or other workers even it is not currently pumping.			
	Eye Injury- grout splashing	Wear safety glasses with side shields or goggles			
	Skin irritation	Wear gloves and avoid getting wet concrete on exposed skin.			
		Wash skin as soon as possible			
22. Staging concrete trucks and pump trucks	Struck or crushed by moving equipment	Stay clear of moving machinery, or chutes, heed backup alarms and get out of the way.			
	Cave-in, and or roll over	Keep concrete trucks and other equipment several feet back from the edge of open trenches, and off steep grades.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Laying Reinforced CMU**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
23. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
24. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
25. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspect. Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Medium Voltage Splicing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electricians	Electricians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train electricians.			
2. Layout, communication, and preparatory instructions	Lack of coordination between Electricians - mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
		Check two way radios other communication equipment to ensure proper operation.			
3. Lock out and tag out all sources of electrical energy	Electrocution	Except for work that must be performed on energized equipment, all circuits or equipment that are energized or may become energized must be locked out and tagged before beginning work on those circuits or equipment.			
		Make sure the locking device is installed correctly.			
		The lock should be your personal lock and the tag should have your name, the date, and time on it (a pager or cell phone number is also helpful).			
		Make sure that the right circuit or equipment has been lock out. Double check that there are no hot wires or equipment at the location of the work.			
4. Inspect tools, set up area of work.	Injuries from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from the jobsite.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your work area.			
5. Opening equipment, manholes, vaults	Rodents, spiders or other pests startling workers as they open equipment.	Use caution while entering existing equipment, check for snakes, spiders or rodents. Don't be startled if they are present.			
	Accidentally moving or dislocating cables as covers are removed.	Remove covers slowly to ensure cables are booted and secure.			
6. Testing & Grounding	Accidental contact with energized parts.	Test & ground all equipment before performing any tasks. Spike all conductors before cutting. Use a remote control hydraulic spike tool if available.			
		Verify That All Isolation Switching Is Proper and Complete. Verify That Ground Lead Is Secure From Accidental Removal. Verify That Hold-Off Cards Are Properly Executed and In-Place. Verify All Signees Are Signed Off Prior To Removal of Grounds. Visual Check For Tools, Materials, etc. Prior To Removal. Check For Where about Of All People in the Area. Remove Ground After All Checks Have Been Double-Checked. Properly and Safely Coil and Store Leads After Removal.			
7. Terminating	Accidental contact with energized parts.	Do not work on energized equipment if terminating or working in close proximity areas.			
	Mixing phases - flash or outage	Phase all cables before terminating.			
	Sharp edges or corners	Wear leather gloves while terminating.			
	Damage to conductors being terminated	Ensure proper tools are used to avoid damaging the conductors.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Medium Voltage Splicing

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
		High pot test cables after installation of terminators.			
8. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Manholes, vaults, tunnels, ductwork, ect., except as direct by your supervisor and in accordance with the requirements of the EM-385 regarding Working In Confined Spaces			
9. Clean up	Tripping - waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements

Inspect. Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Aerial Lift Truck Operation and Use

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel may operate or work from an aerial lift truck.			
2. Inspect the lift truck prior to use.	A lift that is not in good operating condition	**Check the following:** Tires are in serviceable condition, and properly inflated.			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
		Load capacities and operational limits of the work platform are posted			
	Backing over workers.	Automatic back-up alarm is functioning properly.			
	Loss of control due to broken hydraulic lines, or broken steering linkage	All brake and hydraulic lines are in good repair and not leaking.			
		Steering linkage and tie rod are in good operating condition.			
	Burns, cuts, crushed or pinched body parts	Belts, gears, shafts, electrical contacts, & hot pipes/surfaces are adequately guarded.			
3. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		The truck is equipped with an easily accessible fire extinguisher.			
		Do not smoke while refueling.			
4. Getting into and out of the work platform	Slipping and falling	Make sure access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the truck, basket, or boom.	When the truck is unattended the boom is lowered, brakes set, controls neutralized, and the engine is shut down.			
8. Set up and level truck	Truck tipping or shifting	If the truck is equipped with outriggers ensure that the outriggers are supported on a firm foundation capable of supporting the intended load.			
		Never work from a lift truck on a grade where the truck is out of level.			
	Brake failure- truck moving unexpectadly	Check brakes for proper operation and set parking brake.			
	Crushed or pinched body parts	Stay clear of all pinch points while extending and lowering outriggers.			
5. Test the lift prior to beginning operation.	A machine that is not in good operating condition	Check that: Each control is operating properly, and each controls function is clearly marked			
	Trapped in the raised position	Ensure that overriding ground controls are functioning properly.			
6. Machine operation: Hoisting/moving personnel	Accidents due to not being able to see clearly	Assure that the operator's view is unobstructed when moving in any direction.			
		Operator shall look in the direction of travel.			
	Crushed by, or caught between machine parts	Do not allow workers to stand or walk under the elevated portion of the machine.			
		Do not place body parts between pinch points on the machine or between the machine and a stationary object.			
	Falling from the basket	Employees shall not ride on any part of the machine other than in operator's basket.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Aerial Lift Truck Operation and Use**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
		Never stand on anything other that floor of the basket (don't stand or sit on the handrails)			
		All workers in the basket, must wear a full body harness with lanyard attached to the basket.			
	Electrocution	When working near energized lines or equipment, the truck must be insulated for the work being performed.			
	Crushed or pinched	Familiarize yourself with the directional controls of the machine, especially prior to work in tight spaces.			
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.			

Equipment to be Used	Inspection Requirements	Training Requirements
Lift truck	Daily Inspection of truck and lift	AHA training of each Operator
Full body harness		
Lanard		
Approved metal safety cans		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Front End Loader

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Train Operators			
2. Inspect the machine prior to each shift.	A machine that is not in good operating condition	**Check that:** Tires are in serviceable condition, and properly inflated.			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
	Loss of control due to broken hydraulic lines, or broken steering linkage	All brake and hydraulic lines are in good repair and not leaking.			
		Steering linkage and tie rod are in good operating condition.			
	Burns, cuts, crushed or pinched body parts	Belts, gears, shafts, electrical contacts, & hot pipes/surfaces are adequately guarded			
	Cuts from shattered glass	Glazing in operator's compartment is safety glass and in good repair.			
	Falling out of the machine, or crushed in a roll over.	Approved seat belts and roll over protection are provided			
3. Refueling the Backhoe	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		A fire extinguisher is provided at the operator's compartment			
		Do not smoke while refueling.			
4. Getting on and off the machine	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the machine, or machine parts.	When the machine is unattended the bucket is lowered, brakes set, controls neutralized, and the engine is shut down.			
5. Test the machine prior to beginning operation.	A machine that is not in good operating condition	Check that: Each control is operating properly.			
	Brake failure- not being able to stop the machine.	Brakes are capable of safely stopping the machine with a full load.			
	Not being able to see clearly	Windshield wipers work and the rear view mirror is properly adjusted.			
	Backing over workers or running into other equipment or vehicles.	Automatic back-up alarm, headlights, turn signals, & horn are in proper operating condition.			
6. Machine operation: digging, loading, moving material	Accidents due to not being able to see clearly	Assure that the operator's view is unobstructed when digging or loading			
		Operator shall look in the direction of travel.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Front End Loader

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Crushed by, or caught between machine parts	Do not allow workers to stand or walk under the elevated portion of the machine.			
		Employees do not place body parts outside of the cab or near pinch points on the machine.			
	Falling from the machine	Employees shall not ride in buckets or on any part of the machine other than the seat.			
		Seat belt is worn while operating the machine			
7. Digging near gas or utility lines	Explosions from broken gas lines, electrical lines	Call Dig-Alert before you dig, and locate all underground Utilities.			
	Property damage- broken phone lines	Pot-hole for utilities to locate the exact location before beginning full excavation.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.	
Backhoe	Daily Inspection of backhoe	AHA training of each Operator	
Approved metal safety cans			Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Bobcat Operatoin

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Train Operators			
2. Inspect the machine prior to each shift.	A machine that is not in good operating condition	**Check the following:** Tires are in serviceable condition, and properly inflated.			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
	Loss of control due to broken hydraulic lines, or broken steering linkage	All brake and hydraulic lines are in good repair and not leaking.			
		Steering linkage and tie rod are in good operating condition.			
	Burns, cuts, crushed or pinched body parts	Belts, gears, shafts, electrical contacts, & hot pipes/surfaces are adequately guarded			
	Cuts from shattered glass	Glazing in operator's compartment is safety glass and in good repair.			
	Falling out of the machine, or crushed in a roll over.	Approved seat belts and roll over protection are provided			
3. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		A fire extinguisher is provided at the operator's compartment			
		Do not smoke while refueling.			
4. Getting on and off the machine	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the machine, buckets, booms, or stabilizers.	When the machine is unattended the bucket is lowered, brakes set, controls neutralized, and the engine is shut down.			
5. Test the machine prior to beginning operation.	A machine that is not in good operating condition	Check that: Each control is operating properly.			
	Brake failure- not being able to stop the machine.	Brakes are capable of safely stopping the machine with a full load.			
	Not being able to see clearly	Windshield wipers work and the rear view mirror is properly adjusted.			
	Backing over workers or running into other equipment or vehicles.	Automatic back-up alarm, & horn are in proper operating condition.			
6. Machine operation: digging, loading, moving material	Accidents due to not being able to see clearly	Assure that the operator's view is unobstructed when digging or loading			
		Operator shall look in the direction of travel.			
	Crushed by, or caught between machine parts	Do not allow workers to stand or walk under the elevated portion of the machine.			
		Employees do not place body parts outside of the cab or near pinch points on the machine.			
	Falling from the machine	Employees shall not ride in buckets or on any part of the machine other than the seat.			
		Seat belt is worn while operating the machine			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Bobcat Operatoin**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
7. Digging near gas or utility lines	Explosions from broken gas lines, electrical lines	Call Dig-Alert before you dig, and locate all underground Utilities.			
	Property damage- broken phone lines.	Pot-hole for utilities to locate the exact location before beginning full excavation.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.	
Bobcat	Daily Inspection of bobcat	AHA training of each Operator	

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Extensible Boomlift Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel may operate a boomlift.			
2. Inspect the machine prior to beginning each shift.	A machine that is not in good operating condition	**Check that:** Tires are in serviceable condition, and properly inflated.			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
		Load capacities and operational limits of the machine are posted			
	Loss of control due to broken hydraulic lines, or broken steering linkage	All brake and hydraulic lines are in good repair and not leaking.			
		Steering linkage and tie rod are in good operating condition.			
	Burns, cuts, crushed or pinched body parts	Belts, gears, shafts, electrical contacts, & hot pipes/surfaces are adequately guarded			
3. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		The machine is equipped with a fire extinguisher			
		Do not smoke while refueling.			
4. Getting on and off the machine	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the machine, basket, or boom.	When the machine is unattended the boom is lowered, brakes set, controls neutralized, and the engine is shut down.			
5. Test the machine prior to beginning operation.	A machine that is not in good operating condition	Check that: Each control is operating properly, and each controls function is clearly marked			
	Brake failure- not being able to stop the machine.	Brakes are capable of safely stopping the machine with a full load.			
	Backing over workers.	Automatic back-up alarm.			
	Trapped in the raised position	Ensure that overriding ground controls are functioning properly.			
	Backing over workers.	Automatic back-up alarm.			
6. Machine operation: Hoisting/moving personnel	Accidents due to not being able to see clearly	Assure that the operator's view is unobstructed when moving in any direction.			
		Operator shall look in the direction of travel.			
	Crushed by, or caught between machine parts	Do not allow workers to stand or walk under the elevated portion of the machine.			
		Do not place body parts between pinch points on the machine or between the machine and a stationary object.			
	Falling from the machine	Employees shall not ride on any part of the machine other than in operator's basket.			
		Never stand on anything other that floor of the basket (don't stand or sit on the handrails)			
		All workers in the basket, must wear a full body harness with lanyard attached to the basket.			
	Tipping the machine over	Know the operational limits of the machine and never exceed the limits.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Extensible Boomlift Operation**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
	Crushed or pinched	Familiarize yourself with the directional controls of the machine, especially prior to work in tight spaces.			
7. Working on a grade other than horizontal.	Machine roll over. Falling out of the machine, or crushed in a roll over.	When ascending or descending grades load is kept up-grade.			
		Remember that operational limits are less when on incline.			
8. Operating the Machine in enclosed spaces.	Carbon Monoxide Poisoning	Provide natural or mechanical ventilation when operating equipment indoors.			
	Property damage and crushed by	Be aware of your surrounding and know the swing radius of the machine.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.	
Boomlift	Daily Inspection of boomlift	AHA training of each Operator	
Full body harness			
Lanard			
Approved metal safety cans			

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Truck Mounted Crane Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel should be allowed to operate or work in conjunction with a crane.			
		You must be trained in safe use of the particular crane being used.			
2. Make sure the crane has been certified	Crane or component failure	The crane must be certified annually. Make sure there is a current certificate on board.			
3. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
4. Inspect the crane prior to beginning each shift.	A crane that is not in good operating condition	Tires are in serviceable condition, and properly inflated (check tire pressure).			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
		All wire rope is in good condition (see wire rope inspection checklist)			
		Boom wear pads are good condition.			
	Crane failure or tipping over	Load rating chart and operational limits of the crane are posted. Load indicator is provided for cranes rated at 50 tons or more.			
		Boom angle and boom length indicators are clearly visible.			
	Loss of control due to broken hydraulic lines	All hydraulic lines including brake lines are in good repair (not leaking).			
	Cuts from shattered glass	Glazing in operator's compartment is safety glass and in good repair.			
	Struck or crushed by falling objects	Operator station is protected against falling or flying objects, or swinging loads			
5. Communication and preparatory instructions	Lack of coordination between crane operator and workers on the ground	Before beginning each operation get together with everyone involved in the operation and discuss what they are to do, and how the work will proceed.			
		Review hand signals and non-verbal communication.			
		If a signal person is needed to direct the operator only one person should be designated.			
6. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		Do not smoke while refueling.			
		A fire extinguisher (ABC rating) is accessible from the operators station.			
7. Getting on and off the crane	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the crane or boom.	When the crane is unattended the load is lowered, brakes set, controls neutralized, and the engine is shut down.			
8. Set up and level crane	Crane tipping or shifting	Ensure that the outriggers are supported on a firm foundation capable of supporting the intended load. Use lumber to increase the surface area to which the load is applied when setting up on soil.			
	Crushed or pinched injuries	Stay clear of all pinch points while extending and lowering outriggers.			
9. Test the crane prior to beginning operation.	Crane or component failure	Check that: Each control is operating properly and is clearly identified.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Truck Mounted Crane Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Is there sufficient cable to allow two full wraps of cable on drums at all working positions			
		Make sure the following are operating properly: boom hoist disconnect (boom stop), transmission; is not slipping or noisy, boom hoist kickout, parking brake, swing brake, outriggers.			
10. Rigging	Rigging braking, shifting, or coming loose	Accurately estimate the weight of the pick, and use yoke, slings, or other rigging that can safely support the load.			
11. Hoisting, picking, moving material	Accidents due to not being able to see clearly	Make sure operator's view of the pick is unobstructed or a signal person is used as an aid.			
	Crushed by falling objects	Do not allow workers to stand or walk under the elevated portion of the machine.			
	Falling from the machine	Never use the crane to hoist personnel.			
		Seat belt is worn while operating the machine.			
	Crane tipover	Know the operational limits of the machine and never exceed the limits.			
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.			
12. Working around high voltage electrical lines	Electrocution	Keep the boom as far away from high voltage lines as possible, but never closer than10 feet.			
13. Making repairs or adjustments	Crushed by, or caught between machine parts	Do not place body parts near pinch points on the machine.			
	Burns, cuts	Avoid touching hot pipes/surfaces and electrical contacts.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Crane	Once before each shift	Operator must be trained in the safe operation of the crane.	
			Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Setting a Structural Steel Using a Crane

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel should be allowed to operate or work in conjunction with a crane.			
		You must be trained in safe use of the particular crane being used.			
2. Make sure the crane has been certified	Crane or component failure	The crane must be certified annually. Make sure there is a current certificate on board.			
3. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
4. Inspect the crane prior to beginning each shift.	A crane that is not in good operating condition	Tires are in serviceable condition, and properly inflated (check tire pressure).			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
		All wire rope is in good condition (see wire rope inspection checklist)			
		Boom wear pads are good condition.			
	Crane failure or tipping over	Load rating chart and operational limits of the crane are posted. Load indicator is provided for cranes rated at 50 tons or more.			
		Boom angle and boom length indicators are clearly visible.			
	Loss of control due to broken hydraulic lines	All hydraulic lines including brake lines are in good repair (not leaking).			
	Cuts from shattered glass	Glazing in operator's compartment is safety glass and in good repair.			
	Struck or crushed by falling objects	Operator station is protected against falling or flying objects, or swinging loads			
5. Communication and preparatory instructions	Lack of coordination between crane operator and workers on the ground	Before beginning each operation get together with everyone involved in the operation and discuss what they are to do, and how the work will proceed.			
		Review hand signals and non-verbal communication.			
		If a signal person is needed to direct the operator only one person should be designated.			
6. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		Do not smoke while refueling.			
		A fire extinguisher (ABC rating) is accessible from the operators station.			
7. Getting on and off the crane	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the crane or boom.	When the crane is unattended the load is lowered, brakes set, controls neutralized, and the engine is shut down.			
8. Set up and level crane	Crane tipping or shifting	Ensure that the outriggers are supported on a firm foundation capable of supporting the intended load. Use lumber to increase the surface area to which the load is applied when setting up on soil.			
	Crushed or pinched injuries	Stay clear of all pinch points while extending and lowering outriggers.			
9. Test the crane prior to beginning operation.	Crane or component failure	Check that: Each control is operating properly and is clearly identified.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Setting a Structural Steel Using a Crane

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
		Is there sufficient cable to allow two full wraps of cable on drums at all working positions			
		Make sure the following are operating properly: boom hoist disconnect (boom stop), transmission; is not slipping or noisy, boom hoist kickout, parking brake, swing brake, outriggers.			
10. Rigging	Rigging braking, shifting, or coming loose	Check manufactures data in order to accurately estimate the weight of the pick, and use yoke, slings, or other rigging that can safely support the load.			
11. Hoisting steel into position	Accidents due to not being able to see clearly	Make sure operator's view of the pick is unobstructed or a signal person is used as an aid.			
	Crushed by falling objects	Do not allow workers to stand or walk under the elevated portion of the machine.			
	Falling from the machine	Never use the crane to hoist personnel.			
		Seat belt is worn while operating the machine.			
	Crane tipover	Know the operational limits of the machine and never exceed the limits.			
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.			
12. Landing the Steel	Crushed or pinched injuries	Keep body parts clear of all pinch points utill the generator has come to rest and is secured in its final position.			
14. Working around high voltage electrical lines	Electrocution	Keep the boom as far away from high voltage lines as possible, but never closer than10 feet.			
15. Making repairs or adjustments	Crushed by, or caught between machine parts	Do not place body parts near pinch points on the machine.			
	Burns, cuts	Avoid touching hot pipes/surfaces and electrical contacts.			

Equipment to be Used	Inspection Requirements	Training Requirements
Crane	Once before each shift	Operator must be trained in the safe operation of the crane.
rigging		
drift pins		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Boring Using a Hollow Stem Auger Drilling Rig

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel should be allowed to operate or work in conjunction with rig.			
		You must be trained in safe use of the particular machine being used.			
2. Locate utilities	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
3. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times. Wearing a hard hat while in the cab and protected by the canopy is not required.			
	Cuts or abrasions	Wear gloves when handling sharp or rough/abrasive objects.			
4. Inspect the machine prior to each shift.	A machine that is not in good operating condition	Tires are in serviceable condition, and properly inflated (check tire pressure).			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
	Loss of control due to broken hydraulic lines	All hydraulic lines including brake lines are in good repair (not leaking).			
	Cuts from shattered glass	Glazing in operator's compartment is safety glass and in good repair.			
	Struck or crushed by falling objects	Operator station is protected against falling or flying objects, or swinging loads			
	Fires or explosion	A fire extinguisher (ABC rating) is accessible from the operators station.			
5. Communication and preparatory instructions	Lack of coordination between workers.	Before beginning each operation get together with everyone involved in the operation and discuss what they are to do, and how the work will proceed.			
		Review hand signals and non-verbal communication.			
6. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		Do not smoke while refueling.			
7. Getting on and off the machine	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Crushed by or caught between machine parts.	When the machine is unattended the any suspended loads are lowered, brakes set, controls neutralized, and the engine is shut down.			
8. Set up and test the machine prior to beginning operation.	Machine or component failure	Make sure the following are operating properly: transmission; is not slipping or noisy, parking brake, outriggers.			
		Check that: Each control is operating properly and is clearly identified.			
	Entry of unauthorized personnel	Set up warning barricades or temp. fencing around area where drilling is ongoing to prevent the entry of unauthorized personnel.			
	Stuck by or crushed by tipping or unexpected movement of rig	Fully extend and lower outriggers and level the machine. Provide substantial mud sills under outriggers to distribute the load.			
9. Move auger pipe into place, and secure	Crushed by, or caught between machine parts	Do not place body parts in or near pinch points while unloading, moving, or securing auger.			
		While making connections ensure that the auger is secured so that it will not fall or move unexpectedly.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Boring Using a Hollow Stem Auger Drilling Rig

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Pulls and Strains from lifting	Get help when moving auger or other heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Crushed by raised load	Do not allow workers to stand or walk under the elevated portion of the machine.			
10. Drilling/Boring	Organic Gases- flammable and poisonous gases	Since drilling may allow the release of methane (or hydrogen sulfide gas, provide a CGI and PID downwind of the head of the boring to monitor the air.			
		A wind direction flag must be installed on or near the drilling rig.			
		Avoid exposure to organic gases during drilling by staying upwind of the hole as much as possible.			
		If organic vapors are detected at concentrations 5 ppm above the background level for a sustained period, work will cease and cuttings will be contained and covered to lower the organic vapor levels to an acceptable level.			
		Each worker will have a co-worker, never perform boring alone.			
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.			
	Fires or explosion	A fire extinguisher (ABC rated) must be easily accessible from the work area.			
	Hazardous noise, hearing loss	Wear foam ear plugs when sound pressure levels exceed 85 dB(A).			
	Heat Stroke	Make sure you always have an adequate supply of cold water available.			
		Shade the work areas or take scheduled cool down breaks			
	Sunburn	Use sunscreen			
Unloading spoils	Contaminated Soil	Additional PPE is required when drilling through contaminated soil, this may including Tyvek suits, gloves, goggles and respirators.			
11. Working around high voltage electrical lines	Electrocution	Keep the boom as far away from high voltage lines as possible, but never closer than10 feet.			
12. Making repairs or adjustments	Crushed by, or caught between machine parts	Do not place body parts near pinch points on the machine.			
	Burns, cuts	Avoid touching hot pipes/surfaces and electrical contacts.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Boring Using a Hollow Stem Auger Drilling Rig**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
Truck Mounted Drill Rig	Once before each shift	Operator must be trained in the safe operation of the machine.
8" hollow stem auger		

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Truck Mounted Drilling Rig Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel should be allowed to operate or work in conjunction with rig.			
		You must be trained in safe use of the particular machine being used.			
2. Locate utilities	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
3. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times. Wearing a hard hat while in the cab and protected by the canopy is not required.			
	Cuts or abrasions	Wear gloves when handling sharp or rough/abrasive objects.			
4. Inspect the machine prior to each shift.	A machine that is not in good operating condition	Tires are in serviceable condition, and properly inflated (check tire pressure).			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
	Loss of control due to broken hydraulic lines	All hydraulic lines including brake lines are in good repair (not leaking).			
	Cuts from shattered glass	Glazing in operator's compartment is safety glass and in good repair.			
	Struck or crushed by falling objects	Operator station is protected against falling or flying objects, or swinging loads			
	Fires or explosion	A fire extinguisher (ABC rating) is accessible from the operators station.			
5. Communication and preparatory instructions	Lack of coordination between workers.	Before beginning each operation get together with everyone involved in the operation and discuss what they are to do, and how the work will proceed.			
		Review hand signals and non-verbal communication.			
6. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		Do not smoke while refueling.			
7. Getting on and off the machine	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Crushed by or caught between machine parts.	When the machine is unattended the any suspended loads are lowered, brakes set, controls neutralized, and the engine is shut down.			
8. Set up and test the machine prior to beginning operation.	Machine or component failure	Make sure the following are operating properly: transmission; is not slipping or noisy, parking brake, outriggers.			
		Check that: Each control is operating properly and is clearly identified.			
	Entry of unauthorized personnel	Set up warning barricades or temp. fencing around area where drilling is ongoing to prevent the entry of unauthorized personnel.			
	Stuck by or crushed by tipping or unexpected movement of rig	Fully extend and lower outriggers and level the machine. Provide substantial mud sills under outriggers to distribute the load.			
9. Winch auger into place, secure to kelly bar	Crushed by, or caught between machine parts	Do not place body parts in or near pinch points while unloading, moving, or securing auger.			
		While making connections ensure that the auger is secured so that it will not fall or move unexpectedly.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Truck Mounted Drilling Rig Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Pulls and Strains from lifting	Get help when moving auger or other heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Crushed by raised load	Do not allow workers to stand or walk under the auger or other elevated portion of the machine.			
10. Drilling/Boaring	Organic Gases- flammable and poisonous gases	Since drilling may allow the release of methane (or hydrogen sulfide gas, provide a CGI and PID downwind of the head of the boring to monitor the air.			
		A wind direction flag must be installed on or near the drilling rig.			
		Avoid exposure to organic gases during drilling by staying upwind of the hole as much as possible.			
		If organic vapors are detected at concentrations 5 ppm above the background level for a sustained period, work will cease and cuttings will be contained and covered to lower the organic vapor levels to an acceptable level.			
		Each worker will have a co-worker, never perform boaring alone.			
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.			
	Fires or explosion	A fire extinguisher (ABC rated) must be easily accessable from the work area.			
	Hazardous noise, hearing loss	Wear foam ear plugs when sound pressure levels exceed 85 dB(A).			
	Heat Stroke	Make sure you always have an adequate supply of cold water available.			
		Shade the work areas or take scheduled cool down breaks			
	Sunburn	Use sunscreen			
Unloading spoils	Contaminated Soil	Additional PPE is required when drilling through contaminated soil, this may including Tyvek suits, gloves, goggles and respirators.			
	Struck by flying debris, or auger	Ensure that workers stand away from the machine while spoils are spun from the auger.			
		Be aware of the location of workers in and around the excavation at all times.			
		Make sure operator's view of the hole is unobstructed.			
11. Working around high voltage electrical lines	Electrocution	Keep the boom as far away from high voltage lines as possible, but never closer than10 feet.			
12. Making repairs or adjustments	Crushed by, or caught between machine parts	Do not place body parts near pinch points on the machine.			
	Burns, cuts	Avoid touching hot pipes/surfaces and electrical contacts.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Truck Mounted Drilling Rig Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
Truck Mounted Drill Rig	Once before each shift	Operator must be trained in the safe operation of the machine.
36" auger		
Kelly-bar		

Activity Safety Inspection

Y | N | N/A

Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Dump Truck Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Train Operators			
2. Inspect the truck prior to each shift.	A machine that is not in good operating condition	**Check that:** Tires are in serviceable condition, and properly inflated.			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintainence.			
	Loss of control due to broken hydraulic lines	All brake and hydraulic lines are in good repair and not leaking.			
	Broken steering linkage	Steering linkage and tie rod are in good operating condition.			
	Burns, cuts, crushed or pinched body parts	Belts, gears, shafts, electrical contacts, & hot pipes/surfaces are adequately guarded			
	Not being able to see clearly	Windshield and other glazing is clean and in good repair.			
	Fires or explosion	A fire extinguisher is provided on the truck and is located so that it is easily accessable.			
3. Refueling the truck	Fires or explosion	Ensure that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		Do not smoke while refueling.			
4. Getting into and out of the truck	Slipping and falling	Foot holds and steps provided with non-slip surfaces.			
	Accidental movement the truck or truck bed	When the truck is unattended set the parking brake, lower the bed, and turn off the engine.			
5. Test safety features, make adjustments	Backing over or running into workers or vehicles.	Make sure that the automatic back-up alarm, headlights, turn signals, & horn are in proper operating condition.			
	Brake failure- not being able to stop the machine.	Brakes are capable of safely stopping the truck with a full load.			
	Not being able to see clearly	Windshield wipers work and mirrors are properly adjusted.			
6. Staging and loading the truck.	Accidents due to not being able to see clearly	Ensure that your view is unobstructed when backing or use a spotter.			
		When backing under the direction of a spotter stop whenever visual contact with the spotter is lost.			
		Always look in the direction of travel, or use your mirrors when driving in reverse so that you can see where you are going.			
	Crushed by, or caught between machine parts	Do not place body parts near or in pinch points on the truck.			
	Falling or flying rocks and debris	Never operate a truck with out full coverage mud flaps.			
		Make sure the load is covered when driving on public roads and highways.			
	Component failure	Never overload the truck; do not exceed the gross vehicle weight.			
7. Driving the truck, hauling	Falling from the machine	Employees shall not ride in the bed of the truck or on any other part other than in the cab.			
	Injured in an accident	Wear your seat belt while driving the truck.			
		Follow all traffic safety rules or laws.			
	Cave-in or roll over	Stay away from the edge of open excavations or trenches.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Dump Truck Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Be careful when loading or dumping on a grade.			
8. Dumping	Struck by falling debris	Do not allow workers to stand or walk behind the truck when dumping.			
	Tipping the dump truck	Pull the gate release latch to the open position, after dumping secure the gate.			
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Dump Truck	Daily Inspection of Dump Truck	AHA training of each Driver	
			Inspector's Signatu

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Forklift Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel with a valid operator's card are allowed to operate the forklift.			
2. Inspect the machine prior to beginning each shift.	A machine that is not in good operating condition	**Check that:** Tires are in serviceable condition, and properly inflated.			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
		Load capacities and operational limits of the machine are posted			
		Check forks for welds or cracks.			
	Loss of control due to broken hydraulic lines, or broken steering linkage	All brake and hydraulic lines are in good repair and not leaking.			
		Steering linkage and tie rod are in good operating condition.			
	Burns, cuts, crushed or pinched body parts	Belts, gears, shafts, electrical contacts, & hot pipes/surfaces are adequately guarded			
	Cuts from shattered glass	Glazing in operator's compartment is safety glass and in good repair.			
	Falling out of the machine, or crushed in a roll over.	Approved seat belts and roll over protection are provided			
3. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		A fire extinguisher is provided at the operator's compartment			
		Do not smoke while refueling.			
4. Getting on and off the machine	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the machine, Forks, or booms.	When the machine is unattended the bucket is lowered, brakes set, controls neutralized, and the engine is shut down.			
5. Test the machine prior to beginning operation.	A machine that is not in good operating condition	Check that: Each control is operating properly.			
	Brake failure- not being able to stop the machine.	Brakes are capable of safely stopping the machine with a full load.			
	Not being able to see clearly	Windshield wipers work and the rear view mirror is properly adjusted.			
	Backing over workers or running into other equipment or vehicles.	Automatic back-up alarm, headlights, turn signals, & horn are operating properly.			

JOB SAFETY ANALYSIS

Project Description	JSA Description
East County Substation Project	Forklift Operation

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
6. Machine operation: Hoisting, picking, moving material	Accidents due to not being able to see clearly	Assure that the operator's view is unobstructed when picking or loading.			
		Operator shall look in the direction of travel.			
	Crushed by, or caught between machine parts	Do not allow workers to stand or walk under the elevated portion of the machine.			
		Employees do not place body parts outside of the cab or near pinch points on the machine.			
	Falling from the machine	Employees shall not ride on forks or on any part of the machine other than the seat.			
		Seat belt is worn while operating the machine.			
	Machine rollover	Know the operational limits of the machine and never exceed the limits.			
7. Working on a grade other than horizontal.	Machine roll over. Falling out of the machine, or crushed in a roll over.	When ascending or descending grades load is kept up-grade.			
		Remember that operational limits are less when on incline.			

Equipment to be Used	Inspection Requirements	Training Requirements
Forklift	Once before each shift	Each operator must be trained and certified with valid operator's card.
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.

Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Scissorlift Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel may operate a scissor lift.			
2. Inspect the machine prior to each shift.	A machine that is not in good operating condition	**Check that:** Tires are in serviceable condition, and properly inflated.			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
		Load capacities and operational limits of the machine are posted			
	Loss of control due to broken hydraulic lines, or broken steering linkage	All brake and hydraulic lines are in good repair and not leaking.			
		Steering linkage and tie rod are in good operating condition.			
	Burns, cuts, crushed or pinched body parts	Belts, gears, shafts, electrical contacts, & hot pipes/surfaces are adequately guarded			
3. Getting on and off the machine	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the machine.	When the machine is unattended the platform is lowered, brakes set, controls neutralized.			
4. Test the machine prior to beginning operation.	A machine that is not in good operating condition	Check that: Each control is operating properly, and each controls function is clearly marked			
	Brake failure- not being able to stop the machine.	Brakes are capable of safely stopping the machine with a full load.			
	Backing over workers.	Automatic back-up alarm.			
	Trapped in the raised position	Ensure that overriding ground controls are functioning properly.			
5. Clear the work area	Tipping the machine over	Never operate a scissor lift on a surface that is sloped more than 5 degrees from horizontal.			
		Clear the floor in the area where you will be working.			
		Cover and/or barricade all holes or depression in the floor.			
6. Operate the Machine Hoisting personnel	Accidents due to not being able to see clearly	Assure that the operator's view is unobstructed when moving in any direction.			
		Operator shall look in the direction of travel.			
	Falling from the machine	Employees shall not ride on any part of the machine other than in operator's basket.			
		Never stand on anything other that floor of the basket (don't stand or sit on the handrails)			
		All workers in the lift, must wear a full body harness with lanyard attached to anchorage points.			
		Know the operational limits of the machine and never exceed the limits.			
	Crushed by, or caught between machine parts	Do not allow workers to stand or walk under the elevated portion of the machine.			
		Do not place body parts between pinch points on the machine or between the machine and a stationary object.			
	Crushed or pinched	Familiarize yourself with the directional controls of the machine, especially prior to work in tight spaces.			
7. Operating the Machine in enclosed spaces.	Property damage and crushed by	Be aware of your surroundings.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Scissorlift Operation

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
Scissor lift	Daily Inspection of scissor lift	AHA training of each Operator
Full body harness		
Lanard		
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Trencher Equipment Operation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of the task.	Only trained personnel should be allowed to operate or work in conjunction with a crane.			
		You must be trained in safe use of the particular crane being used.			
2. Put on your personal protective equipment.	Head, or foot injury. Hearing loss. Flying or falling objects.	You must wear a hard hat, long pants, and work boots at all times. Ear plugs or hearing prtection to be worn while operating equipment. Safety glasses to be worn to protect against flying objects.			
3. Inspect the trencher prior to beginning each shift.	A trencher that is not in good operating condition	Tires are in serviceable condition, and properly inflated (check tire pressure).			
		Recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points show signs of recent maintenance.			
		All chain/teeth is in good condition.			
		Boom is in good condition.			
	Loss of control due to broken hydraulic lines	All hydraulic lines including brake lines are in good repair (not leaking).			
	Struck or crushed by falling objects	Operator station is protected against falling or flying objects.			
4. Communication and preparatory instructions	Lack of coordination between trench operator and workers	Before beginning each operation get together with everyone involved in the operation and discuss what they are to do, and how the work will proceed.			
		Review hand signals, warning signs and non-verbal communication.			
		If a spotter is needed to direct the operator only one person should be designated.			
5. Refueling	Fires or explosion	Check that there are no leaks in the fuel system & fuel spills are cleaned up immediately after refueling.			
		Do not smoke while refueling.			
		A fire extinguisher (ABC rating) is accessible from the operators station.			
6. Getting on and off the equipment	Slipping and falling	Access steps, platforms, etc. provided with non-slip surfaces.			
	Accidental movement the trencher or boom.	When the trencher is unattended the boom is lowered, brakes set, controls neutralized, and the engine is shut down.			
	Crushed or pinched injuries	Stay clear of all pinch points while extending and lowering trench boom.			
7. Test the equipment prior to beginning operation.	Control or component failure	Check that: Each control is operating properly and is clearly identified.			
		Make sure the following are operating properly: trench boom, transmission; is not slipping or noisy, boom, parking brake, lights, horns, and any other safety devices			
8. Making repairs or adjustments	Crushed by, or caught between machine parts	Do not place body parts near pinch points on the machine.			
	Burns, cuts	Avoid touching hot pipes/surfaces and electrical contacts.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Trencher Equipment Operation**

Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**
Equipment to be Used	Inspection Requirements	Training Requirements
Trencher	Daily inspection before each shift	Operator must be trained in the safe operation of the trencher.
	Fall Hazards	Provide fall arrest body harness with 100% tie-off to 5000 lb capacity restraint. Provide handrails where applicable. Cover holes per Cal/OSHA.

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Place and Finish Concrete Flatwork**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Cement Masons	Cement Masons not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Cement Masons.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
	Impact injuries from spinning tool	Hand held power tools, and power trowels are equipped only with constant pressure switch. This means the tool stops when the trigger is released.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Refuel power tools	Fires, explosions, burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
6. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
7.Check preparations for pour	Hazardous release of energy- form failure	Check forms and bracing of forms to ensure there are no missing or weak sections.			
	Impalement from falls on rebar	All rebar which is below the level where concrete placement or finishing operations will be ongoing onto which workers could fall must be protected with square type rebar caps.			
8. Set screed pins and lumber	Impact injuries- hammer	Keep hand several inches away from whatever you are hitting with a hammer			
9. Layout, communication, and preparatory instructions	Lack of coordination between finishers- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
10. Staging concrete trucks and pump trucks	Struck or crushed by moving equipment	Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Cave-in.	Keep concrete trucks several feet back from the edge of open trenches.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Place and Finish Concrete Flatwork			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
	Electric shock, fires	Pump trucks should be staged in a location where the operator has a good view of the entire pour and where the boom can not come in contact with high voltage electrical lines.			
11. Place concrete, shovel mud	Strains from lifting or pulling	Place concrete as close to its final location as possible			
		Don't be too aggressive when moving heavy or wet material.			
	Striking and injuring co-workers	Be aware of your surroundings while moving materials			
	Eye Injury	Wear safety glasses with side shields or goggles			
	Chemical burns	Wear rubber boots and avoid getting wet concrete on exposed skin.			
		Wash skin as soon as possible			
12. Walking on a rebar mat	Tripping and falling	Watch your step. Don't run or try and move too quickly.			
13. Screed concrete	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points, especially when using a power screed with moving parts.			
14. Float and trowel concrete	Striking and injuring co-workers	Be aware of the location of other workers, especially when using long handled tools.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
17. Apply curing compound	Burns, eye irritant, Airway irritation, silicosis	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
18. Clean up	Trips, slips, falls Puncture wounds- nails	Clean up work area at the end of each shift. remove protruding nails from scrap form lumber and stack materials in designated lay down areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Place and Finish Concrete Flatwork**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements

Inspect. Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Concrete Reinforcement**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Cement Masons	Cement Masons not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Cement Masons.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, unload and store material	Crushing or pinching hands or feet	When moving pallets or individual sacks of material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move material with a forklift	See Job Hazard Analysis on Forklift Operation				
5. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Only use tools for their intended use.			
		Grinders are equipped with properly functioning manufacture installed guards.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
7. Refuel grout pump and/or mixer	Fires, explosions, burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
8. Layout, communication, and preparatory instructions	Lack of coordination between finishers- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
9. Prep substrate to receive product	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes			
	Hazardous dust inhalation, silicosis	Wear a dust mask at any time when grinding, crushing (chipping) or mixing cementious materials.			
	Impact injuries- hammer	Keep hand several inches away from whatever you are hitting with a hammer			
10. Cleaning surfaces with compressed air	Hazardous dust inhalation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Broom clean the area prior to cleaning with air to minimize the amount of dust that will be blown into the air.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Reinforcement

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Stand up wind from the air nozzle.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
11. Mix resurfacing product	Crushed or pinched, or caught between machine parts	Do not place body parts near or between pinch points on the mixer.			
		Do not wear loose clothing that could get caught in the machine.			
	Impact injuries from spinning tool	Drills used for mixing are equipped with constant pressure switch. This means the tool stops when the trigger is released.			
	Eye Injury	Wear safety glasses with side shields or goggles			
12. Move material	Pulls and Strains from lifting	Use a mechanical lift such as a dolly or wheelbarrow when moving heavy materials			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Balance your load by carrying two partially full buckets one in each hand instead of one full bucket.			
13. Spread or pump material with a grout pump	Struck by material	Never point the material hose at yourself or other workers even it is not currently pumping.			
		Make sure all hose connections are properly secured.			
14. Float and/or trowel on resurfacing product	Burns, eye irritant, sickness, silicosis	Read through the MSDS for the product that you are applying. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
	Chemical burns	Avoid getting wet product on exposed skin.			
		Wash skin as soon as possible			
	Cuts, and scrapes	Wooden handles for tools must be secured tightly in the tool and free of cracks and splinters.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
17. Clean up	Trips, slips, falls Puncture wounds- nails	Clean up work area at the end of each shift. remove protruding nails from scrap form lumber and stack materials in designated lay down areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Reinforcement

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date		
Forklift	Forklift- prior to each shift	AHA training of each cement mason			
Chipping hammer	Inspect tools and equipment				
Grinders					
Trowels					
Drill					
Mixer					
Buckets					

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Formwork for Deck Pour

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Carpenters	Carpenters not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Carpenters.			
2. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Organize work area, keep hoses and cords clear of traffic lanes.			
		Clean up scrap material & debris before and after working in an area.			
3. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
4. Check power tools for safe operation	Defective or improperly functioning power tools	Tag defective tools and remove them from the workplace.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saw blades have properly functioning manufacture installed blade guards.			
		Hand held power tools (saws, air impact) are equipped only with a constant pressure switch.			
		Devices provided on air power tools to prevent tools from becoming accidentally disconnected from hose.			
5. Setting up and using ladders	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
	Falling from ladder	Use the proper size of ladder for the job			
		Do not work from the top two steps of the ladder			
		Do not work from a step ladder leaned against a wall.			
		Do not move a ladder while you are on it			
	Tools falling from a ladder	Do not move a ladder with tools on it			
6. Moving material (shores, plywood, lumber)	Strains from lifting	Get help when moving/heavy materials, use a mechanized lift if necessary.			
		Use proper lifting technique			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving materials			
		See Job Hazard Analysis on operating a forklift			
7. Setting up shores and/or scaffolding	Scaffolds or shores collapsing and injuring workers. Parts or pieces falling and injuring workers.	Always follow the manufacturers recommend installation procedures when installing a shoring system.			
		Never leave structural elements unbraced where they could tip over or be blown over.			
	Crushing or pinching body parts	Keep hands, fingers, and other body parts away from pinch points.			
		Communicate clearly with co-workers			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Formwork for Deck Pour

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
11. Cut lumber, or form components	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Saw kick backs	Never cut pieces from stock which is shorter than 8"			
		Do not cut too fast.			
		Hold the saw steady (parallel with the direction of the cut).			
		Do not stand directly behind the saw.			
		Do not cut a radius with a circular or worm drive saw.			
	Cutting fingers	Keep fingers at least 6" from the blade. Use a clamp to hold small pieces.			
		Never pin back the guard on a worm drive saw.			
	Cuts, abrasions	Take your finger off the switch when carrying a plugged in tool.			
		Unplug all tools before making any repairs or adjustments.			
	Flying particals- eye damage	Wear goggles or safety glasses with side shields			
8. Cut lumber using a chop saw or radial arm saw	Cutting fingers or hands	Make sure the saw is securely fastened to a stand, table or bench that will prevent the saw from shifting or tipping while in use. Set up other supports as nessesary to facilitate easy handling of the work piece.			
		Cut short pieces from long stock and hold the long end of the piece.			
		Keep fingers at least 8 inches from the blade			
		Radial arm pull saws shall be equipped with an automatic return device, returning the saw blade to the resting position.			
	Injuries to eyes or ears	Wear eye glasses and ear protection			
9. Set prebuilt forms and large structural elements	Unexpected movements	Before moving a beam make sure that all workers are in a secure position, are aware of the move, and are tied off.			
	Strains from lifting	Know how much you can safely lift. Rules above apply.			
	See AHA for Crane Operation				
	Materials striking and injuring workers	Ensure that there is good communication between workers and the lift operator.			
	Crushed by falling material	Never walk under a raised load.			
10. Working from an elevated position	Falling	Whenever you are working from an elevated location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		Workers must wear a full body harness and lanyard secured to a safe anchorage point. This may be a bracket specifically designed for fall protection or a structural member.			
		Lines shall be checked after each move to ensure correct length.			
11. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Formwork for Deck Pour**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
	Sunburn	Use sunscreen
12. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. remove waste and stack materials in designated lay down areas.

Equipment to be Used	Inspection Requirements	Training Requirements
Chop saw	Inspect tools and equipment	AHA training of each carpenter
Skill saw		
nail guns		
compressor		

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Formwork for Deck Pour

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Carpenters	Carpenters not trained in safe execution of task	Use this Activity Hazard Analysis, and other formal and informal training to train Carpenters.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving forms or lumber keep hands and feet clear of pinch points. Stack lumber on stickers.			
		Store forms or form components in such a manner that they will not be blown or knocked over.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move forms or lumber with a forklift	See Activity Hazard Analysis on forklift operation				
5. Roll out tools and set up equipment	Tripping - Hoses, Cords, Compressor	Keep corridors and high traffic areas free of cords, hoses, & other equipment.			
		Completely unroll all hoses and cords, avoid tangles			
		Arrange hoses and cords in an orderly fashion.			
		Clean up scrap materials and debris before and after working in an area.			
6. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
7. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws are equipped with properly functioning manufacture installed guards.			
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
	Puncture wounds	Pneumatic nailers have a functioning safety device on the muzzle to prevent ejection unless muzzle in contact with work surface.			
8. Set up and align chop saw or radial arm saw	Saw tipping or moving while in use	Fasten saw securely to stand; Stand or workbench must be strong, level, and resists tipping			
		Roller stands, saw horses, or tables should be used to support long or awkward pieces of lumber.			
9. Layout, communication, and preparatory instructions	Lack of coordination between Carpenters- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
10. Spread forms or move lumber into position	Pulls and Strains from lifting	Get help when moving heavy forms, panels or lumber, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Formwork for Deck Pour

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Impalement from falls on rebar	All rebar which is below the level where formwork is ongoing onto which workers could fall must be protected with square type rebar caps.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers.			
11. Cut lumber, or form components	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Saw kick backs	Never cut pieces from stock which is shorter than 8"			
		Do not cut too fast.			
		Hold the saw steady (parallel with the direction of the cut).			
		Do not cut a radius with a circular or worm drive saw.			
	Cutting fingers	Keep fingers at least 6" from the blade. Use a clamp to hold small pieces.			
		Never pin back the guard on a worm drive saw.			
	Cuts, abrasions	Take your finger off the switch when carrying a plugged in tool.			
		Unplug all tools before making any repairs or adjustments.			
	Flying particals- eye damage	Wear goggles or safety glasses with side shields			
	Splinters or abrasions	Wear gloves when handling rough cut lumber or sharp steel.			
	Hazardous noise- hearing loss	Wear foam ear plugs when using any saws or other noisy power tools or when working in noisy areas.			
12. Position and fit forms and lumber	Crushing or pinching body parts	Keep fingers, hands, and feet clear of all pinch points.			
		Communicate clearly with coworkers.			
13. Erect forms	Forms collapsing or falling crushing workers. Parts or pieces falling and injuring workers.	Always follow the manufacturers recommend installation procedures when installing a forming system.			
		Never leave structural elements unbraced where they could tip, be blown, or knocked over.			
		Secure the form components as soon as possible.			
14. Fasten forms and/or lumber in place	Nailing fingers/hands, fastener ricochet	Fire nail and staple guns by depressing the trigger not by banging the muzzle of the gun against the work piece.			
	Nailing fingers/hands	Keep hands clear of gun, do not disable safety trigger			
	Flying particles- eye damage	Wear goggles or safety glasses with side shields when using hammers and pneumatic tools.			
	Smashed fingers	Keep free hand several inches away from whatever you are hitting with a hammer			
	Dropping lumber, scrap, or tools on workers	Do not allow workers below the level from which you are working unless they are protected from falling objects.			
	Tripping, slipping, and falling	Keep work area beneath your feet clear hoses, cords, scrap, and equipment. Pick it up and move it out of the way; don't trip over it.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Formwork for Deck Pour

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
15. Hoist and set large forms and form components (Crane work)	Unexpected movements	Before moving or hoisting the form make sure that all workers are in a secure position, are aware of the move, and are tied off.			
	Strains from lifting	Know how much you can safely lift. Rules above apply.			
	Materials striking and injuring workers	Ensure that there is good communication between workers and the lift operator.			
	Crushed by falling material	Never walk under a raised load.			
	Swinging loads striking and injuring workers	Use a tag line on all loads to help stabilize the load and maneuver it into position.			
	See Activity Hazard Analysis on Crane Operation				
16. Install form material from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
17. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
18. Working from an elevated position	Falling	Whenever you are working from an elevated location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		Workers must wear a full body harness and lanyard secured to a safe anchorage point. This may be a bracket specifically designed for fall protection or a structural member.			
		Lines shall be checked after each move to ensure correct length.			
19. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
20. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Formwork for Deck Pour

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Only persons trained in first aid should be allowed to administer first aid.			
21. Erecting and using scaffolding	See Activity Hazard Analysis on Erecting and Using Scaffolding.				
		Set up scaffolds at a comfortable distance from the work and at the proper height.			
22. Using compressed air	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
23. Cleaning surfaces with compressed air	Airway irritation, eye injuries	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
24. Clear scrap and debris from the work area	Debris striking and injuring workers below	Never throw or drop scrap and debris to a lower level unless that drop area has been cautioned/barricaded off to prevent workers from entering the area.			
25. Roll up Equipment & Clean-up	Slipping, Tripping, or falling, and Delayed Egress	Store equipment out of the way. Roll up hoses and cords at end of day			
		Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
		Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Crane	Crane- prior to each shift	AHA training of each carpenter	
Forklift	Forklift- prior to each shift		Inspector's Signature
Chop saw	Inspect tools and equipment		
Skill saw			
nail guns			
compressor			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Formwork for Walls and Columns

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Cement Masons	Cement Masons not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Cement Masons.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
	Impact injuries; splinters	Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Refuel gas powered tools	Fires, explosions, burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
6. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a respirator and goggles in addition to the standard PPE when cleaning with compressed air.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
7.Check preparations for pour	Hazardous release of energy- form failure	Check forms and bracing of forms to ensure there are no missing or weak sections.			
	Impalement from falls on rebar	All rebar which is below the level where concrete placement will be ongoing, onto which workers could fall must be protected with square type rebar caps.			
8. Layout, communication, and preparatory instructions	Lack of coordination between finishers- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
9. Apply form oil	Chemical burns, eye irritant, damage due to long term occupational exposure	Read through the MSDS for form oil that you will be using. Wear the PPE required for the chemical.			
10. Staging concrete trucks and pump trucks	Struck or crushed by moving equipment	Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Cave-in.	Keep concrete trucks several feet back from the edge of open trenches.			
	Electric shock, fires	Pump trucks should be staged in a location where the operator has a good view of the pour and where the boom can not come in contact with high voltage electrical lines.			
11. Place concrete	Strains from lifting or pulling	Place concrete as close to its final location as possible			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Formwork for Walls and Columns

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Don't be too aggressive when moving heavy or wet material.			
	Eye Injury	Wear safety glasses with side shields or goggles during all placement operations.			
	Chemical burns	Avoid getting wet concrete on exposed skin; wash skin as soon as possible			
12. Place concrete using a concrete pump.	Pulls or strains; Losing control of the material hose	Do not try to pull the hose too far away from the boom wait for the boom operator to move the boom.			
		Use a tag line attached to the boom to prevent sudden or uncontrolled movements.			
	Striking and injuring co-workers	Be aware of your surroundings and the location of coworkers.			
13. Vibrate concrete	Hazardous noise	Wear foam ear plugs when working with noise equipment or in noisy areas.			
14. Screed concrete	Tripping and falling	Watch your step, especially when work on a scaffold.			
	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points, especially when using a power screed with moving parts.			
15. Float and/or trowel concrete, working from a scaffold	Defective scaffold components	Inspect scaffolds and scaffold components for defects before each work shift. Replace defective components.			
	Falling	Do not horse play on or around scaffolding.			
		Do not work on a scaffold during storms or high winds.			
		Do not use a ladder on a scaffold to increase your working height.			
	Falling objects	Be careful to not drop tools or material from the scaffold			
	Slipping, tripping, or falling.	Remove debris and waste materials from work platform at regular intervals and at the end of each shift.			
	See AHA on Scaffold Erection and Use				
16. Working from an elevated location	Falling	Whenever you are working from an elevated location that is 6' or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		Workers must wear a full body harness and lanyard secured to a safe anchorage point. This may be a bracket specifically designed for fall protection or a structural member.			
		Lifelines shall be checked after each move to ensure correct length.			
	Equipment failure- falling	Inspect personal fall arrest equipment (lanyard, harness, D-rings), for frays, burns, hair line cracks, or other defects prior to use.			
17. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Formwork for Walls and Columns

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
18. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
19. Apply curing compound	Burns, eye irritant, Airway irritation, silicosis	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
20. Clean up	Trips, slips, falls Puncture wounds- nails	Clean up work area at the end of each shift. remove protruding nails from scrap form lumber and stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements
Vibrators	Inspect tools and equipment	AHA training of each worker
trowel		
screed		
Boom pump		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Place and Finish Concrete

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Cement Masons	Cement Masons not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Cement Masons.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
	Impact injuries from spinning tool	Hand held power tools, and power trowels are equipped only with constant pressure switch. This means the tool stops when the trigger is released.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Refuel power tools	Fires, explosions, burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
6. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
7.Check preparations for pour	Hazardous release of energy- form failure	Check forms and bracing of forms to ensure there are no missing or weak sections.			
	Impalement from falls on rebar	All rebar which is below the level where concrete placement or finishing operations will be ongoing onto which workers could fall must be protected with square type rebar caps.			
8. Set screed pins and lumber	Impact injuries- hammer	Keep hand several inches away from whatever you are hitting with a hammer			
9. Layout, communication, and preparatory instructions	Lack of coordination between finishers- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
10. Staging concrete trucks and pump trucks	Struck or crushed by moving equipment	Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Cave-in.	Keep concrete trucks several feet back from the edge of open trenches.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Place and Finish Concrete

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Electric shock, fires	Pump trucks should be staged in a location where the operator has a good view of the entire pour and where the boom can not come in contact with high voltage electrical lines.			
11. Place concrete, shovel mud	Strains from lifting or pulling	Place concrete as close to its final location as possible			
		Don't be too aggressive when moving heavy or wet material.			
	Striking and injuring co-workers	Be aware of your surroundings while moving materials			
	Eye Injury	Wear safety glasses with side shields or goggles			
	Chemical burns	Wear rubber boots and avoid getting wet concrete on exposed skin.			
		Wash skin as soon as possible			
12. Walking on a rebar mat	Tripping and falling	Watch your step. Don't run or try and move too quickly.			
13. Screed concrete	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points, especially when using a power screed with moving parts.			
14. Float and trowel concrete	Striking and injuring co-workers	Be aware of the location of other workers, especially when using long handled tools.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
17. Apply curing compound	Burns, eye irritant, Airway irritation, silicosis	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
18. Clean up	Trips, slips, falls Puncture wounds- nails	Clean up work area at the end of each shift. remove protruding nails from scrap form lumber and stack materials in designated lay down areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Place and Finish Concrete

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
Vibrators	Inspect tools and equipment	AHA training of each finisher
Power trowel		
Vibratory screed		
Boom pump		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Dry Packing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Laborers	Laborers not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Laborers.			
2. Put on your personal protective equipment.	Head, or hand injury	You must wear a hard hat, long pants, work boots, safety glasses and gloves at all times.			
3. Receive material deliveries, unload and store material	Crushing or pinching hands or feet	When moving pallets or individual sacks of material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move material with a forklift	See Job Hazard Analysis on Forklift Operation				
5. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Only use tools for their intended use.			
		Grinders are equipped with properly functioning manufacture installed guards.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
7. Refuel grout pump and/or mixer	Fires, explosions, burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
8. Layout, communication, and preparatory instructions	Lack of coordination between finishers- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
9. Prep substrate to receive product	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes			
	Hazardous dust inhalation, silicosis	Wear a dust mask at any time when grinding, crushing (chipping) or mixing cementious materials.			
	Impact injuries- hammer	Keep hand several inches away from whatever you are hitting with a hammer			
10. Cleaning surfaces with compressed air	Hazardous dust inhalation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Broom clean the area prior to cleaning with air to minimize the amount of dust that will be blown into the air.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Dry Packing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Stand up wind from the air nozzle.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
11. Mix dry packing product	Crushed or pinched, or caught between machine parts	Do not place body parts near or between pinch points on the mixer.			
		Do not wear loose clothing that could get caught in the machine.			
	Impact injuries from spinning tool	Drills used for mixing are equipped with constant pressure switch. This means the tool stops when the trigger is released.			
	Eye Injury	Wear safety glasses with side shields or goggles			
12. Move material	Pulls and Strains from lifting	Use a mechanical lift such as a dolly or wheelbarrow when moving heavy materials			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Balance your load by carrying two partially full buckets one in each hand instead of one full bucket.			
13. Spread or pump material with a grout pump	Struck by material	Never point the material hose at yourself or other workers even it is not currently pumping.			
		Make sure all hose connections are properly secured.			
14. Float and/or trowel on dry packing product	Burns, eye irritant, sickness, silicosis	Read through the MSDS for the product that you are applying. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
	Chemical burns	Avoid getting wet product on exposed skin.			
		Wash skin as soon as possible			
	Cuts, and scrapes	Wooden handles for tools must be secured tightly in the tool and free of cracks and splinters.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
17. Clean up	Trips, slips, falls Puncture wounds- nails	Clean up work area at the end of each shift. remove protruding nails from scrap form lumber and stack materials in designated lay down areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Dry Packing

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
Scissor Lift	Scissor Lift- prior to each shift	AHA training of each laborer.
Chipping hammer	Inspect tools and equipment	
Grinders		
Trowels		
Drill		
Mixer		
Buckets		
Scaffolding	check for green tag	AHA training of each laborer.

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Shotcrete Walls and Ceilings

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers	Workers not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
	Impact injuries, splinters	Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
	Impact injuries from spinning tool	Hand held power tools (hammer drill, grinder) are equipped only with constant pressure switch. This means the tool stops when the trigger is released.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
5. Stage pump ring and refuel pump and compressor	Fires, explosions- burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
	Hazardous noise- hearing loss	Wear foam ear plugs when working around the pump rig.			
	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points on moving machine parts.			
6. Roll out hoses and cords and set up equipment	Tripping - Hoses, Cords, Compressor	Keep corridors and high traffic areas free of hoses and other equipment.			
		Arrange hoses and cords in an orderly fashion.			
	Pulls and Strains from lifting	Know how much you can lift. Get help when moving heavy equipment.			
		Convert lifting and lowering tasks to pulling and pushing.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
7. Set up scaffolding	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points, especially when setting up scaffolding and moving planking.			
	Scaffold tipping or shifting, falling from the scaffold	The working platform on scaffolds less 4' high must be at least 2 planks wide. Scaffolds between 4' and 6' high must have a fully planked work platform at least 45" wide.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Shotcrete Walls and Ceilings

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Horse or trestle scaffolds should only be one tier high.			
		Space horses (or plaster jacks) so that planking does not deflect more than 1/60th of the span. (5' span would deflect less than 1 inch)			
		Scaffolds including job built scaffolds must be capable of supporting 4 times the intended load.			
	See AHA for Scaffold Erection and Use				
8. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a respirator and goggles in addition to the standard PPE when cleaning with compressed air.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
9.Check preparations for shotcreting	Hazardous release of energy- form failure	Check forms and bracing of forms to ensure there are no missing or weak sections.			
	Impalement from falls on rebar	All rebar which is below the level where shotcreting operations will be ongoing onto which workers could fall must be protected with rebar caps.			
10. Set screed wires	Impact injuries- hammer	Keep free hand several inches away from whatever you are hitting with a hammer			
	Impact injuries, pulls, or strains hammer drill bit binding up	Hold the tool steady with arms flexed, and drill as straight a hole as possible.			
11. Staging concrete trucks and pump trucks	Struck or crushed by moving equipment	Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Cave-in.	Keep concrete trucks and other equipment several feet back from the edge of open trenches.			
12. Layout, communication, and preparatory instructions	Lack of coordination between Workers- mistakes.	Once shotcreting operations have commenced communication will be difficult. Make sure each worker understands what needs to be done and how the work will proceed before beginning.			
13. Shotcrete walls or ceiling	Strains from lifting or pulling	Get help as needed to move the material hose.			
	Hazardous noise- hearing loss	Wear foam ear plugs and ear muffs			
	Shooting and injuring co-workers	Never point an air or material hose at yourself or other workers even it is not shooting.			
	Eye Injury	Wear safety glasses with side shields or goggles			
	Chemical burns	Wear gloves and avoid getting wet concrete on exposed skin.			
		Wash skin as soon as possible			
14. Screed concrete	Falling material striking workers below	Do not screed above workers at a lower level.			
15. Float concrete	Tripping and falling	Watch your step. Don't try and move to quickly			
		Keep the surface you are standing on clear of equipment, debris, or unused material			
16. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Shotcrete Walls and Ceilings**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
18. Clean up	Trips, slips, falls Puncture wounds- nails	Clean up work area at the end of each shift. remove protruding nails from scrap form lumber and stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements
Pump rig (with concrete pump and air compressor)	Inspect tools and equipment	AHA training of each operator
3" material hose		
Air hoses		
hammer drill		
Misc. hand tools		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Resurfacing and Rehabilitation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Cement Masons	Cement Masons not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Cement Masons.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, unload and store material	Crushing or pinching hands or feet	When moving pallets or individual sacks of material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move material with a forklift	See Job Hazard Analysis on Forklift Operation				
5. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Only use tools for their intended use.			
		Grinders are equipped with properly functioning manufacture installed guards.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
7. Refuel grout pump and/or mixer	Fires, explosions, burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
8. Layout, communication, and preparatory instructions	Lack of coordination between finishers- mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
9. Prep substrate to receive product	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes			
	Hazardous dust inhalation, silicosis	Wear a dust mask at any time when grinding, crushing (chipping) or mixing cementious materials.			
	Impact injuries- hammer	Keep hand several inches away from whatever you are hitting with a hammer			
10. Cleaning surfaces with compressed air	Hazardous dust inhalation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Broom clean the area prior to cleaning with air to minimize the amount of dust that will be blown into the air.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Resurfacing and Rehabilization

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Stand up wind from the air nozzle.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
11. Mix resurfacing product	Crushed or pinched, or caught between machine parts	Do not place body parts near or between pinch points on the mixer.			
		Do not wear loose clothing that could get caught in the machine.			
	Impact injuries from spinning tool	Drills used for mixing are equipped with constant pressure switch. This means the tool stops when the trigger is released.			
	Eye Injury	Wear safety glasses with side shields or goggles			
12. Move material	Pulls and Strains from lifting	Use a mechanical lift such as a dolly or wheelbarrow when moving heavy materials			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Balance your load by carrying two partially full buckets one in each hand instead of one full bucket.			
13. Spread or pump material with a grout pump	Struck by material	Never point the material hose at yourself or other workers even it is not currently pumping.			
		Make sure all hose connections are properly secured.			
14. Float and/or trowel on resurfacing product	Burns, eye irritant, sickness, silicosis	Read through the MSDS for the product that you are applying. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
	Chemical burns	Avoid getting wet product on exposed skin.			
		Wash skin as soon as possible			
	Cuts, and scrapes	Wooden handles for tools must be secured tightly in the tool and free of cracks and splinters.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
17. Clean up	Trips, slips, falls Puncture wounds- nails	Clean up work area at the end of each shift. remove protruding nails from scrap form lumber and stack materials in designated lay down areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Concrete Resurfacing and Rehabilitation

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
Forklift	Forklift- prior to each shift	AHA training of each cement mason
Chipping hammer	Inspect tools and equipment	
Grinders		
Trowels		
Drill		
Mixer		
Buckets		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Brazing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers	Workers who are not trained in the safe execution of their task	Use this Activity Hazard Analysis, and other formal and informal training to train workers.			
2. Roll out equipment and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas clear of cords, hoses, and other equipment.			
		Clean up scrap materials and debris before and after working in an area.			
		Do not place compressed gas cylinders in traffic lanes or where they can be hit by vehicles or equipment.			
	Electric Shock	Power tools must be run on a GFCI protected circuit.			
3. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
4. Fire Control- move work or set up shielding or other controls	Fires, explosions- burns	If possible move objects to be brazed or cut to an area free of dangerous combustibles.			
		Clean up combustible trash and debris before working in an area.			
		Install noncombustible shielding to protect combustible wall or floor assemblies from flashes, sparks, and molten metal.			
		Always have an ABC rated fire extinguisher ready adjacent to the work.			
		Do not place cylinders where they will could be reached by sparks, hot slag or flames.			
5. Inspect tools and equipment	Injuries from defective equipment	Do not use defective tools or equipment. Remove them from jobsite.			
	Cuts, injuries from flying particles	Chop saws and grinders have properly functioning manufacture installed guards.			
	Interchanging of hoses	Gas hoses and the hose connections to the manifold shall not be interchangeable, and should be easily distinguishable from each other (oxygen-green, acetylene-red)			
	Fires due to oil or grease	Keep hose connections, cylinders, fittings, cylinder caps, valves, couplings, and regulators clean and free of oil and grease.			
5. Inspect tools and equipment	Leaking hose-fires and burns	Do not use a single hose having more than one gas passage. Make sure hoses are free of cuts and abrasions.			
		Make sure hoses are free of cuts and abrasions. Do not use a defective or potientially defective hose.			
	Leaking torch-fires and burns	Torches shall be inspected at the beginning of each shift for leaking valves, hose couplings and tip connections.			
6. Inspect compressed gas cylinders	Mistakes in the use of compressed gas	Learn how to read the stamping at the top of the cylinder.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Brazing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Use cylinders with oldest delivery date first.			
	Surges in gas pressure	Make sure that cylinders are equipped with suitable regulators.			
7. Lift and move materials and equipment	Pulls and Strains from lifting	Get help when moving/heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Be aware of your surroundings while moving materials, watch where you are going.			
8. Move or hoist a compressed gas cylinder	Fires and explosions	Unless the cylinder is secured in a cart the regulators must be removed and the valve protection caps installed before the cylinder is moved.			
		Do not hoist cylinders by their valve protection cap, or by using a magnet, or choker sling.			
		Move cylinders by tilting them and rolling them on their bottom edges.			
		Do not drop cylinders or premit them to strike together violently.			
		Never hoist a cylinder over or above workers.			
9. Prep and test surface of work	Hazardous fumes, flammable coatings	Do not braze or cut any surface covered by a preservative coating that is highly flammable. Test by burning scrapings of the coating in a non-flammable container.			
		When welding or cutting through preservative coatings the coating must first be stripped or a respirator must be worn. (this includes galvanized steel)			
10. Clamp and/or brace materials to be brazed into position	Steel falling or shifting before weld can be made	Brace, shim, clamp, or otherwise secure the materials that you are brazing so that they do not fall or move before the joint is completed.			
11. Braze	Eye injury.	Wear goggles with the proper level of shading (3-4).			
	Burns	Wear long gloves for hand and arm protection.			
	Asphyxiation, airway irratation	Ensure that there is natural or mechanical exhaust to the work area when brazing or cutting.			
	Burns	Be careful not to touch or rub against hot work.			
	Fires or explosions	Cylinders must be secured in an upright position at all times. A convient way to accomplish this is to use a welding cart with the cylinders chained to the cart.			
		Do not disable any safety appliances attached to a gas cylinder such has check valves, indicating devices, or control devices.			
	Inability to quickly shut off gas in case of an emergency	Be careful not to damage the regulator by opening and closing valves too quickly. If a special wrench is required to open the valve it should be left in place for shutting the valve off.			
	Leaking gas- fire or explosion	If a fuel gas cylinders is leaking at the valve stem, valve seat or in any other way the gas shall be shut off and the leak fixed. If the leak can not be fixed the cylinder shall be tagged as defective and removed from the jobsite.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Brazing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Do not light a torch by matches or from hot work use an approved friction lighter.			
12. Make cuts with a chop saw, or cut-off saw.	Cutting fingers	Keep fingers at least 6" from the blade. Use a clamp to hold small pieces.			
	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Saw kick backs	Cut short pieces from long stock and hold the long end of the piece.			
		Don't try to cut too quickly			
	Flying particles- Eye injury	Wear goggles or safety glasses with side shields			
13. Grind steel	Flying particles- Eye injury	Wear safety goggles or a face shield.			
	Burns, cuts or abrasions	Wear gloves when handling metal that is hot or has sharp edges.			
	Hazardous noise, hearing loss	Wear foam ear plugs grinding, cutting or working in noisy areas.			
14. Brazing from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
	Electric shock	Nonconductive ladders are recommended.			
	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
16. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
17. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never weld, cut, or burn through any Lead-containing material.			
18. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Brazing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
19. Store compressed gas cylinders, or fuel gas hoses	Fires and explosions	Store compressed gas cylinders secured in an upright position with valve protection caps in place.			
		Store fuel gas cylinders and oxygen cylinders in separate locations (20' apart) or incompartments divided by a fire rated wall.			
		Storage locations should be well-protected, ventilated, dry, and at least 20' from highly combustible materials.			
		Boxes used to store gas hose shall be ventilated.			
20. Clean up	Tripping -- waste and debris, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Compressed gas cylinders	Inspect cylinders and other equipment prior to each shift	Activity hazard training of each worker	
safety appliances			Inspector's Signature
gas hoses			
torch and striker			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Laying Undergroumd Pipe

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Plumbers	Plumbers not trained in the safe execution of their tasks	**Section I Indoctrination & Training 01.B.02** Use this Activity Hazard Analysis, and other formal and informal training to Train Plumbers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	**Section 5 P.P.E. 05.A.01 (A)** You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Locate utilities, layout excavation	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	**Section 25 Excavations 25.A.01 (A) (b)** Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
		Pot-hole for utilities to locate the exact location before beginning a full excavation. Hand excavate when nearing the utility so that it is not damaged.			
	Explosions of buried munitions, or military ordnance	Contact Explosive Ordnance Disposal (EOD) before commencing excavations in areas where there may be unexploded munitions or military ordnance.			
4. Saw cut pavements and/or slabs	**Section 13 Power Saws & Woodworking Machinery 13.C.02 (b)** See AHA on Saw Cutting				
3. Make a soil analysis	Failure to use the proper protection for the soil type	Analyze the soil through which the excavation will be made. Based on those observations, determine the required sloping/benching and/or shoring required for protection of workers in the excavation.			
5. Set up barricades and caution-off area.	People or vehicles falling into the excavation	**Safe Access 25.B** Set up warning barricades and caution off area where trenching is ongoing to prevent the entry of equipment or unauthorized personnel.			
		Do not allow persons other than construction workers near an excavation. If this is infeasible a guardrail with a midrail and toe board is required.			
		When vehicles are operated adjacent to an excavation set up stop logs, jersey barriers, or similar protection.			
	Overloading excavation- cave-in	Keep material (excavated spoils) and equipment a minimum of 2 ft. from the edge of the trench.			
6. Dig ditches, place sand bags for water control	Water undermining or overloading the walls of the excavation	**Section 25 Excavations 25.A.06 (2)** Where there is a danger of surface water entering the excavation dig ditches or place sand bags to prevent the water from reaching the excavation.			
7. Begin excavating- using power equipment	Striking and injuring co-workers with equipment or material	**Section 25 Excavations 25.A.02 25.A.D3 25.d.01** Be aware of the location of workers in and around the excavation at all times.			
		Never move excavated material, or shoring system components over or above workers.			
		Stand away from equipment that is loading or unloading excavated material.			
		Wear a hard hat at all times			
	See the AHA for Backhoe Operation				

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Laying Undergroumd Pipe			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
	Cave-in, crushed by	In trenches less than 5 ft. deep when it is determined by competent soil analysis that there is no potential for cave-in a protective system is not mandatory.			
	Cave-in, crushed by	When sloping or benching is used as the method of protection in an excavation the maximum slope shall be 1 1/2 horizontal to 1 vertical.			
		Sloping or benching shall be done following tabulated data or the design of a licensed engineer.			
	Crushed by roll-over	Machinery or equipment shall not be operated in a manner that will endanger persons or property nor shall the safe operating speeds or loads be exceeded.			
8. Install shoring	Failure of shoring system- cave-in	**Section 25 Excavations 25.D.04 25.D.05** Install the shoring system and components in accordance with the manufactures' recommendations. If you don't know, read the owner's manual, call the manufactures' rep. or ask your supervisor. Don't guess.			
	Crushed or pinched by, or falling	Do not ride or allow co-workers to ride in or on a trench box when it is raised or lowered into position.			
	Crushed by cave-in	Do not enter an unprotected trench to install shoring.			
		Make sure the excavation is never deeper than 2' below the base of the shoring system.			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
9. Lock-out and tag-out, live steam lines.	Burns	**Section 12 Lock Out / Tag Out 12.A.07** Live steam lines or equipment must be locked out and tagged before beginning work on those lines.			
		The lock should be your personal lock and the tag should have your name, the date and time on it (a pager or cell phone number is also helpful).			
10. Inspect the excavation	An unsafe excavation due to subsidence, water, or failure of shoring components.	**Section 25 Excavations 25.A.02 (A) (b) 25.A.06 25.B** Inspect the excavation, the adjacent areas, and all protective systems (shoring) before each shift and after each hazard-increasing occurrence such as rain.			
		Correct any unsafe conditions or prevent workers from entering the excavation.			
11. Excavating adjacent to buildings or retaining walls	Collapse of the adjacent structure or retaining wall	**Section 25 Excavations 25.A.04** Never excavate below the level of the footing of an adjacent building or retaining wall except under the direction of an approved engineered plan with engineered controls in place.			
12. Hand excavation, digging	Pulls and strains from digging	**Section 14 Material Handling Storage and Disposal 14.A. General 13.A** Don't be too aggressive when moving heavy or wet material.			
		Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Foot or leg injuries	Wear work boots and long pants			
13. Entering and exiting the excavation from a ladder	Delayed egress	**Section 25 Safe Access 25.B.05 (A) (B)** In trenches more than 4 ft. deep set up a ladder within 25 ft. of each worker in the excavation.			
	Ladders tipping or shifting- falling	Set up ladders on firm level footing. Level and compact the soil under the base of the ladder.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Laying Undergroumd Pipe			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
		Set up extension ladders so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. Tie off the top of the ladder and extend the side rails 36" above the excavation.			
		Set up two ladders for every trench over 5 ft. deep.			
	Ladder failure- Falling from ladder	Inspect ladders regularly. Do not use a defective ladder. Remove defective ladders from the jobsite.			
14. Cut piping	Sprains, cuts, bruises	**Section 13 Hand and Power Tools 13.A** All saws and grinders have properly functioning manufacture installed guards.			
		Saws are equipped only with a constant pressure switch.			
	Electric shock from defective tools.	**Section 11 Electrical 11.C.05** Use only GFCI protected outlets			
	Burns	**Section 13 Hand and Power Tools 13.A** Be careful not to touch a hot grinding wheel, or saw blade			
	Flying particles- Eye injury	**Section 5 P.P.E. 05.B** Wear goggles or a safety glasses with side shields for work which creates flying particles or dust such as hammers, chipping tools, grinders, or drills.			
	Hazardous noise, hearing loss	**Section 5 P.P.E. 05.C** Wear foam ear plugs when working in an area where sound pressure levels exceed 85 dB(A).			
	Burns, fires	**Section 9 Fire Prevention & Protection 09.B.04** Use approved metal safety cans used for handling and use of flammable liquids.			
15. Join pipe, install fittings	Dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	**Section 6 Hazardous Substances Agents & Environments 06.B** Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
	Skin irritation from glue	**Section 5 P.P.E. 05.A** Wear protective gloves when applying glues.			
	Pinch point, smashed fingers or hands	**Section 5 P.P.E 05.A** All pipe wrenches shall be in good repair and used only for the purpose for which designed.			
		Section 13 Hand and Power Tools 13A Keep body parts clear of pinch points when assembling or moving pipe and fittings.			
17. Lift and move pipe, tools, or equipment	Pulls and Strains from lifting	**Section 14 Material Handling, Storage & Disposal 14.A** Get help when moving heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Laying Undergroumd Pipe**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
		Never move materials over or suspended above workers.			
18. Set pipe using a lift or crane	Rigging braking, shifting, or coming loose	**Section 16 Machinery & Mechanized Equipment 16.C.14** Accurately estimate the weight of the pick, and use yoke, slings, or other rigging that can safely support the load.			
	Accidents due to not being able to see clearly	Make sure operator's view is unobstructed or a signal person is used as an aid.			
	Crushed by falling objects	Do not allow workers to stand or walk under the elevated load.			
	Falling from the machine	Never use the crane to hoist personnel.			
		Seat belt is worn while operating the machine.			
	Tipover	Know the operational limits of the machine and never exceed the limits.			
19. Concrete kickers- stage concrete trucks	Struck or crushed by moving equipment	**Section 16 Machinery & Mechanized Equipment 16.A** Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Cave-in.	**Section 25 Excavations 25.B** Keep concrete trucks and other equipment several feet back from the edge of open trenches.			
20. Responding to an emergency	Delayed emergency response- further injury or loss of life	**Section 1 Program Management 01.E** Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Section 1 Program management 01.E Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Section 3 Medical & First-Aid Requirements 03.A Only persons trained in first aid should be allowed to administer first aid.			
		Section 1 Program Management 01.D Report all accidents to your supervisor immediately.			
21. Working in a trench classified as a confined space	Engulfment, asphyxiation, or impairment of ability to self rescue.	**Section 6 Confined Space 06.1** An excavation becomes a confined space under the following conditions: there is only one point of egress, there is the potential of a hazardous atmosphere developing, or there is a potential for engulfment (example water is accumulating in the trench, or			
		Never enter a confined space except in accordance with the requirements of the AHA Working In Confined Spaces			
22. Remove shoring system and backfill trench	Cave-in, crushed by	**Section 25 Excavations 25.D** Backfilling and removal of shoring systems should progress together unless it is possible to remove the shoring from outside the excavation.			
		Begin removal of shoring at the bottom of the excavation and proceed towards the top.			
		Release jacks or braces slowly and note any possible kick-in of the bottom of the excavation or failure of the remaining supports.			
		When feasible pull out jacks or braces from above using a rope or other means.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Laying Undergroumd Pipe

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
23. Backfill and compact	Cave-in, crushed by	**Section 25 Excavations 25.D** Mechanical vibration increases the likelihood of a cave-in. Do not operate a compactor in an unprotected trench.			
24. Clean up	Tripping or falling into an open excavation	**Section 25 Excavations 25.B** Clean up work area at the end of each shift. Caution off area as needed.			

Equipment to be Used	Inspection Requirements	Training Requirements
Backhoe		
shoring system, trench box		
PVC saw, hand tools		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Plumbing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Plumbers	Plumbers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to Train Plumbers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
3. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of corridors and stairways.			
		Clean up scrap materials and debris (especially short pieces of pipe) before and after working in an area.			
4. Check electrical cords	Electric shock due to electrical cords with cuts or worn insulation	Dispose of or have an electrician repair faulty electrical cords			
		Check that ground prong is in tact.			
5. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, controls locked in off position, or physically removed from jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All Saw blades have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Use hand and power tools	Sprains, cuts, bruises	Use tools for their intended use.			
		Never disable the built in safety features on a tool.			
		Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
7. Use power tools	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, drills, hazardous substances which create dust, mist, and fumes			
8. Set concrete anchors - hammer drill	Injuries to eyes, hands and wrists, or ears	Wear safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs			
	Twists or sprangs due to drill bit catching	Hold the tool firmly with arms flexed and drill as straight a hole as possible.			
9. Cut Pipe- using the pipe machine	Cutting fingers or hands	Keep fingers at least 6 inches from dies and cutting wheels at all times			
		Don't wear loose clothing			
10. Lift and move material- pipe, fittings, act.	Pulls and Strains from lifting	Get help when moving/heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Plumbing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			
		Never move materials over or suspended above workers unless positive means have unless positive precautions have taken to protect workers.			
11. Working from a ladder-hanging pipe	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
		Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
12. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
13. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ie.. Man-holes, vats, silos, vaults, tunnels, ductwork, etc.. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
14. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
15. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
16. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Plumbing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
17. Soldering, Brazing, and other hot work	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your working area.			
		Know how to operate the fire extinguisher			
		Remove combustible scrap and debris from work areas daily. Store combustibles in approved locations/containers.			
		Use approved metal safety cans used for handling and use of flammable liquids.			
		Wear gloves when soldering & brazing			
	Ionizing radiation - eye injury	Wear shaded goggles or safety glasses when brazing			
18. Working with compressed gases	Fires and explosions	Do not place compressed gas cylinders in traffic lanes or where they can be hit by vehicles or equipment.			
		Store cylinders upright and secure to prevent falling.			
		Do not disable any safety appliances attached to a gas cylinder such has check valves, indicating devices, or control devices.			
19. Working with rolling scaffolding	Falling due to scaffold racking unexpectedly	All diagonal & horizontal bracing is in place to square the scaffold & prevent racking.			
	Falling due to scaffold moving unexpectedly	Wheel brakes are set whenever the scaffold is stationary.			
	Scaffold failure- falling	Forklifts, trucks, or other motor vehicles are not used to push the scaffold			
20. Working from a rolling scaffolding	Falling from scaffold, crushed by tipping scaffold.	**Never ride on the scaffold except under the following conditions:**			
		The floor across which the scaffold is moved is within 3 degrees of level, and is clean and free of all obstacles, such as cords, debris, holes, depressions etc..			
		When pushing scaffold force is applied as close to the base as possible			
		Height to width ratio is 2 to 1 or less. (i.e.. a 10' high scaffold is 5' wide)			
		No employee shall ride on any part of the scaffold that extends beyond the wheels.			
		Castor stems are pinned/secured to the scaffold legs.			
		Before the scaffold is moved all riders are made aware of the move.			
21. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			
22. Repairing underground water or sewer lines a. Excavate lines b. Repair PVC lines c. Repair galvanized lines	Backhoe turning over or striking a co worker	1. Machinery or equipment shall not be operated in a manner that will endanger persons or property nor shall the safe operating speeds or loads be exceeded. 2. The reverse signal alarms shall be in addition to requirements for signal persons. 3. Backhoe must have rollover protective structures.			
	Skin irritation from glue	Wear protective gloves when applying glues.			
	Pinch point	All pipe wrenches shall be in good repair and used only for the purpose for which designed.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Plumbing**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls

Activity Safety Inspection

Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
		AHA training of each Plumber

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Landscape Irrigation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train sprinkler installers	Installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to Train installers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
3. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of corridors and stairways.			
		Clean up scrap materials and debris (especially short pieces of pipe) before and after working in an area.			
4. Check electrical cords	Electric shock due to electrical cords with cuts or worn insulation	Dispose of or repair faulty electrical cords			
		Check that ground prong is intact.			
5. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, controls locked in off position, or physically removed from jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All Saw blades have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Use hand and power tools	Sprains, cuts, bruises	Use tools for their intended use.			
		Never disable the built in safety features on a tool.			
		Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
7. Use power tools	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, drills, hazardous substances which create dust, mist, and fumes			
8. Cut Pipe	Cutting fingers or hands	Keep fingers at least 6 inches from sawblades and cutting edges at all times			
		Don't wear loose clothing			
9. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Landscape Irrigation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
10. Soldering, Brazing, and other hot work	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your working area.			
		Know how to operate the fire extinguisher			
		Remove combustible scrap and debris from work areas daily. Store combustibles in approved locations/containers.			
		Use approved metal safety cans used for handling and use of flammable liquids.			
		Wear gloves when soldering & brazing			
	Ionizing radiation - eye injury	Wear shaded goggles or safety glasses when brazing			
11. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
		AHA training of each Installer	

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Ductwork

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Sheet Metal Workers	Sheet Metal Workers not trained in the safe execution of the task	Train Sheet Metal Workers			
2. Put on your personal protective equipment.	Head or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, store ductwork	Crushing or pinching hands or feet	When moving ducting keep hands and feet clear of pinch points.			
		Store ductwork in a location where they will not be blown or knocked over, or create a tripping hazard.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Communicate clearly with coworkers.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of traffic lanes. Completely unroll all cords to avoid tangles			
		Clean up scrap materials and debris before and after working in an area.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Check power tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
7. Set up and use ladders	Ladders tipping or shifting while in use causing worker to fall	Set up ladders on firm level footing			
	Falling from ladder	Use the proper size of ladder for the job			
		Do not work from the top two steps of the ladder			
		Do not work from a step ladder leaned against a wall.			
8. Move ladders	Tools or Materials falling from ladders	Do not move ladder while you are on it			
		Do not move ladder with tools on it			
9. Move Ductwork	Strains from lifting	Get help when moving/heavy materials, use a mechanical lift if necessary.			
	Cuts and abrasions	Wear gloves			
10. Cut Ductwork	Cuts and metal splinters	Wear gloves			
11. Set hangers and straps, use powder actuated tools	Injuries to eyes, hands and wrists, or ears	Wear personal protective gear including safety goggles, ear plugs, and gloves			
		Never use a powder actuated tool unless you have been trained and certified in its use.			
		Hold the tool firmly perpendicular to the work surface.			
	See AHA on Using Powder Actuated Tools				

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Ductwork

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
12. Lift ductwork into place-overhead	Falling from ladders/scaffolds	Set up ladders/scaffolds at the correct distance from work and at proper height			
	The ductwork falling and injuring worker	Set all hangers and make other necessary preparations prior to lifting ductwork into place.			
		Use a mechanical/hydraulic lift for large sections. Learn how the lift works before using it.			
13. Secure Duct	Injuries to eyes	Wear safety glasses with side shields when using a screw gun or hammer.			
	The ductwork falling and injuring worker	Make sure the piece is adequately supported until it is permanently fastened into place.			
	Smashed fingers	Keep hands and fingers clear of any pinch points			
14. Seal Ductwork	Dizziness, nausea, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
15. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements
Powder Actuated Tools	Tools and equipment- prior to each shift.	AHA training of each Sheetmetal Worker
Ladders		
Hand tools		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Duct Cleaning

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Laborers	Laborers not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Laborers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Whenever cleaning operations create dusts you must wear a dust mask or respirator.			
3. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Arrange cords in an orderly fashion, and completely unroll all cords to avoid tangles			
		Clean up scrap steel & debris before and after working in an area.			
4. Check electrical cords	Electric shock due to electrical cords with cuts or worn insulation	Dispose of or have an electrician repair faulty electrical cords			
		Check that ground prong is in tact.			
5. Inspect tools prior to use	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, controls locked in off position, or physically removed from jobsite.			
		Only use tools for their intended use.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Remove registers and grills - from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Use step ladders only in fully open position.			
7. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
8. Cut holes in duct work	Cutting fingers or hands	Be careful to keep hands and arms away from sharp edges of duct.			
		Wear gloves when you must handle sharp edges.			
	Injuries to eyes or ears	Wear safety glasses and ear protection when drilling holes			
9. Crawling the duct-cleaning	Cuts and abrasions	Avoid sharp edges and protruding screws.			
	Asphyxiation	Never enter a duct, except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
	Airway irritation, and/or injury due to long term occupational exposure	Always wear a respirator when cleaning inside a duct.			
10. Using compressed air	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
		Ensure devices are provided on air power tools to prevent tools from becoming accidentally disconnected from hose.			
11. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound levels are high.			
12. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Duct Cleaning

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before handling any material that may contain asbestos.			
15. Clean up	Slipping, Tripping, or falling	Clean up work area at the end of each shift. Remove equipment from hallways and stairways			

Equipment to be Used	Inspection Requirements	Training Requirements
Drills	Air sampling and monitoring of confined spaces	AHA training of each laborer
Snips		Confined space entry
Air cleaner/Vac		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Control Equipment Installation and Wiring

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Technicians	Technicians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Technicians.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
3. Roll out cords and tools, set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of traffic lanes. Completely unroll all cords to avoid tangles			
		Clean up scrap materials and debris before and after working in an area.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		Use electrically insulated hand tools.			
		Screw gun are in good condition; housing is not cracked.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Drill holes and set anchors, install brackets	Impact injuries, pulls and strains	Avoid binding the drill bit, causing the drill body to spin. Hold the drill steady, don't force the drill.			
	Hearing loss	Wear foam ear plugs when working in noisy areas or with loud tools such as a hammer drill.			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work which creates flying particles or hazardous dust, mist, or fumes.			
7. Install devices or equipment	Sprains, cuts, bruises	Always use the right tool for the job. Don't use a screw driver as a chisel or punch.			
		Never disable the built in safety features on a tool.			
	Electrocusion	Double check that there are no hot wires or equipment at the location of the work.			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
	Impact injuries, cuts and abrasions	Hand tools to coworkers handle first; do not throw them.			
	Dropping scrap material or tools on workers.	Do not allow workers below the level at which you are working unless they are protected from falling objects.			
8. Lift and move materials and equipment	Pulls and Strains from lifting	Get help when moving heavy materials, use a hand truck or wheelbarrow when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			

JOB SAFETY ANALYSIS

Project Description	JSA Description
East County Substation Project	Control Equipment Installation and Wiring

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
9. Work or program equipment from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
10. Move ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
	Electric shock	Use a nonconductive ladders when working near energized electrical lines or equipment.			
11. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels exceed 85 dB(A) time-weighted ave. over 8 hrs.			
12. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
13. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
14. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
15. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Control Equipment Installation and Wiring**

Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**

Equipment to be Used	Inspection Requirements	Training Requirements
Step ladders		AHA training of each Technician

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Above Ground Storage Tanks

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Plumbers	Plumbers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to Train Plumbers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
3. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords & other equipment clear of corridors and stairways.			
		Clean up scrap materials and debris (especially short pieces of pipe) before and after working in an area.			
4. Check electrical cords	Electric shock due to electrical cords with cuts or worn insulation	Dispose of or have an electrician repair faulty electrical cords			
		Check that ground prong is in tact.			
5. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, controls locked in off position, or physically removed from jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All Saw blades have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
6. Use hand and power tools	Sprains, cuts, bruises	Use tools for their intended use.			
		Never disable the built in safety features on a tool.			
		Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
7. Use power tools	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, drills, hazardous substances which create dust, mist, and fumes			
8. Set concrete anchors - hammer drill	Injuries to eyes, hands and wrists, or ears	Wear safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs			
	Twists or sprangs due to drill bit catching	Hold the tool firmly with arms flexed and drill as straight a hole as possible.			
9. Cut Pipe- using the pipe machine	Cutting fingers or hands	Keep fingers at least 6 inches from dies and cutting wheels at all times			
		Don't wear loose clothing			
10. Lift and move material-pipe, fittings, act.	Pulls and Strains from lifting	Get help when moving/heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Above Ground Storage Tanks

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			
		Never move materials over or suspended above workers unless positive means have unless positive precautions have taken to protect workers.			
11. Working from a ladder-hanging pipe	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
		Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
12. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
13. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ie.. Man-holes, vats, silos, vaults, tunnels, ductwork, etc.. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
14. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
15. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
16. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			

JOB SAFETY ANALYSIS

Project Description	JSA Description
East County Substation Project	Above Ground Storage Tanks

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
17. Soldering, Brazing, and other hot work	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your working area.			
		Know how to operate the fire extinguisher			
		Remove combustible scrap and debris from work areas daily. Store combustibles in approved locations/containers.			
		Use approved metal safety cans used for handling and use of flammable liquids.			
		Wear gloves when soldering & brazing			
	Ionizing radiation - eye injury	Wear shaded goggles or safety glasses when brazing			
18. Working with compressed gases	Fires and explosions	Do not place compressed gas cylinders in traffic lanes or where they can be hit by vehicles or equipment.			
		Store cylinders upright and secure to prevent falling.			
		Do not disable any safety appliances attached to a gas cylinder such has check valves, indicating devices, or control devices.			
19. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Tools and Equipments	Tools and Equipments	AHA training of each Plumber	

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Pull Electrical Wire

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Electricians	Electricians not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train electricians.			
2. Put on your personal protective equipment	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out	Crushing or pinching hands or feet	When moving spools of wire, keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
4. Roll out cords and tools, set up workplace	Slipping, tripping, or falling, and delayed egress.	Clean up scrap materials an debris before and after working in an area.			
	Falls through floor openings	Floor openings, holes must be covered with plywood or other covering that will prevent workers or equipment from falling through the opening. The cover should be marked "hole or opening".			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
	Fires and exlposions, burns	Ensure that a portable ABC rated fire extinuisher is always within 100 ft of your work area.			
5. Check electrical cords	Electrocution - faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible.Repairs must preserve the original electrical andmechanical integrity of the cord. Electrical tape fixesare prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Layout, communication, and preparatory instructions	Lack of coordination between Electricians - mistakes.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
		Check two way radios other communication equipment to ensure proper operation.			
7. Lock out and tag out all sources of electrical energy	Electrocution	Except for work that must be performed on energized equipment, all circuits or equipment that are energized or may become energized umst be locked out and tagged before beginning work on those circuits or equipment.			
		Make sure the locking device is installed correctly.			
		The lock should be your personal lock and the tag should have your name, the date, and time on it (a pager or cell phone number is also helpful).			
		Make sure that the right circuit or equipment has been lock out. Dlouble check that there are no hot wires or equipment at the location of the work.			
8. Inspect tools (wire tugger)	Injuries from defective or broken tools	Tag Defective tools/equipment as unsafe and remove them from the jobsite.			
	Electric shock from defective tools.	Use only GFCI protected outlets			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Pull Electrical Wire

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
9. Set up wire tugger	Machine anchorage breaking - unexpected movements	Set up the machine on a firm level surface out of high traffic areas.			
		Make sure that the tugger is securely anchored to a substantial structural member or surface.			
	Crushed or pinched body parts	Keep fingers and hands away from all pinch points			
10. Lift and move spools of wire, tools, or equipment	Pulls and Strains from lifting	Know how much you can safely lift, use a mechanical lift when possible			
11. Pull Wire	Electrocution	Protect all live areas/equipment when pulling into a hot gear. Wear proper protective gear.			
		Make sure your fish tape is not going into a live panel or box.			
	Slipping and falling	Clean up spilled wire pull soap (lube) immediately.			
12. Cut wire	Cuts	Keep fingers several inches from cutting blades.			
		Never disable the built in safety features on a tool.			
		Hand tools to coworkershandle first; do not throw them.			
13. Pull wire from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing.			
		don’t' work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a ladder.			
		Choose the correct size of ladder for the job.			
	Ladder failure - falling from ladders	Ladders just be inspected regularly and tagged "do not use" if defective. Remove defective ladders from the jobsite.			
14. Move the ladder	Tools or Materials falling from ladders	Use only nonconductive ladders.			
		Do not move ladder with tools on it.			
15. Pull wire on a Scaffold	See AHA on Scaffold Erection and Use				
16. Responding to an emergency	Delayed emergency response - further injury or loss of life	Respond quickly and decisively in case of an accident.Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Report all accidents to your supervisor immediately.			
17. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Pull Electrical Wire

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
18. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Manholes, vats, silos,vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the ARA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
19. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
20. Working from a scissor lift	See Job Hazard Analysis on operating a scissor lift				
21. Clean up	Tripping - waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements
Wire tugger	Tools and equipment - prior to use	AHA training of each Electrician
cable cutters		
fish tape		
hand tools		

Inspect. Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Lead/Asbestos Abatement on Roofs

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	See Activity Hazard Analysis on Scissor and Boom Lift Operation				
2. Train Lead / Asbestos Abatement Laborers	See Activity Hazard Analysis on Lead and Asbestos Abatement Laborers.				
3. Put on your personal protective equipment.	Head or foot injury.	You must wear a hard hat, long pants, and work boots at all times.			
4. Install safe anchorage points for fall protection system.	Falling	Anchorage points should be installed on roof ridges and hips so that all work can be completed within a 30 degree swing radius on either side of the anchor point.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
6. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
7. Clear scrap and debris from the roof	Debris striking and injuring workers below	Barricade off drop area onto which scrap is thrown from the roof. Have someone on the ground to prevent anyone from entering this area.			
		As always hard hats are manditory.			
8. Working from an elevated position	Falling	Whenever you are working on roof or other location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		Workers must wear a full body harness and lanyard secured to a roof anchor bracket.			
		Lanyard shall be adjusted so that it will not allow the worker to fall further than 2 feet from the roof area.			
		Lines shall be checked after each move to ensure correct length.			
9. Setting up and using ladders	Ladders tipping or shifting while in use causing worker to fall	Set up ladders on firm level footing. Level the dirt beneath the base of the ladder.			
	Falling from ladder	Use the proper size of ladder for the job			
		Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
10. Getting on and off the roof- using a ladder	Loosing balance and falling	Keep at least one hand free when ascending and descending a ladder.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Lead/Asbestos Abatement on Roofs

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing or roof edge.			
11. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
12. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
13. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
14. Clean up	Tripping, cuts, and scrapes	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements
Forklift	Forklift prior to each shift	Activity hazard training of each worker
Ladders	Ladders prior to use	
Tin snips	Tools and equipment prior to use	
Steel cutoff saw		
Vise grips		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Insulation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train installers	installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train installers.			
2. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
3. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
4. Inspect tools	Injures from defective or broken tools	Tag Defective tools equipment as unsafe and remove them from the jobsite.			
		All Saw blades have properly functioning manufacture installed guards.			
		Hand held power saws are equipped only with constant pressure switch.			
	Electric shock	Use only GFCI protected outlets			
5. Install epoxy pins/anchors (blanket insulation)	Chemical burns, nausea, or cumulative damage due to long term occupational exposure	Read through the MSDS for every epoxy that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			
6. Cut insulation	Cut by utility knife, or razor blades	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
	Flying particles- Eye injury	Wear safety goggles for any work that creates hazardous dust, mist, or fumes.			
	Skin or airway irration	Wear a dust filtering respirator, gloves, and long sleaved shirt.			
7. Move insulation into position	Trips and falls	Be aware of your surroundings while moving bulky or akward materials, watch where you are going.			
8. Install insulation	Head injuries, hazardous particles	Wear your hard hat, safety goggles, gloves, and respirator.			
	Dropping tools or equipment	Do not allow workers below the level at which you are working.			
9. Install insulation from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Insulation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
	Electric shock	Nonconductive ladders used when working near energized electrical lines or equipment.			
10. Install insulation at elevated location	Falling	Whenever you are working on open-sided floor, platform, or other location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		For guardrail requirements see scaffolding			
		The personal fall arrest system, which consists of a body harness and shock absorbing lanyard, must prevent the user from falling more than 6', or from contacting any lower level			
		Secure lifelines to a structural member capable of supporting a dead weight of 5400 lbs.			
		100% tie off is required when working at or above 25'. This requires the use of 2 lanyards.			
11. Inspect fall protection equipment prior to use	Equipment failure- falling	Lanyard, harness, D-rings, and other personal fall arrest equipment is in good condition and suitable for use			
		Remove equipment from service that has sustained a fall.			
12. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels exceed 85 dB(A) time-weighted ave. over 8 hrs.			
13. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
14. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
15. Working around asbestos-containing materials	Asbestos Inhalation	Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Insulation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
16. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
18. Installing insulation from a scaffold.	Falling from the scaffold, or workers below scaffold struck by falling objects	Maintain the top rails, midrails, and toeboards on the scaffold from which you are working. Top rails must be 42" high ± 3" and capable of withstanding a lateral force of 200 lbs., midrails are midway between floor surface and top rail.			
		Toe boards at least 3 1/2" high are installed on scaffolds where there is not some alternate form of falling object protection such as barricades, debris nets, or canopies.			
		Ensure that scaffolds platforms are fully planked with no spaces between planks greater than 1"			
		Planks overlap the end of the scaffold no less than 12".			
		Do not horse play on or around scaffolding.			
		Be careful to not drop tools or material from the scaffold			
19. Working with rolling scaffolding	Falling due to scaffold racking unexpectedly	All diagonal & horizontal bracing is in place to square the scaffold & prevent racking.			
	Falling due to scaffold moving unexpectedly	Wheel brakes are set whenever the scaffold is stationary.			
	Scaffold failure- falling	Forklifts, trucks, or other motor vehicles are not used to push the scaffold			
20. Working with rolling scaffolding	Falling from scaffold, crushed by tipping scaffold.	**Never ride on the scaffold except under the following conditions:**			
		The floor across which the scaffold is moved is within 3 degrees of level, and is clean and free of all obstacles, such as cords, debris, holes, depressions ect.			
		When pushing scaffold force is applied as close to the base as possible			
		Height to width ratio is 2 to 1 or less. (ie. a 10' high scaffold is 5' wide)			
		No employee shall ride on any part of the scaffold that extends beyond the wheels.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install Insulation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Castor stems are pinned/secured to the scaffold legs.			
		Before the scaffold is moved all riders are made aware of the move.			
21. Getting on and off the scaffold	Falling while getting on or off the scaffold	Always use a ladder to gain access to scaffold work platforms			
		Ladders rails extend 3' above the platform and are tied off securely			
22. Working from a scissor lift	See Job Hazard Analysis on operating a scissor lift				
23. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Crawl spaces, attics, vaults, tunnels, ductwork, ect. that has been identified as a permit required confined space, except in keeping with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
24. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Scaffold	Scaffold	AHA training of each installer	
Scissor lift	Ladders		Inspector's Signature
ladders	Electrical cords		
razor knife	Tools and equipment		
reciprocating saw			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Metal Roofing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Roofers	Roofers not trained in the safe execution of the task	Use this Activity Hazard Analysis, and other formal and informal training to train Roofers.			
2. Put on your personal protective equipment.	Head or foot injury.	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, shake out materials, panel storage on sloped surfaces	Crushing or pinching hands or feet	When moving steel panels keep hands and feet clear of pinch points. Stack steel on stickers.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling. Slippage from sloped surfaces. Loose materials slipping off roofs.	Stage material as close to its final destination as possible. Install stops / cleats to prevent slipping from sloped surfaces. Stops / cleats to be full height & width of stored materials. Piles / panels to be secured from movement / slipping when in unbanded. Create controlled access zone on ground where materials stored or being installed to protect individuals on ground from falling / slipping materials and debris.			
4. Install safe anchorage points for fall protection system.	Falling	Anchorage points should be installed on roof ridges and hips so that all work can be completed within a 30 degree swing radius on either side of the anchor point.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
7. Communication and preparatory instructions	Lack of coordination between Roofers and resulting misunderstandings.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
8. Cut panels	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Burns, fires	Watch where you are throwing your sparks. Do not cut where sparks will land on other workers or on combustible materials			
	Cuts and abrasions	Wear gloves			
		Keep fingers several inches from all blades			
	Flying particles- eye damage	Wear goggles or safety glasses with side shields			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Metal Roofing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Hazardous noise- hearing loss	Wear foam ear plugs. When using an abrasive saw or grinder for more than 30 minutes ear muffs shall be worn in addition to the ear plugs.			
9. Move panels into place	Unexpected movements	Before moving a panel make sure that all workers are in a secure position, are aware of the move, and are tied off.			
	Strains from lifting	Know how much you can safely lift. Get help with heavy pieces.			
		Convert lifting and lowering tasks to pulling and pushing. (Slide panels when possible).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Use a forklift or other lift when feasible.			
		See AHA for forklift operation			
	Materials striking and injuring workers	Ensure that there is good communication between workers on the roof and the lift operator.			
	Crushed by falling material	Never walk under a raised load.			
	Cuts and abrasions	Wear gloves when handling site-cut edges that are sharp or that have burrs.			
10. Position and fit panels	Crushing or pinching body parts	Keep fingers, hands, and feet clear of all pinch points.			
11. Fasten panels into place	Tripping, slipping, and falling	Keep hoses and cords that are draped across the roof to a minimum.			
	Dropping material or tools	Barricade area where steel erection is ongoing.			
	Eye injury.	Wear goggles or safety glasses with side shields for any work that may create flying particles.			
12. Clear scrap and debris from the roof	Debris striking and injuring workers below	Barricade off drop area onto which scrap is thrown from the roof. Have someone on the ground to prevent anyone from entering this area.			
		As always hard hats are manditory.			
13. Working from an elevated position	Falling	Whenever you are working on roof or other location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		Workers must wear a full body harness and lanyard secured to a roof anchor bracket.			
		Lanyard shall be adjusted so that it will not allow the worker to fall further than 2 feet from the roof area.			
		Lines shall be checked after each move to ensure correct length.			
14. Setting up and using ladders	Ladders tipping or shifting while in use causing worker to fall	Set up ladders on firm level footing. Level the dirt beneath the base of the ladder.			
	Falling from ladder	Use the proper size of ladder for the job			
		Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Getting on and off the roof- using a ladder	Loosing balance and falling	Keep at least one hand free when ascending and descending a ladder.			
		Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing or roof edge.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Metal Roofing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
17. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
18. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
19. Clean up	Tripping, cuts, and scrapes	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Forklift	Forklift prior to each shift	Activity hazard training of each worker	
Ladders	Ladders prior to use		
Tin snips	Tools and equipment prior to use		
Steel cutoff saw			
Vise grips			
Stops / Cleats	When materials stored on sloped	Discuss at Prep and Worker Orientation	
	roofs, band & secure. Cleats to be full height & width of pile.	Secure up Controlled Access Zone on ground when materials installed / stored above.	

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Built-Up Tar Roofing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators and Laborers	Workers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
		Never operate a piece of equipment for which you have not been trained.			
		Read through the owner's manual for the equipment you are operating.			
2. Mobilize and refuel equipment	Spillage during transit	Kettle covers should be closed and latched during transit, and the kettle should be slop proof when the cover is closed.			
	Accidental movement of the kettle	Block the wheels of the kettle while it is parked.			
	Fires, explosions- burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
3. Inspect Equipment	Equipment failure- or unsafe operation	Inspect each piece of equipment prior to the start of each shift. Use the checklist for that piece of equipment.			
		Kettle covers should be equipped with a long handle that projects beyond the edge of the cover or lid at least 14 inches.			
		Lubrication points should show signs of recent maintainence.			
4. Fire Control	Fires, explosions- burns	An ABC rated fire extinguisher is kept at the kettle (on the tongue away from the danger zone if practical) and on the roof at all times.			
		Clean up combustible trash and debris before working in an area.			
6. Communication and preparatory instructions	Lack of coordination between Roofers and resulting mistakes.	Before beginning each phase of work the foreman will explain to all roofers where they will be working, what they are to do, and how the work will proceed.			
7. Put on your personal protective equipment.	Head or foot injuries	You must wear a hard hat, sleaved shirt, long pants and work boots at all times.			
	Crushed by moving equipment	Wear a high visiblity vest at all times when working in and around equipment.			
8. Set up barricades and caution-off area.	Entry of unauthorized personnel	Set up warning barricades or temp. fencing and caution off area where roofing is ongoing to prevent the entry of unauthorized personnel.			
9. Getting on and off the roof	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Use three points of contact with the ladder at all times.			
10. Prep roof substrate					
11. Tend tar kettle	Pulls and strains from loading	Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Crushed or pinched body parts	Do not place body parts near pinch points on the machine.			
	Burns	Do not touch any hot surfaces			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Built-Up Tar Roofing

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Never make repairs while the machine is still hot.			
12. Carrying buckets of hot tar	Pulls and Strains from lifting	Balance your load by carrying two partially full buckets one in each hand instead of one full bucket.			
		Wear gloves and long sleaved shirt with a lap at the wrists.			
13. Spread or mob tar	Impact injuries, splinters	Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Struck by falling material	Do not allow workers to stand or walk under the area where roofing operations are ongoing.			
14. Cut felt or roofing paper	Cuts	Cut away from yourself. The blade should always be pointed away from any body parts.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working on equipment where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
16. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Do not try and unearth a worker buried by a cave-in with power equipment such as a backhoe.			
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
	Sunburn	Use sunscreen			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Installing Built-Up Tar Roofing**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls

Equipment to be Used	Inspection Requirements	Training Requirements
	Inspect each piece of equipment at the beginning of each shift	AHA training of each roofer.

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Sign and Placard Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Installers	Installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Installers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times.			
3. Inventory and store signs	Crushing or pinching hands or feet	When moving signs keep hands and feet clear of pinch points.			
		Communicate clearly with coworkers.			
		Store signs in shipping crates/packages or store in a location where they will not be damaged.			
4. Move material with a forklift.	Struck by machinery, impact injuries	See AHA for forklift operation.			
5. Spread signs or placards, move material, and equipment	Pulls and Strains from lifting	Know how much you safely lift, use a mechanical lift such as a wheelbarrow or hand truck when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving material, watch where you are going.			
6. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
	Fires, burns Pour illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
7. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
8. Inspect tools	Defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
9. Drill holes and set anchors	Impact injuries, pulls and strains	Avoid binding the drill bit, causing the drill body to spin. Hold the drill steady, don't try to drill too quickly.			
	Hearing loss	Wear foam ear plugs when working in noisy areas or with loud tools such as a hammer drill, or grinder.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Sign and Placard Installation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
10. Apply Adhesive	Dizziness, nausea, damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
11. Install the sign or placard	Crushed or pinched body parts	Keep fingers and hands clear of pinch points			
		Communicate clearly with co-workers			
	Struck by falling sign	Have a helper hold heavy signs until it they can be permanently fastened into place.			
	Impact injuries, cuts	Hand tools to coworkers handle first; do not throw them.			
12. Trim sign or make adjustments	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work involving hammers, drills, grinders, saws, or pneumatic tools.			
	Burns	Be careful not to touch a hot bit, grinding wheel, or saw blade			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
13. Install signs from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size ladder for the job			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in fully open position.			
	Electric shock	Nonconductive ladders are recommended.			
14. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
		Do not move ladder with tools on it			
15. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. ie. old paint.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
16. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
18. Clean up	Tripping and falling	Clean up work area at the end of each shift.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Sign and Placard Installation

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
		Store signs or placards out of the way so that they do not create a tripping hazard.			
	Impact injuries	Do not store large signs in a location or in such a manner that they can fall over and injure workers.			

Equipment to be Used	Inspection Requirements	Training Requirements
Saw horses	Electrical cords	AHA training of each installer
Screw gun/cordless drill	Tools and equipment	
Reciprocating saw		
Porta-band saw		
hammer drill		
Grinders		
Chop saw		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Tree Removal			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Workers	Workers not trained in the safe execution of the activity.	Use this AHA and other informal training to train workers. All tree removal shall be done under the directiion of a qualified tree worker.			
2. Put on Personal Protective Equipment	Head, foot, or eye injury and/or hearing loss.	a. Worker must wear a hard hat, work boots, eye protection, and hearing protection at all times.			
3. Working around power lines	Electrocution.	a. Qualified tree worker must determine if electrical hazard exists prior to any work, if so must supervise. b. Workers shall be trained in accordance with EM 385, Section 31, Para 31.a.02.			
4. Tree climbing	Falling from trees.	a. Climbers must wear suitable climbing spurs and ropes (min diameter of 1/2", constructed of synthetic fibers with min breaking strenght of 5400 lbs). b.Climber must be tied off.			
5. Brush removal and chipping	Bodily injury from chipper.	a. All employees shall be trained in the safe operation of the chipper in accordance with the manufactuers recomendations. b. Chipper must be equiped with an in feed hopper. c. Chipper shall be equiped with a quick stop and reversing device. d. Push sticks shall be used when materials are inside the hopper.			
6. Other operations and equipment	Injuries from other equipment.	a. All pole tools must be non-metalic. b. Power saws that weigh more than 15 lbs must be supported by a separate line. c. Chopping tools that have cracked heads or splintered handles shall not be used. d. Chopping tools shall never be used while working aloft. e. Chopping tools shall be swung away from the body.			
7. Using an aerial lift	Numerous	Review Aerial Lift AHA.			
Equipment to be Used	Inspection Requirements	Training Requirements			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Tree Removal**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
Aerial Lift	Complete aerial operation checklist and operate per manufacturer recommendations	Aerial Lift training guide lines and review manufacturer requirements.			
Chipper	Complete operation checklist and inspect per manufacturer recommendations. Inspect per EM 385, Section 31, Para 31.d.	Aerial Lift training guide lines and review manufacturer requirements.			
Chain Saw	Check per manufacturer recommendation	Train per manufacturer recommendation			
**Manufacturer data on all equipment must be with the equipment					

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Demolition

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Laborer	Laborers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Laborers.			
2. Secure a copy of the demolition plan	Collapse of structural elements, or disruption of hazardous materials without required protection	The demolition plan provides for the safe removal and dismantling of all building components and debris. All workers should read or be instructed in the demolition plan and should follow the plan.			
		Follow the directions of your supervisor. If you do not understand the instructions ask for clarification.			
3. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat, long pants, and work boots at all times. Most demolition activities also require safety glasses with side shields or goggles, foam ear plugs, gloves, and a dust mask or respirator.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep cords, hoses, and other equipment clear of traffic lanes.			
		Clean up scrap materials and debris before and after working in an area.			
	Falls through holes or openings	Cover holes or openings in floors as soon as it is feasible to do so. The cover must be sufficient to prevent workers or equipment from falling through the opening. Mark the cover, "Danger, Hole"			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
4. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, and remove them from jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saw blades and grinders must have properly functioning manufacture installed guards.			
	Twisted or spranged hands or wrists	Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Impact or eye injury	Devices are provided on air power tools to prevent tools from becoming accidentally disconnected from hose.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
5. Entering and exiting the building	Delayed egress, or injuries from falling objects	All designated entries to the building must be protected from falling objects by sidewalk sheds or canopies.			
		Use only exits or entrances designated in the demolition plan.			
6. Cut, break, grind, or otherwise demolish surfaces and structures for removal.	Sprains, cuts, abrasions, bruises	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Demolition

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Never disable the built in safety features on a tool.			
		Use tools for their intended use.			
		Wear gloves when handling sharp or abrasive objects.			
	Struck, or crushed by falling material or debris	Be aware of the location of other workers. Never demolish anything with workers at a lower level that may be injured by falling debris.			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work which creates flying particles, dust, mist, or fumes.			
7. Cutting steel with a cut-off saw	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Burns, fires	Watch where you are throwing your sparks. Do not cut where sparks will land on other workers or on combustible materials			
	Cuts and abrasions	Keep fingers several inches from all blades			
	For cutting with an oxyfuel torch see AHA on Gas Cutting and Welding				
8. Inspect building components and assemblies	Collapse of structural elements, or weakened or loosened materials	During demolition all workers especially the job foreman should be constantly inspecting building components and assemblies for structural integrity. If a hazardous condition is observed leave the area immediately and tell your supervisor.			
		Use your brain. If it looks or feels unsafe stop, and investigate before someone gets hurt.			
9. Demolish and remove utility lines	Electrocution, burns from hot water or steam, explosions- gas	Shut off, cap, or otherwise control all electric, gas, water, sewer, and other service lines, before commencing demolition.			
	Explosion or fire- burns	Demo gas only after bleeding the line and venting the workspace.			
10. Remove windows and glazing	Shattered glass- cuts	When possible remove windows with glass intact.			
		Before breaking glass for removal apply strips of duct tape, spray adhesive and visqueen, or some other membrane to catch and hold most of the shattered glass			
		Use a drop cloth to catch loose shards of glass			
		Clean up all broken glass in the work area as soon as possible.			
	Eye injury	Wear safety goggles or a safety glasses with side shields and gloves.			
11. Set up a debris chute	Struck, or crushed by falling material or debris	Fully enclose all chutes set up at an angle of more than 45 degrees from horizontal.			
		Close off the area surrounding the discharge end of the chute when it is not in use.			
		Attach a 4" x 6" bumper to the floor directly in front of the chute opening			
		Install a cover (plywood or similar) to protect any gap between the floor and the opening to the chute.			
	Workers falling into the chute	Protect all chute openings into which debris is dumped by a guardrail (42" high)			
		Close all openings to chutes when not in use.			
14. Load out concrete and masonry debris	See AHA for Bobcat or Backhoe Operation				

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Demolition

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
15. Working from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
		All step and extension ladders must be equipped with ladder shoes.			
16. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
	Electric shock	Use a nonconductive ladder when working near energized electrical lines or equipment.			
17. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
18. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
19. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
20. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
21. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material, except during asbestos abatement operations in accordance with all applicable laws and the process outlined in the AHA for Asbestos Abatement.			
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Demolition

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
22. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material., except during Lead abatement operations in accordance with all applicable laws and the process outlined in the AHA for Lead Abatement.			
23. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			
24. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
25. Working with combustible materials	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your working area.			
		Know how to operate the fire extinguisher			
		Always heed “No Smoking or Open Flame” warning signs.			
		Use approved metal safety cans used for handling and use of flammable liquids.			
26. Using compressed air	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
27. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Stand up wind from the air nozzle.			
28. Working on or around scaffolding	See Activity Hazard Analysis for Scaffold Erection & Use				
29. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area, especially corridors and stairways, at the end of each shift. Caution off unsafe areas.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Demolition

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
Various power hammers	Tools	AHA training of each laborer
Air compressor and hoses		
Ladders		
Hand Tools		
Misc. Power Tools		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Building Demolition - Structural			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Laborers	Laborers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Laborers.			
2. Secure a copy of the demolition plan, and engineering survey	Collapse of structural elements, release of hazardous energy	The demolition plan provides for the safe removal and dismantling of all building components and debris. All workers should read or be instructed in the demolition plan and should follow the plan.			
		Follow the directions of your supervisor. If you do not understand the instructions ask for clarification.			
3. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat, long pants, and work boots at all times. Most demolition activities also require safety glasses with side shields or goggles, foam ear plugs, gloves, and a dust mask or respirator.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, and remove them from jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saw blades and grinders must have properly functioning manufacture installed guards.			
	Twisted or spranged hands or wrists	Hand held power tools (saws, air impact) equipped only with constant pressure switch.			
	Impact or eye injury	Devices are provided on air power tools to prevent tools from becoming accidentally disconnected from hose.			
	Electric shock from defective tools.	Use only GFCI protected outlets			
Cap, blank, and/or lock out utilities	Release of hazardous energy, explosion	Ensure that all electric, gas, water, and other service lines are shut off, capped, or blanked before demolition is started.			
	Explosion or fire- burns	Demo gas only after bleeding the line and venting the workspace.			
6. Entering and exiting the building	Delayed egress, or injuries from falling objects	All designated entries to the building must be protected from falling objects by sidewalk sheds or canopies.			
		Use only exits or entrances designated in the demolition plan.			
Demolish finish assemblies and surfaces	Struck, or crushed by falling material or debris	Begin demolition on the upper most floor and proceed downward. Never demolish anything with workers at a lower level that may be injured by falling debris.			
		Be aware of the location of other workers.			
	Sprains, cuts, abrasions, bruises	Never disable the built in safety features on a tool.			
		Use tools for their intended use.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Building Demolition - Structural			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
		Wear gloves when handling sharp or abrasive objects.			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for work which creates flying particles, dust, mist, or fumes.			
Crane set up and rigging	Crane tipping or shifting	Ensure that the outriggers are supported on a firm foundation capable of supporting the intended load. Use lumber to increase the surface area to which the load is applied when setting up on soil.			
	Crushed or pinched injuries	Stay clear of all pinch points while extending and lowering outriggers.			
	Crane or component failure	Check that: Each control is operating properly and is clearly identified.			
		Is there sufficient cable to allow two full wraps of cable on drums at all working positions			
		Make sure the following are operating properly: boom hoist disconnect (boom stop), transmission; is not slipping or noisy, boom hoist kickout, parking brake, swing brake, outriggers.			
	Rigging braking, shifting, or coming loose	Accurately estimate the weight of the pick, and use yoke, slings, or other rigging that can safely support the load.			
	Accidents due to not being able to see clearly	Make sure operator's view of the pick is unobstructed or a signal person is used as an aid.			
7. Demo structural members.		Install shoring and other protective support in accordance with the demolition plan.			
		Make sure that all structural members are adequately supported before cutting for removal.			
8. Cut steel with an abrasive saw	Burns, fires	Watch where you are throwing your sparks. Do not cut where sparks will land on other workers or on combustible materials			
	Cuts and abrasions	Keep fingers several inches from all blades			
	Hazardous noise	Wear foam ear plugs.			
9. Cut steel with oxy-acytlene torch	Fires, explosions- burns	Install noncombustible shielding to protect combustible wall or floor assemblies from flashes, sparks, and molten metal.			
		Clean up combustible trash and debris before cutting.			
		Keep an ABC rated fire extinguisher ready adjacent to the work.			
		Do not place cylinders where they will could be reached by sparks, hot slag or flames.			
		Before breaking glass for removal apply strips of duct tape, spray adhesive and visqueen, or some other membrane to catch and hold most of the shattered glass			
		Use a drop cloth to catch loose shards of glass			
		Clean up all broken glass in the work area as soon as possible.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Building Demolition - Structural			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
	Workers falling into the chute	Protect all chute openings into which debris is dumped by a guardrail (42" high)			
		Close all openings to chutes when not in use.			
	Debris chute failure	Construct the chute out of a strong, durable material.			
13. Remove debris from the building.	Collapse of structural elements	Remove debris at regular intervals. Do not allow stockpiled debris to exceed the allowable floor loads.			
	Pulls and Strains from lifting	Get help when moving heavy materials, use a wheelbarrow, rollable container, or similar when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with material or debris	Be aware of your surroundings while moving materials, watch where you are going.			
		Never commence debris removal in lower levels before removal has ceased on the floors above.			
14. Drop debris through openings in the floor (no chute)	Falling through the floor opening	The floor opening must be protected by a guardrail so as not to create a fall hazard.			
	Being struck or crushed by falling debris	The area onto which the material is dropped shall be enclosed with barricades at least 42" high and 6' back from the projected edge of the opening.			
		Post warning signs on the barricades that read, "Danger, Falling Debris Hazard"			
15. Load out concrete and masonry debris	See AHA for Bobcat or Backhoe Operation				
16. Working from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
		Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
	Ladder failure- Falling from ladder	Ladders must be inspected regularly and tagged “do not use” and removed from the jobsite when found defective.			
		All step and extension ladders must be equipped with ladder shoes.			
17. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
	Electric shock	Use a nonconductive ladder when working near energized electrical lines or equipment.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Building Demolition - Structural			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
18. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
19. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
		Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
20. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
21. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
22. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material, except during asbestos abatement operations in accordance with all applicable laws and the process outlined in the AHA for Asbestos Abatement.			
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
23. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material., except during Lead abatement operations in accordance with all applicable laws and the process outlined in the AHA for Lead Abatement.			
24. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Building Demolition - Structural			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			
25. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
26. Working with combustible materials	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your working area.			
		Know how to operate the fire extinguisher			
		Always heed “No Smoking or Open Flame” warning signs.			
		Use approved metal safety cans used for handling and use of flammable liquids.			
27. Using compressed air	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
28. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Stand up wind from the air nozzle.			
29. Working on or around scaffolding	See Activity Hazard Analysis for Scaffold Erection & Use				
30. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area, especially corridors and stairways, at the end of each shift. Caution off unsafe areas.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Various power hammers	Tools	AHA training of each laborer	
Air compressor and hoses			Inspector's Signature
Ladders			
Hand Tools			
Misc. Power Tools			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Earthwork, Excavation & Grading

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Operators.			
		Never operate a piece of equipment for which you have not been trained.			
		Read through the owner's manual for the equipment you are operating.			
2. Locate utilities	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
		Pot-hole for utilities to locate the exact location before beginning a full excavation. Hand excavate when nearing the utility so that it is not damaged.			
		Each operator on the job should be aware of the location of all underground utilities, structures, tanks, ect.			
	Explosions of buried munitions, or military ordnance	Contact Explosive Ordnance Disposal (EOD) before commencing excavations in areas where there may be unexploded munitions or military ordnance.			
3. Refuel equipment	Fires, explosions- burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
		For gasoline powered equipment attach the grounding wire from the fuel tank to the equipment before fueling.			
4. Inspect Equipment	Equipment failure- or unsafe operation	Inspect each piece of equipment prior to the start of each shift. Use the checklist for that piece of equipment.			
		Make sure recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points should show signs of recent maintainence.			
	Fires, explosions- burns	A fire extinguisher is provided at the operator's compartment			
	Backing over workers or running into equipment	**Ensure that the backup alarm is fully operational**			
5. Put on your personal protective equipment.	Head or foot injuries	You must wear a hard hat (except when protected by the cab or canopy of the equipment) and work boots at all times.			
	Crushed by moving equipment	Wear a high visiblity vest at all times when working in and around equipment.			
6. Set up barricades and caution-off area.	Entry of unauthorized personnel	Set up warning barricades or temp. fencing and caution off area where earthwork is ongoing to prevent the entry of unauthorized personnel.			
	Knocking down power lines	Caution tape off power poles and guy wires and be careful when operating heavy equipment near high voltage lines.			
7. Communication and preparatory instructions	Lack of coordination between Operators and resulting mistakes.	Before beginning each phase of work the foreman will explain to all operators where they will be working, what they are to do, and how the work will proceed.			
		Review hand signals and non-verbal communication.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Earthwork, Excavation & Grading

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
8. Clear and grub	Environmental hazards - bees	Always keep an eye out for swarms of bees. If there are a lot of bees in an area be careful.			
9. Getting on an off the machine	Slipping and falling	Use three points of contact with the machine at all times.			
		Make sure the machine is provided with slip resistant surfaces.			
		Be especially careful in the rain or mud.			
	Crushed or pinched injuries from moving equipment	Whenever the machine is unattended the bucket/blades are lowered, brakes set, controls neutralized, and the engine is shut down.			
10. Excavate - cuts	Striking and injuring co-workers with equipment or material	Be aware of the location of workers in and around the excavation at all times.			
		Stand away from equipment that is loading or unloading excavated material.			
	Struck by falling material	Never move excavated material over or above workers.			
		Do not allow workers to stand or walk under the elevated portion of the machine.			
	Roll over or equipment failure	Know the limits of your machine. Do not hot dog or push the limits of the machine.			
		Sloping or benching of cuts shall be done following the design of a licensed engineer.			
	Falling from an elevated location	Stay away from the face of any cut where you could fall more than 6' to the lower level.			
11. Place fill and compaction	Inability to see clearly	Keep the windshield and other glazing clean so that your view is unobstructed			
		Make sure the windshield wipers work and all mirrors are properly adjusted.			
		Look in the direction of travel.			
	Falling from the machine	Wear your seat while operating the machine.			
		Employees shall not ride in buckets or on any part of the machine other than the seat.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working on equipment where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
12. Grading	Crushed by moving equipment	When on foot never enter the operation area of any piece of equipment without first making eye contact with the operator and waiting for him to acknowledgement of your presence.			
13. Changing attachments or blades or making repairs	Crushed or pinched injuries from moving parts.	Never make repairs or change attachments without first setting the brake, neutralizing the controls, and shutting down the engine.			
		Do not place body parts near pinch points on the machine.			
	Burns	Do not touch hot pipes/surfaces or electrical contacts.			
	Sunburn	Use sunscreen			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection
	East County Substation Project	**Earthwork, Excavation & Grading**	

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
	Inspect each piece of equipment at the beginning of each shift	AHA training of each Operator or laborer	
			Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Installing Landscape Valves, Boxes & Equipment**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Installer	Installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Installers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep walkways, work area and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords and hoses to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
6. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All Saw blades have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric shock	Use only GFCI protected outlets			
7. Drill holes, set anchors and/or brackets	Twists or sprangs due to drill bit catching	Hold the tool steady with arms flexed, and drill as straight a hole as possible.			
	Cuts, abrasions, impact injuries	Never disable the built in safety features on a tool.			
		Hand tools to coworkers handle first; do not throw them.			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes			
	Impact injuries	Use a wire or other locking device to prevent air hoses from being accidentally disconnected.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Landscape Valves, Boxes & Equipment

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
Assemble components	Cuts, abrasions	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
		Take your finger off the switch when carrying a plugged in tool.			
		Unplug all tools before making any repairs or adjustments.			
	Electric Shock	Do not carry or hoist tools by their power cords.			
Make modification or adjustments	Hazardous noise, hearing loss	Wear foam ear plugs when using tools or when working in an area where sound pressure levels are greater than 85 dB(A) time-weighted ave. over 8 hrs.			
	Cuts	Be careful while handling edges that are sharp or burred.			
Move equipment into position	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers.			
	Crushed or pinched body parts	Use a pry bar or other mechanical means to help position the equipment or to prevent it from shifting.			
		Keep fingers and hands clear of pinch points			
		Communicate clearly with co-workers			
Fasten equipment in place	Impact injuries, or crushed or pinched injuries	Make sure the equipment is adequately supported until it is permanently fastened into place.			
8. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
	Exposure to Bloodborne Pathogens	Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
9. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
12. Hot work- welding, cutting, soldering, brazing.	Fires and explosions- burns	Always have an ABC rated fire extinguisher adjacent to where the work is being performed			
		Remove all combustibles from your work area prior to beginning and hot work.			
	See AHA for Welding and Cutting				

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Installing Landscape Valves, Boxes & Equipment**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
Ladders, scaffolding	Tools & equipment prior to use	Activity hazard training for each laborer
Drills		
Chipping hammer/drill		
reciprocating saw		
grinders		
compressors		

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Trench Excavation			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Operators.			
2. Locate utilities	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
		Pot-hole for utilities to locate the exact location before beginning a full excavation. Hand excavate when nearing the utility so that it is not damaged.			
	Explosions of buried munitions, or military ordnance	Contact Explosive Ordnance Disposal (EOD) before commencing excavations in areas where there may be unexploded munitions or military ordnance.			
3. Make a soil analysis	Failure to use the proper protection for the soil type	Analyze the soil through which the excavation will be made. Based on those observations, determine the required sloping/benching and/or shoring required for protection of workers in the excavation.			
4. Set up barricades and caution-off area.	People or vehicles falling into the excavation	Set up warning barricades and caution off area where trenching is ongoing to prevent the entry of equipment or unauthorized personnel.			
		Do not allow persons other than construction workers near an excavation. If this is infeasible a guardrail with a midrail and toe board is required.			
		When vehicles are operated adjacent to an excavation set up stop logs, jersey barriers, or similar protection.			
	Overloading excavation- cave-in	Keep material (excavated spoils) and equipment a minimum of 2 ft. from the edge of the trench.			
5. Dig ditches, place sand bags for water control	Water undermining or overloading the walls of the excavation	Where there is a danger of surface water entering the excavation dig ditches or place sand bags to prevent the water from reaching the excavation.			
6. Begin excavating- using power equipment	Striking and injuring co-workers with equipment or material	Be aware of the location of workers in and around the excavation at all times.			
		Never move excavated material, or shoring system components over or above workers.			
		Stand away from equipment that is loading or unloading excavated material.			
		Wear a hard hat at all times			
	See the AHA for Backhoe Operation				
	Cave-in, crushed by	In trenches less than 5 ft. deep when it is determined by competent soil analysis that there is no potential for cave-in a protective system is not mandatory.			
		When sloping or benching is used as the method of protection in an excavation the maximum slope shall be 1 1/2 horizontal to 1 vertical.			
		Sloping or benching shall be done following the design of a licensed engineer.			
7. Inspect shoring system components.	Failure of shoring system	Prior to installation inspect all parts of shoring system. Do not use any components that are not in good repair.			
8. Install shoring	Failure of shoring system- cave-in	Install the shoring system and components in accordance with the manufactures' recommendations. If you don't know, read the owner's manual, call the manufactures' rep. or ask your supervisor. Don't guess.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Trench Excavation			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
	Crushed or pinched by, or falling	Do not ride or allow co-workers to ride in or on a trench box when it is raised or lowered into position.			
	Crushed by cave-in	Do not enter an unprotected trench to install shoring.			
		Make sure the excavation is never deeper than 2' below the base of the shoring system.			
9. Inspect the excavation	An unsafe excavation due to subsidence, water, or failure of shoring components.	Inspect the excavation, the adjacent areas, and all protective systems (shoring) before each shift and after each hazard-increasing occurrence such as rain.			
		Correct any unsafe conditions or prevent workers from entering the excavation.			
10. Hand excavation, digging	Pulls and strains from digging	Don't be too aggressive when moving heavy or wet material.			
		Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Foot or leg injuries	Wear work boots and long pants			
11. Working in a trench with water present.	Water undermining or overloading the walls of the excavation- cave-in	If you are working in a trench and water begins to accumulate, leave the trench immediately. Do not reenter the excavation or work in any excavation where water is present until shoring has been installed which is sufficient to prevent a cave-in and the			
		If an excavation requires continuous pumping to control water the pump shall be provided with back up power.			
12. Entering and exiting the excavation from a ladder	Delayed egress	In trenches more than 4 ft. deep set up a ladder within 25 ft. of each worker in the excavation.			
	Ladders tipping or shifting- falling	Set up ladders on firm level footing. Level and compact the soil under the base of the ladder.			
		Set up extension ladders so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. Tie off the top of the ladder and extend the side rails 36" above the excavation.			
		Set up two ladders for every trench over 5 ft. deep.			
	Ladder failure- Falling from ladder	Inspect ladders regularly. Do not use a defective ladder. Remove defective ladders from the jobsite.			
13. Excavating adjacent to buildings or retaining walls	Collapse of the adjacent structure or retaining wall	Never excavate below the level of the footing of an adjacent building or retaining wall except under the direction of an approved engineered plan with engineered controls in place.			
14. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Trench Excavation

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Do not try and unearth a worker buried by a cave-in with power equipment such as a backhoe.			
16. Working in a trench classified as a confined space	Engulfment, asphyxiation, or impairment of ability to self rescue.	An excavation becomes a confined space under the following conditions: there is only one point of egress, there is the potential of a hazardous atmosphere developing, or there is a potential for engulfment (example water is accumulating in the trench, or			
		Never enter a confined space except in accordance with the requirements of the AHA Working In Confined Spaces			
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
Shoring system					
Hand tools- shovels					

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Landscape Trenching			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Operators.			
2. Locate utilities and building service stubouts	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
		Pot-hole for utilities to locate the exact location before beginning a full excavation. Hand excavate when nearing the utility so that it is not damaged.			
3. Set up barricades and caution-off area.	People or vehicles falling into open trenches.	Set up warning barricades and caution off area where trenching is ongoing to prevent the entry of equipment or unauthorized personnel.			
		Do not allow persons other than construction workers near an open trench.			
		When vehicles are operated adjacent to an open trench set up caution tape, barricades, or similar protection.			
	Trench cave-in	Keep material (excavated spoils) and equipment a minimum of 2 ft. from the edge of the trench.			
4. Begin trenching - using power equipment	Striking and injuring co-workers with equipment or material	Be aware of the location of workers in and around the excavation at all times.			
		Never move excavated material, or shoring system components over or above workers.			
		Stand away from equipment that is loading or unloading excavated material.			
		Wear a hard hat at all times			
5. Hand excavation, digging	Pulls and strains from digging	Don't be too aggressive when moving heavy or wet material.			
		Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Foot or leg injuries	Wear work boots and long pants			
6. Working in a trench with water present.	Water undermining or overloading the walls of the excavation- cave-in	If you are working in a trench and water begins to accumulate, leave the trench immediately. Do not reenter the excavation or work in any excavation where water is present until shoring has been installed which is sufficient to prevent a cave-in and the			
		If an excavation requires continuous pumping to control water the pump shall be provided with back up power.			
7. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
8. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Do not try and unearth a worker buried by a cave-in with power equipment such as a backhoe.			

JOB SAFETY ANALYSIS

Project Description	JSA Description
East County Substation Project	Landscape Trenching

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
9. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
	Sunburn	Use sunscreen			
10. Backfill and compact	Crushed feet	Mechanical vibration increases the likelihood of crushing feet. Do not operate a compactor or wacker in an trench without wearing steel toed boots and hearing protection.			

Equipment to be Used	Inspection Requirements	Training Requirements
Trenchers	Daily checklist and Operator training	Training of each Operator or laborer
Hand tools- shovels	Broken handles / sharp edges	
Wacker / Compactor	Visual Inspection	

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Excavating for a Retaining Wall

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Operators.			
2. Locate utilities	Explosions, burns (gas lines), electrocution or electrical fires (electrical lines)	Call utility companies and/or other responsible authorities (Dig-Alert) before you dig. Have them locate and mark all underground utilities.			
		Pot-hole for utilities to locate the exact location before beginning a full excavation. Hand excavate when nearing the utility so that it is not damaged.			
	Explosions of buried munitions, or military ordnance	Contact Explosive Ordnance Disposal (EOD) before commencing excavations in areas where there may be unexploded munitions or military ordnance.			
3. Make a soil analysis	Failure to slope or bench the excavation properly based on the soil type	Analyze the soil through which the excavation will be made. The person making the analysis must be the competent person.			
4. Set up barricades and caution-off area.	People or vehicles falling into the excavation	Set up warning barricades and caution off area where excavation is ongoing to prevent the entry of equipment or unauthorized personnel.			
		Do not allow persons other than construction workers near an excavation. If this is infeasible a barricade (guardrail system, fence, wall, ect.) is required.			
		When vehicles are operated adjacent to an excavation set up stop logs, jersey barriers, or similar protection.			
	Overloading excavation- cave-in	Keep material (excavated spoils) and equipment a minimum of 2 ft. from the excavation.			
5. Dig ditches, place sand bags for water control	Water undermining or overloading the walls of the excavation	Where there is a danger of surface water entering the excavation dig ditches or place sand bags to prevent the water from reaching the excavation.			
6. Begin excavating- using power equipment	Striking and injuring co-workers with equipment or material	Be aware of the location of workers in and around the excavation at all times.			
		Never move excavated material, or shoring system components over or above workers.			
		Stand away from equipment that is loading or unloading excavated material.			
		Wear a hard hat at all times			
	See the AHA for Bobcat Operation				
	Cave-in, crushed by	Sloping or benching of the excavation shall be done in accordance with written data and diagrams accompanying this hazard analysis.			
		The maximum unsupported vertical sided lower portion of the excavation face shall be 3' 6".			
		The maximum allowable slope for type B soil is 1 to 1.			
7. Inspect the excavation	An unsafe excavation due to subsidence, water, or failure of shoring components.	Inspect the excavation, the adjacent areas, and all protective systems (shoring) before each shift and after each hazard-increasing occurrence such as rain.			
		Correct any unsafe conditions immediately or prevent workers from entering the excavation.			
8. Hand excavation, digging	Pulls and strains from digging	Don't be too aggressive when moving heavy or wet material.			
		Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Foot or leg injuries	Wear work boots and long pants			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	Excavating for a Retaining Wall			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
10. Working in a excavation with water present.	Water undermining or overloading the walls of the excavation- cave-in	If you are working near the face of an excavation and water begins to accumulate, leave the area immediately. Do not reenter the area until the soil has been resloped or benched as required by the saturated condition of the soil.			
		If an excavation requires continuous pumping to control water the pump shall be provided with back up power.			
11. Traversing the slopes of the excavation	Slipping or falling	Use a ladder or stairs to assend or desend the sloped or benched side of the excavation when it is infeasible to walk around.			
	Ladders tipping or shifting- falling	Set up ladders on firm level footing. Level and compact the soil under the base of the ladder.			
	Ladder failure- Falling from ladder	Inspect ladders regularly. Do not use a defective ladder. Remove defective ladders from the jobsite.			
12. Excavating adjacent to buildings or retaining walls	Collapse of the adjacent structure or retaining wall	Never excavate below the level of the footing of an adjacent building or retaining wall except under the direction of an approved engineered plan with engineered controls in place.			
13. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs.			
14. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
		Do not try and unearth a worker buried by a cave-in with power equipment such as a backhoe.			
15. Install french drain at footing	Engulfment, asphyxiation, cave-in	Install the french drain or footing drain after the footings have be poured but before the wall is completed (so that it creates a trench).			
		An excavation becomes a confined space under the following conditions: there is only one point of egress, there is the potential of a hazardous atmosphere developing, or there is a potential for engulfment (example water is accumulating in the trench, or there is not a shoring system in place to prevent a cave-in).			
16. Backfill and compact against retaining wall	Failure of the retaining wall.	Make sure the retaining wall has cured to at least its design strength before backfilling and compacting against it.			
		Do not use excessive amounts of water for compaction.			
	Equipment roll over and/or cave-in	Keep all machinery at least 2' from the face of the excavation at all times.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Excavating for a Retaining Wall**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
	Sunburn	Use sunscreen			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Saw Cut Asphalt with Water Control

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers	Workers not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots at all times while onsite.			
3. Check saw and blade for safe operation	Injury due to defective or improperly functioning saw or blade	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		Check blade for warping or missing teeth.			
		The blade you are using should be designed for the work being performed.			
		Make sure the saw is equipped with a manufacture installed guard and that it is functioning properly.			
		Check that kill switch or shut-off is working properly.			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
5. Refuel saw	Fires, explosions- burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
6. Layout saw cut, mark utilities	Damage to utilities	Make sure saw cut lines are straight and in correct location.			
		Identify energized and/or pressurized utilities			
7. Roll out hoses and cords and set up equipment	Tripping - Hoses, Cords, Compressor	Keep corridors and high traffic areas free of hoses and other equipment.			
		Arrange hoses and cords in an orderly fashion.			
	Pulls and Strains from lifting	Know how much you can lift. Get help when moving heavy equipment.			
		Convert lifting and lowering tasks to pulling and pushing. (use a ramp)			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
8. Make a test cut	Cutting too deep or too shallow	Cut a small square or triangle that can be broken out in order to get an actual measurement of the AC pavement.			
9. Break out test piece, measure asphalt thickness	Smashed fingers	Keep hand several inches away from whatever you are hitting with a hammer			
	Flying particles	Wear safety glasses with side shields or wrap-around type when chipping.			
		Set blade to the proper depth			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Saw Cut Asphalt with Water Control

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
10. Saw cut asphalt	Hazardous noise- hearing loss	Wear foam ear plugs when sawing for more 30 minutes ear muffs shall be worn in addition to the ear plugs.			
	Crushed or pinched, cuts and abrasions	Keep fingers, hands, and other body parts away from pinch points and moving machine parts.			
	Burns and abrasions	Do not touch a hot blade or exhaust pipes			
	Flying particles	Wear safety glasses with side shields or wrap-around type when sawing.			
	Running into workers or equipment	Always be aware of your surroundings and look in the direction of travel.			
	Crushed by moving equipment	Wear a high visibility vest when working in the vicinity of other equipment.			
11. Sawing in enclosed spaces	Hazardous levels of dust or fumes in the work area	Set up mechanical ventilation to force air into and out of the work area. If this ventilation does not reduce fumes to a safe level a respirator must be worn.			
12. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
13. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
14. Clean up	Trips, slips, falls	Clean up water and mud that might create a slip hazard as soon as possible.			
		Roll up hoses and cords and remove equipment to designated laydown areas.			
	Fires, explosions- burns	Store fuel in an approved metal safety can.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Laying Asphaltic Concrete Pavement

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators and Laborers	Workers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
		Never operate a piece of equipment for which you have not been trained.			
		Read through the owner's manual for the equipment you are operating.			
2. Refuel equipment	Fires, explosions- burns	Use only approved metal safety cans or tanks to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
		For gasoline powered equipment attach the grounding wire from the fuel tank to the equipment before fueling.			
3. Inspect Equipment	Equipment failure- or unsafe operation	Inspect each piece of equipment prior to the start of each shift. Use the checklist for that piece of equipment.			
		Make sure recommended preventive maintenance is being performed and a log maintained.			
		Lubrication points should show signs of recent maintenance.			
	Fires, explosions- burns	A fire extinguisher is provided at the operator's compartment			
	Backing over workers or running into equipment	**Ensure that the backup alarm is fully operational**			
4. Put on your personal protective equipment.	Head or foot injuries	You must wear a hard hat (except when protected by the cab or canopy of the equipment), long pants, and work boots at all times.			
	Crushed by moving equipment	Wear a high visibility vest (Caltrans approved) at all times when working in and around equipment.			
5. Set up barricades and caution-off area.	Entry of unauthorized personnel	Set up warning barricades or temp. fencing and caution off area where paving is ongoing to prevent the entry of unauthorized personnel.			
6. Traffic Control	Struck by moving vehicles	Provide a flag person when operations create a traffic hazard.			
		Flag persons shall wear a Caltrans approved high visibility vest.			
7. Communication and preparatory instructions	Lack of coordination between Operators and resulting mistakes.	Before beginning each phase of work the foreman will explain to all operators where they will be working, what they are to do, and how the work will proceed.			
		Review hand signals and non-verbal communication.			
8. Clean and prep edges	Hazardous dust inhalation	Stand up wind from your broom so that dust is blown away from you.			
		When sweeping produces significant quantities of airborne dust, that is not blown away, wear a dust mask or respirator.			
	Impact injuries, hazardous noise, flying particles	Whenever you are using a jack hammer the following additional PPE is required: Toe-guards, ear muffs, safety glasses,			
9. Saw cut edges of AC or concrete pavements	Hazardous dust and noise, flying particles	Whenever you are using an abrasive cut-off saw the following additional PPE is required: ear muffs, safety glasses, and dust mask or respirator.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Laying Asphaltic Concrete Pavement

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	See the AHA for Saw Cutting with Water Control				
10. Install header boards	Saw kick backs	Properly support the lumber, and hold the saw steady (parallel with the direction of the cut).			
	Cutting body parts	Never pin back the guard on a saw.			
	Eye damage	Wear goggles or safety glasses with side shields			
	Smashed fingers	Keep opposite hand several inches away from whatever you are hitting with a hammer			
11. Apply tack coat	Burns- hot oil	Wear rubber gloves and never point the wand at yourself or other workers.			
	Twisted ankle or knee	At all times when walking in and around the work area watch your step! Be careful of changes in elevation from one grade to another.			
	Fire or explosion- burns	Before using a propane torch inspect the cylinder for leaks or damage.			
12. Stage dump trucks, and unload AC	Crushed by material	Stand away from equipment that is unloading material.			
	Crushed by moving equipment	At all times when working around equipment heed back up alarms and get out of the way. This is especially true for rollers, dump trucks, and loaders because they are frequently backing up.			
13. Spread AC by hand or wheelbarrow	Strained or pulled muscles	Don't be too aggressive when moving heavy material.			
		Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Crushed by moving equipment	When on foot never enter the operation area of any piece of equipment without first making eye contact with the operator and waiting for him to acknowledgement of your presence.			
	Burns	Don't touch hot asphalt or allow it to touch you.			
14. Operate paving machine	Crushed or pinched injuries	Keep and hands and other body parts away from pinch points on the machine.			
	Burns	Don't touch the screed, heaters or other hot surfaces.			
15. Roll/compact AC, or operate other equipment (skip loader)	Hazardous noise, hearing loss	Wear foam ear plugs when working on equipment where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
	Inability to see clearly	Keep the windshield and other glazing clean so that your view is unobstructed			
		Make sure the windshield wipers work and all mirrors are properly adjusted.			
		Look in the direction of travel.			
	Falling from the machine	Wear your seat while operating the machine.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
19. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Laying Asphaltic Concrete Pavement**

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
Paving Machine	Inspect each piece of equipment at the beginning of each shift	AHA training of each Operator or laborer
Dump Truck		
Rollers- Vibratory and Static		
Tack Truck		
Skip Loader		
Shovels, rakes		
Propane Torch		
Street sweeper		
Jack hammer		

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Installing Chainlink Fence and Gates**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Roofers	Roofers not trained in the safe execution of the task	Use this Activity Hazard Analysis, and other formal and informal training to train Roofers.			
2. Put on your personal protective equipment.	Head or foot injury.	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Stay clear of material that may move or shift when breaking bands.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Move lumber with a forklift	See Activity Hazard Analysis on forklift operation				
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Inspect tools	Defective or broken tools	Tag and remove defective tools from the jobsite.			
		All saws and grinders have properly functioning manufacture installed guards.			
		Power saws are equipped only with a constant pressure switch.			
7. Communication and preparatory instructions	Lack of coordination between workers and resulting misunderstandings.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
8. Dig post holes	Crushed by, or caught between machine parts	Do not stand or walk under the elevated portion of the machine, and stay clear of the auger.			
		Do not place body parts near pinch points on the machine or between the machine and a stationary object.			
	Pulls and strains from digging	Don't be too aggressive when moving heavy or wet material.			
		Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters.			
	Falling into a hole	When holes must be left open for extended periods, place caution tape around the hole or cover the hole with 3/4" plywood or similar cover.			
9. Move steel, fence posts and frame work	Strains from lifting	Know how much you can safely lift. Get help with heavy objects.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving long or bulky materials, watch where you are going.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Chainlink Fence and Gates

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
10. Set and plumb fence posts, pour footings	Struck or crushed by moving equipment	Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Eye Injury	Wear safety glasses with side shields or goggles while placing concrete.			
11. Cut posts, rails, truss rods (cut off saw or chopsaw)	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Burns, fires	Watch where you are throwing your sparks. Do not cut where sparks will land on other workers or on combustible materials			
	Cuts and abrasions	Keep fingers several inches from all blades			
	Flying particles- eye damage	Wear goggles or safety glasses with side shields			
	Hazardous noise- hearing loss	Wear foam ear plugs.			
12. Install framework	Cuts and abrasions	Wear gloves when handling site-cut edges that are sharp or that have burrs.			
	Crushing or pinching body parts	Keep fingers, hands, and feet clear of all pinch points.			
	Dropping materials, scrap, or tools on workers	Do not allow other workers to work below you.			
	Impact injuries, cuts and abrasions	Hand tools to coworkers handle first; do not throw them.			
13. Move fence fabric into place	Being struck by material or equipment	Use a forklift to move large rolls of woven wire fabric when feasible.			
		See AHA for forklift operation			
		Ensure that there is good communication between workers on the ground and the lift operator.			
	Struck by falling material	Never walk under a raised load.			
		Make sure there are sufficient workers to hoist fabric into place without allowing it to fall.			
14. Stretch fabric and tie fabric to framework	Struck by pull jack or cables	Ensure that the pull jack is secured properly to a substantial structural anchorage.			
	Struck by falling material	Secure fence fabric as soon as possible.			
15. Install hardware and/or barbed wire	Smashed fingers	Keep hand several inches away from whatever you are hitting with a hammer			
		Keep fingers and hands clear of all pinch points.			
	Cuts and scrapes	Wear gloves when installing barbed wire. Wear gloves and gauntlets when installing razor wire.			
21. Clean up	Tripping, cuts, and scrapes	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date

JOB SAFETY ANALYSIS			Activity Safety Inspection		
	Project Description	**JSA Description**			
	East County Substation Project	**Structural Steel Erection**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Ironworkers	Ironworkers not trained in the safe execution of the task	Train Ironworkers			
2. Receive material deliveries, shake out steel.	Crushing or pinching hands or feet	When moving steel keep hands and feet clear of pinch points. Stack steel on stickers.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Stack steel flat or make sure that it will not fall over			
	Excessive material handling	Stage material as close to its final destination as possible.			
3. Carrying and lifting steel	Strains from lifting	Know how much you can safely lift. Get help with heavy pieces.			
		Use a forklift, crane, or other lift as necessary.			
4. Communication and preparatory instructions	Lack of coordination between ironworkers and the resulting misunderstandings.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
5. Hoisting steel into position	Falling	Before moving steel make sure that all workers are in a secure position, are aware of the move, ready to make the connection and are tied off.			
		Ironworkers must wear a full body harness and shock absorbing lanyard secured to a structural member capable of supporting a dead weight of 5400 lbs.			
		If a retractable lanyard is used it should be non-shock absorbing and should be adjusted so that it will not allow the worker to fall further than 2 feet.			
	Equipment failure- falling	Inspect personal fall arrest equipment (lanyard, harness, D-rings), for frays, burns, hair line cracks, or other defects prior to use.			
	Steel striking and injuring ironworkers	Assure that there is good communication between connectors and lift or crane operator.			
		Use a tag line when moving steel.			
	Rigging failure- steel falling	Know about how much each piece of steel weighs and make sure rigging and connections are adequate.			
		Barricade area where steel erection is ongoing.			
6. Positioning steel - prying, lifting, twisting	Crushing or pinching body parts	Keep fingers, hands, and feet clear of all pinch points.			
		Be aware of how the steel may move suddenly.			
7. Setting up and using ladders	Ladders tipping or shifting while in use causing worker to fall	Set up ladders on firm level footing			
	Falling from ladder	Use the proper size of ladder for the job			
		Do not work from the top two steps of the ladder			
		Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
8. Bolting connections and torquing bolts	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace.			
		Only use tools for their intended use.			
	Dropping nuts, bolts, or tools on workers	Barricade area where steel erection is ongoing.			
Cutting steel with a cut-off saw	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Burns, fires	Watch where you are throwing your sparks. Do not cut where sparks will land on other workers or on combustible materials			

JOB SAFETY ANALYSIS			Activity Safety Inspection		
	Project Description	**JSA Description**			
	East County Substation Project	**Structural Steel Erection**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
	Cuts and abrasions	Keep fingers several inches from all blades			
	Starting a fire	Dispose of any combustibles before cutting or welding. Use approved containers.			
		Always have a fire extinguisher near by.			
9. Cutting and welding- electric arc.	Burns	Wear gloves, safety goggles and/or face shield.			
		Don't touch hot steel, or sharp edges.			
	See Activity Hazard Analysis on Welding and Cutting				
10. Operating a forklift	See Activity Hazard Analysis on forklift operation				
11. Working with a crane	See Activity Hazard Analysis on working with a crane.				
12. Working from a boom lift	See Activity Hazard Analysis on operating a boom lift.				
13. Working from a scissor lift	See Activity Hazard Analysis on operating a scissor lift				
14. Clean up	Tripping, cuts, and scrapes	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Forklift with jib	Forklift- prior to each shift	AHA training	
Scissor lift	Scissor lift- prior to each shift		Inspector's Signature
Boom lift	Boom lift- prior to each shift		
Ladders	Ladders tools and equipment		
Personal Fall Protection Sys.			
Welding machine			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Structural Steel Decking

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Ironworkers	Ironworkers not trained in the safe execution of the task	Use this Activity Hazard Analysis, and other formal and informal training to train Ironworkers.			
2. Put on your personal protective equipment.	Head or foot injury.	You must wear a hard hat, long pants, and work boots at all times.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving steel panels keep hands and feet clear of pinch points. Stack steel on stickers.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Install safe anchorage points for fall protection system.	Falling	Anchorage points should be installed on roof ridges and hips so that all work can be completed within a 30 degree swing radius on either side of the anchor point.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use 12 gauge or larger cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
6. Inspect tools	Injures from defective or broken tools	Remove defective tools from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All saws and grinders have properly functioning manufacture installed guards.			
		Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch.			
7. Communication and preparatory instructions	Lack of coordination between Ironworkers and resulting misunderstandings.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
8. Cut decking	Workpiece moving unexpectedly	Make sure the piece you are cutting is properly supported and secured.			
	Burns, fires	Watch where you are throwing your sparks. Do not cut where sparks will land on other workers or on combustible materials			
	Cuts and abrasions	Wear gloves			
		Keep fingers several inches from all blades			
	Flying particles- eye damage	Wear goggles or safety glasses with side shields			
	Hazardous noise- hearing loss	Wear foam ear plugs. When using an abrasive saw or grinder for more than 30 minutes ear muffs shall be worn in addition to the ear plugs.			
9. Move decking into place	Unexpected movements	Before moving a panel make sure that all workers are in a secure position, are aware of the move, and are tied off.			
	Strains from lifting	Know how much you can safely lift. Get help with heavy pieces.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Structural Steel Decking

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Convert lifting and lowering tasks to pulling and pushing. (Slide panels when possible).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Use a forklift or other lift when feasible.			
		See AHA for forklift operation			
	Materials striking and injuring workers	Ensure that there is good communication between workers on the roof and the lift operator.			
	Crushed by falling material	Never walk under a raised load.			
	Cuts and abrasions	Wear gloves when handling site-cut edges that are sharp or that have burrs.			
10. Position and fit panels	Crushing or pinching body parts	Keep fingers, hands, and feet clear of all pinch points.			
	Dropping materials, scrap, or tools on workers	Barricade area where steel erection is ongoing.			
11. Weld panels into place	Tripping, slipping, and falling	Keep hoses and cords that are draped across the roof to a minimum.			
	See AHA for Arc Welding and Cutting				
12. Clear scrap and debris from the roof	Debris striking and injuring workers below	Barricade off drop area onto which scrap is thrown from the roof. Have someone on the ground to prevent anyone from entering this area.			
		As always hard hats are mandatory.			
13. Working from an elevated position	Falling	Whenever you are working on roof or other location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		Workers must wear a full body harness and lanyard secured to a roof anchor bracket.			
		Lanyard shall be adjusted so that it will not allow the worker to fall further than 2 feet from the roof area.			
		Lines shall be checked after each move to ensure correct length.			
14. Setting up and using ladders	Ladders tipping or shifting while in use causing worker to fall	Set up ladders on firm level footing. Level the dirt beneath the base of the ladder.			
	Falling from ladder	Use the proper size of ladder for the job			
		Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Getting on and off the roof- using a ladder	Loosing balance and falling	Keep at least one hand free when ascending and descending a ladder.			
		Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing or roof edge.			
16. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Structural Steel Decking

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
17. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
18. Working from a boom lift	See Job Hazard Analysis on operating a boom lift.				
19. Clean up	Tripping, cuts, and scrapes	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Forklift	Forklift prior to each shift	Activity hazard training of each worker	
Ladders	Ladders prior to use		Inspector's Signature
Welding machine	Tools and equipment prior to use		
Steel cutoff saw			
Vise grips			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install T-Line Structures & Conductor

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Tailboard Briefings	Lack of hazard awareness	Hold briefings on-site to highlight potential hazards and assign tasks according to worker classification			
2. PPE	Physical injuries due to exposure	All appropriate PPE must be worn at all times and is to be covered in tailboard briefings.			
3. Perform 360 on vehicles	Breakdown of vehicles and possible injury to workers or public	All vehicles will be inspected in accordance with CDL/DMV training. All inspections will be documented and any discrepancies including leaks will be referred to Fleet for repair.			
4. Inspect Tools	Physical injury from broken tools	All tools will be inspected for wear or for missing handles, guards, or cracks and splinters.			
5. Power Tools	Electrocution, bodily injury	All power tools will be checked for cracks, wear, and holes in the cord and must have a grounding prong.			
		Any guards or safetys will not be removed and be functional.			
		Power tools are not to transported or stored hanging by their cord.			
		No cracks or holes to tool housing.			
6. Loading or Unloading Material	Crushing and/or pinching hazard	Ensure workers are not in the bight of any loading or unloading of materials.			
		Use clear and concise communication to include both verbal and physical signals while performing duties.			
		Workers operating fork lift will be trained and qualified to operate said equipment.			
		Proper PPE should be worn.			
7. Guarding vehicle	Vehicles pulling pole trailers could cause damage to other structures or other vehicles making turns	When using pole trailers, a guard vehicle will be used to follow to guard against other vehicles trying to pass underneath.			
8. Booms and cranes	Crushing and/or falling object hazard	While boom or cranes are engaged, care should be taken to avoid booming over workers.			
		Workers should be made aware when objects are aloft.			
	Damage from outriggers and stiff legs to ground underneath vehicle	Always use pads or proper cribbing underneath outriggers and stiff legs to guard against damage to asphalt, conrete, or other customer property.			
		Ensure that all outriggers/stiff legs are extended to guard against unbalanced load.			
	Load lockout or damage to equipment	Always verify load weight before starting to ensure equipment can properly handle the load.			
	Miscommunication	Operator and worker giving signal shall be in agreement on definition of signals to guard against damage or injury.			
9. Pole holes	Falling and/or cave in hazard	If poles are not immediately utilized, care should be taken to guard hole from persons accidentally falling into hole. If a person should fall into hole there is a possibility of cave-in.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install T-Line Structures & Conductor

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
10. Pole enclosures	The insides of steel poles make great animal habitats.	Openings to the inside portion of the pole should be closed off to inhibit any local species of animal making it their home.			
		When encountering animals inside poles, care should be taken to allow animal to not feel cornered and to allow animal to egress on its own.			
11. Energized Circuits	Electrocution	If working on or near energized circuits, GF's will ascertain whether circuits are to be deenergized and grounded or worked energized.			
	When working on or near energized lines or equipment, proper PPE will be worn at all times.				
12. Heat and Humidity	Heat related hazards	All employees will be trained in the Company's Heat Stress training.			
13. Bucket Trucks	Worker working aloft hazards	Workers working aloft will ensure they are wearing proper lanyards and harnesses attached to boom arm and not bucket along with other associatied PPE.			
	Dropping and/or crushing hazards	Workers working aloft will be aware of any potential dropping hazards and workers below will not be underneath worker in bucket.			
14. Terrain	Terrain Hazards for vehicles and workers	Soil types will be ascertained a determination will be made as to what type of mitigation will be required.			
		Natural terrain hazards such as steep slopes, large boulders, and vegetation will be identified and mitigated.			
15. Wire Pulling	Grounding and bight points	Wire pulling vehicles will have proper grounding.			
		Bight points will be identified and either mitigated or eliminated.			
		Where needed, guard structures shall be utilized.			
16. Emergency Procedures	Response time, improperly trained, communication, and no first aid kit	All employees will be trained in giving first aid and documentation will be up -to-date.			
		The foreman or designated person will contact emergency services and shall have all pertinent information for proper response.			
		First aid kits will checked daily by the drivers of all company vehicles. Packages that are opened should be replaced.			
17. Sagging and Clipping	Strain hazards and bight issues	A dynamometer shall be used to determine proper sag of wire.			
		Insulated bucket shall not be used to lift pulling rope or conductor. Use of boom or crane will be used.			
18. Jobsite Cleanliness	Tripping, cuts, scrapes	Trucks and jobsite will be kept free of debris and/or tripping hazards before, during, and after work.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Install T-Line Structures & Conductor**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
Bucket truck		
Boom truck		
Crane		
Water truck		
Front-end loader/back-hoe		
Wire pulling truck		
Pick-ups		
Digger/derrick		

Y | N | N/A

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Install UG Duct Bank & Vaults**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
Trench to place conduit	Break ex utilities	Good USA Check marks, prints, pothole	X		
	Cave in	Shore trench using tabulated data, Use ladder, Refer to CCR Title 8 Article 6 Section 1541.1	X		
		Keep spoil pile 2 foot back			
	Toxic atmosphere	Test atmosphere with calibrated air monitor.	X		
	Injure hands handling shoring	wear gloves, keep hands away from pinch points	X		
	Injure back handling shores and	Use proper lifting techniques, lift with legs not back	X		
	conduit				
	Hit by vehicular traffic	Stay off of haul roads, wear high vis clothing	X		
		use a spotter when backing up	X		
		Make sure that all back up alarms work.	X		
Pour flowable backfill	Exposure to skin and eyes	Wear rubber gloves to protect hands, wear long sleeve shirt to protect arms, wear face shield to protect eyes	X		
	Concrete truck in trench	Keep truck as far away as possible from the edge of trench.	X		
		Keep crew members from working between truck and trench	X		
		Make sure that the concrete truck has as smooth and flat suface to drive on while off loading material	X		
Excavate for vault	Break existing utilities	Good USA marks, check drawings, pothole	X		
	Cave in	Shore trench using shields or hydralic shores. Use tabulated data and refer to CCR Title 8 Article 6 Section 1541.1	X		
		Keep haul trucks as far away from the edgeof the excavation as possible reduce the overburden	X		
	Toxic atmosphere	Test Atmosphere with calibrated air monitor	X		
	Hit by excavating equipment	Stay clear of the swing zone	X		
		Wear high viability clothing	X		
		Make sure that back up alarms are working properly	X		
	Injure hands handling shoring	wear gloves, keep hands away from pinch points	X		
	Injure back handling shores and	Use proper lifting techniques, lift with legs not back	X		
Set Vaut	Crane tip over	Make sure you have a pick plan in place	X		
		Use only certified crane operators	X		
		Make sure all outriggers are extended	X		
	Rigging failure	Inspect all rigging before use	X		
		Only use certified rated rigging with tags	X		
		Use trained riggers to do all rigging	X		
		Stay clear of all elevated loads	X		

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Install UG Duct Bank & Vaults

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date		
Shores and shields	Before use	Competent person shoring			
Air monitors	Daily	Competent person confined space			
Haul trucks	Before use	Valid drivers lic			
Excavation equipment	Before use	Valid drivers lic			

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Blasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Operators	Operators not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Operators.			
		All personnel involved in transporting, handling, storage, and use of explosives shall be trained in their safe use.			
		Obtain permission in writing from the ROICC before bringing explosive material onto the jobsite.			
		Read through the site specific blasting safety plan. Follow the plan at all times.			
		Place warning signs at all points of access to the blast area.			
		Cease blasting operations and remove everyone from the blast area prior to and during a thunderstorm.			
		Controls to prevent the accidental discharge of electric blasting caps from extraneous electricity (such as overhead power lines, lightning, radar, or radio transmission facilities) shall be as follows:			
Inspect electrical supply		Electric detonators shall be chosen and used in keeping with the manufacturer's recommendations.			
		Leg wires for electric detonators must be short circuited (shunted) until they are connected into the circuit for firing.			
		Initiate detonator cord in accordance with manufacturer's recommendations.			
		The blasting switch shall be ungrounded, UL listed, enclosed, externally operable double-pole, double throw switch, and will shunt the firing lines when open.			
		Install a grounded switch (at least 15' from the blasting switch) between the blasting switch and the power supply.			
Test and secure blasting machine	Equipment failure- or unsafe operation	Test the blasting machine prior to use and peridically thereafter as prescribed by the manufacturer.			
		Make sure recommended preventive maintenance is being performed and a log maintained.			
		Secure the blasting machine so that it is accessable only to the blaster.			
	Fires, explosions- burns	A fire extinguisher is provided at the operator's compartment			
		Never use black powder.			
5. Put on your personal protective equipment.	Head or foot injuries	You must wear a hard hat (except when protected by the cab or canopy of the equipment) and work boots at all times.			
	Crushed by moving equipment	Keys to the switches remain with the blaster at all times.			
6. Set up barricades and caution-off area.	Entry of unauthorized personnel	Set up warning barricades or temp. fencing and caution off area where blasting is ongoing to prevent the entry of unauthorized personnel.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Blasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
7. Communication and preparatory instructions	Lack of coordination between Operators and resulting mistakes.	Before beginning each phase of work the foreman will explain to all operators where they will be working, what they are to do, and how the work will proceed.			
		Review hand signals and non-verbal communication.			
		Make sure firing line is long enough to allow the blaster to be a safe distance from the blast			
		Never abandone explosive materials			
		Stay away from the face of any cut where you could fall more than 6' to the lower level.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working on equipment where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
	Burns	Do not touch hot pipes/surfaces or electrical contacts.			
	Foot or leg injuries	Wear work boots and long pants			
16. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
	Sunburn	Use sunscreen			
		Dispose of all refuse from explosive loading such as empty boxes, paper, packing ect. By burning at an approved location.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Blasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
	Inspect each piece of equipment at the beginning of each shift	AHA training of each Operator or laborer

Activity Safety Inspection

Y	N	N/A

Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Working in a Permit Required Confined Space

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Workers	Workers not trained in safe confined space entry procedures	All people listed on a confined space entry permit must be trained so they can safely perform the duties assigned to them. The training must be certified.			
		Be familiar with the potential hazards encountered in a confined space, and know the signs or symptoms of exposure.			
		Know how to properly use the required personal protective equipment, ventilation equipment, communication equipment, testing and monitoring equipment.			
2. Identify all Permit Required Confined Spaces (PRCS) on the jobsite	Workers unknowingly entering a PRCS	Before beginning work on any job identify all PRCS, so that these can be avoided or permits can be obtained and precautions taken for entry.			
3. Train employees who are to provide rescue and emergency services	Delayed or incompetent emergency rescue	Receive training to perform assigned rescue duties. This training must include basic first aid and CPR certification, use of the required PPE, and training as an authorized entrant of a PRCS			
		Practice making PRCS rescues at least once every year.			
4. Test the air in the confined space	Hazardous atmospheres- oxygen deficient, contains flammable or toxic gases, vapors, or airborne dusts	Before anyone enters the space the internal atmosphere shall be tested for oxygen content, and for flammable or toxic gases, vapors, or dusts			
		Record the test on the permit form. Post the form at the entrance to the confined space. Afterward keep the record of the test at the jobsite for the duration of the job.			
		If at any time it is necessary to enter the space either to test the air or to isolate the space. An authorized entrant equipped with a supplied-air respirator and attached to a retrieval system tended by a trained attendant will enter the space.			
5. Isolate the confined space	Engulfment, asphyxiation, incapacitation, or impairment	Prevent the release of energy, flowable material, and flammable or toxic gases, vapors, or mists into the space by blocking or disconnecting all mechanical linkages.			
		If isolation of the space is infeasible, air monitoring shall be continuous.			
	Engulfment	Disconnect, lock out, or blind all pumps and lines which may reasonably be expected to allow flowable material to enter the space.			
		If isolation is accomplished by use of a valve the valve must be locked and tagged.			
		When a blind is used to isolate the space ensure that it is installed correctly and that it has a safety rating of four times the line pressure.			
	Electrocution- impairment of ability to self rescue.	Disconnect, lock, and tag out all sources of electrical energy flowing into the space.			
5. Isolate the confined space	Burns, impact injuries- impairment of ability to self rescue.	Bleed, disconnect, blind, or lock, and tag out all sources of steam or compressed air which may reasonably be expected to enter the space.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Working in a Permit Required Confined Space

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
6. Control Atmospheric Hazards	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Set up gas powered blowers down wind of the opening and several feet away from the opening.			
		Run electric blowers on a GFCI protected circuit.			
		Make sure the air intake for the blower is clean air (not next to a vehicles exhaust)			
		Direct the ventilation so that it forces air to the immediate areas where the worker is working			
		Make sure the ventilation continues uninterrupted until all personnel have left the confined space.			
		Never ventilate an extremely flammable atmosphere this may cause an explosion.			
7. Set up temporary barriers-prevent entry of unauthorized personnel	Unauthorized personnel entering a Permit Required Confined Space, Falling through an opening.	Install a fence, gate, cover, or other physical means to prevent unauthorized workers from unknowingly entering a Permit Required Confined Space, or falling through an opening.			
8. Set up the retrieval system	Delayed rescue. Injury to rescuers entering a PRCS	When a retrieval system is used as the means of rescue for PRCS entry, each entrant must wear a chest or full body harness, with a retrieval line attached at the center of the back.			
		Set up the mechanical retrieval device outside of the confined space. Follow manufacturer's recommendations.			
		Have a trained attendant stationed outside the PRCS who's only duty is to monitor the authorize entrants, and pull them to safety in case of an emergency.			
9. Put on your personal protective equipment.	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Put on full body harness and attach the retrieval line.			
		Wear the PPE required by the entry permit. Read the permit.			
		PRCS with a hazardous atmosphere requires the use of a full face supplied-air respirator or a self contained breathing apparatus (pressure demand type).			
10. Complete the pre-entry checklist	Failure to perform a necessary safety check	Complete the pre-entry checklist found in the Permit Required Confined Space Entry Program.			
11. Enter the confined space	Falls	Keep hands free when climbing a ladder, lower tools into the space rather carry them up and down.			
	Inability to communicate with the attendant outside the PRCS	Once in the PRCS check your communication equipment to ensure you can communicate with your attendant.			
	Poor illumination	Set up lighting that is sufficient to properly illuminate the work area.			
	Fires or explosion	If the hazardous atmosphere is due to flammable and/or explosive gases or dusts all lighting and electrical equipment shall be Class 1 Division 1 per the NEC.			
12. Test the air as work is ongoing	Development of a hazardous atmosphere while workers are in the PRCS	Periodically test the air in the confined space while work is ongoing.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Working in a Permit Required Confined Space

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Provide all persons entering a PRCS with an opportunity to observe the air testing required before and during operations in a PRCS			
13. Leave the confined space	Fires, explosions	Clean up and remove tools or equipment in the confined space			
		Do not leave lighting in the confined space			
14. Close off PRCS	Unauthorized personnel entering a Permit Required Confined Space	Reinstall barriers (fence, gate, cover, or other) to prevent workers from unknowingly entering a Permit Required Confined Space.			
15. Post Signs	Unauthorized entry of the PRCS	Post warning signs at all possible entrances to the PRCS. Signs should read: DANGER- Permit Required Confined Space-Do Not Enter.			
16. Cancel the permit	Unauthorized personnel entering a Permit Required Confined Space	Cancel the permit keep a copy on file for one year. Any further entries into the PRCS will require a new permit.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Sniffer, air monitoring device	Air sampling and monitoring of confined spaces	AHA training of each laborer	
Blower with flex duct	Inspection of monitoring devices	Confined space entry training	
Lights and power cords	Inspection of retrieval systems		
Hand and power tools	Inspection of personal fall protection		
Signs and barriers			
Retrievel Equipment	Onsite	Rescue Training within 12 months	
Harness; Lifeline; Tripod	Working order; Inspect prior to use	Rescue Training within 12 months	
Communication Equip. Radios; Phones	Working order; Inspect prior to use	911 numbers and job location; contact for off site rescue crews / response team	

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Working in a (c5) Non-Permit Required Confined Space

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Workers	Workers not trained in safe confined space entry procedures	All people involved in confined space entry must be trained so they can safely perform the duties assigned to them.			
		Authorized entrants must be familiar with the potential hazards encountered in a confined space, and know the signs or symptoms of exposure.			
		Authorized entrants must know how to properly use the required personal protective equipment, ventilation equipment, communication equipment, testing and monitoring equipment.			
2. Identify all Permit Required Confined Spaces (PRCS) on the jobsite	Workers unknowingly entering a PRCS	Before beginning work on any job identify all PRCS, so that these can be avoided or permits can be obtained and precautions taken for entry.			
3. Complete the pre-entry checklist	Failure to perform a necessary safety check	Complete the c5 pre-entry checklist found in Permit Required Confined Space Entry Program.			
4. Demonstrate that the PRCS is a c5 non-permit required confined space	Failure to correctly identify the hazards of the space	A "c5" Non-PRCS is a confined space where the only hazard posed by the space is an actual or potential hazardous atmosphere. Forced air ventilation must be sufficient to eliminate the actual or potential hazardous atmosphere. This condition must be demonstrated by testing before and after setting up mechanical ventilation.			
5. Test the air in the confined space	Hazardous atmospheres- oxygen deficient, contains flammable or toxic gases, vapors, or airborne dusts	Before anyone enters the space the internal atmosphere shall be tested for oxygen content, and for flammable and/or toxic gases, vapors, or dusts			
		Record the test on the c5 form. Post the form at the entrance to the confined space. Afterward keep the record of the test at the jobsite for the duration of the job.			
		If at any time it is necessary to enter the space either to test the air or to set-up the ventilation equipment. A full permit must be issued. See the AHA for Permit Required Confined Spaces.			
6. Set up temporary barriers- prevent entry of unauthorized personnel	Unauthorized personnel entering a Permit Required Confined Space, Falling through an opening.	Install a fence, gate, cover, or other physical means to prevent unauthorized workers from unknowingly entering a Permit Required Confined Space, or falling through an opening.			
7. Set up forced air ventilation	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Set up a blower or other mechanical means to ventilate the confined space. Do not enter the space until the forced air ventilation has eliminated the hazardous atmosphere.			
		Direct the ventilation so that it forces air to the immediate areas where the worker is working			
		Make sure the ventilation continues uninterrupted until all personnel have left the confined space.			
8. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Whenever operations create dusts you must wear a dust mask or respirator.			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields when using hammers, chipping tools, grinders, drills, and pneumatic tools.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Working in a (c5) Non-Permit Required Confined Space

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
9. Enter the confined space	Falls	Keep hands free when climbing a ladder, lower tools into the space rather carry them up and down.			
10. Set up lighting	Poor illumination	Provide lighting so that you can see well enough to perform the work safely			
11. Using power tools	Electrocution	Be especially careful when using power tools and electrical cords. Confined spaces are often wet or damp.			
12. Test the air as work is ongoing	Development of a hazardous atmosphere while workers are in the c5 Non-PRCS	Periodically test the air in the confined space while work is ongoing. Record test results.			
		Record ongoing tests on the c5 form. Post the form at the entrance to the confined space			
		If a hazardous atmosphere is detected during operations in the confined space leave the space immediately.			
13. Responding to an emergency	Delayed emergency response-further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid/CPR should be allowed to administer first aid.			
14. Leave the confined space	Fires, explosions	Clean up and remove tools or equipment in the confined space			
		Do not leave lighting in the confined space			
15. Post Signs	Unauthorized entry of the PRCS	Post warning signs at all possible entrances to the PRCS. Signs should read: DANGER- Permit Required Confined Space-Do Not Enter.			
16. Prevent entry of unauthorized personnel	Unauthorized personnel entering a Permit Required Confined Space	Reinstall barriers (fence, gate, cover, or other) to prevent workers from unknowingly entering a Permit Required Confined Space.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Working in a (c5) Non-Permit Required Confined Space**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
Sniffer, air monitoring device	Air sampling and monitoring of confined spaces	AHA training of each laborer
Blower with flex duct		Confined space entry
Lights and power cords		
Hand and power tools		
Signs and barriers		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Equipment

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Installer	Installers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train Installers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All Saw blades have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric shock	Use only GFCI protected outlets			
7. Drill holes, set anchors and/or brackets	Twists or sprangs due to drill bit catching	Hold the tool steady with arms flexed, and drill as straight a hole as possible.			
	Cuts, abrasions, impact injuries	Never disable the built in safety features on a tool.			
		Hand tools to coworkers handle first; do not throw them.			
	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes			
	Impact injuries	Use a wire or other locking device to prevent air hoses from being accidentally disconnected.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Equipment

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
Assemble components	Cuts, abrasions	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
		Take your finger off the switch when carrying a plugged in tool.			
		Unplug all tools before making any repairs or adjustments.			
	Electric Shock	Do not carry or hoist tools by their power cords.			
Make modification or adjustments	Hazardous noise, hearing loss	Wear foam ear plugs when using tools or when working in an area where sound pressure levels are greater than 85 dB(A) time-weighted ave. over 8 hrs.			
	Cuts	Be careful while handling edges that are sharp or burred.			
Move equipment into position	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers.			
	Crushed or pinched body parts	Use a pry bar or other mechanical means to help position the equipment or to prevent it from shifting.			
		Keep fingers and hands clear of pinch points			
		Communicate clearly with co-workers			
Fasten equipment in place	Impact injuries, or crushed or pinched injuries	Make sure the equipment is adequately supported until it is permanently fastened into place.			
11. Installing equipment from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
12. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
	Electric shock	Nonconductive ladders used when working near energized electrical lines or equipment.			
14. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Installing Equipment

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Wash after contact with blood or other body fluids.			
	Exposure to Bloodborne Pathogens	Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
	Failure to abate a hazard	Report all accidents to your supervisor immediately.			
16. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
19. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			
20. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
22. Hot work- welding, cutting, soldering, brazing.	Fires and explosions- burns	Always have an ABC rated fire extinguisher adjacent to where the work is being performed			
		Remove all combustibles from your work area prior to beginning and hot work.			
	See AHA for Welding and Cutting				
31. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Installing Equipment**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Ladders, scaffolding	Tools & equipment prior to use	Activity hazard training for each laborer	
Drills			Inspector's Signature
Chipping hammer/drill			
reciprocating saw			
grinders			
compressors			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Purpose Fire Extinguisher Distribution

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers on the proper use of fire extinguisher	Workers who are not trained in the safe execution of this task	Use this Activity Hazard Analysis, and other formal and informal training for training workers on how to operate extinguishers.			
2. Put on your personal protective equipment	Chemical getting in eyes.	You must wear a hard hat and work boots at all times. Have safety glasses with side shields or goggles, on person when operation requires special protection.			
3. First response Fire protection	Fires and explosions- burns, Injury or loss of life	Portable fire extinguisher shall be provided where needed as specified in the EM-385. Extinguishers to be placed in low hazard conditions allowing a perdon to travel no more than 75'. Refer to EM 385 Table 9.4 for placement for change in hazard conditions.			
4. Approved fire extinguishers.	Delayed emergency response	It is recommended to use class ABC rated fire extinguishers approved by a nationally recognized testing laboratory.			
		In multiple story facilities at least 1 fire extinguisher shall be placed adjacent to stairway.			
		Fire extingusher shall be fully charged and in operating condition, distinctly marked and readliy accessible.			
5. Inspection of Fire extinguishers	Injuries from defective equipment	Fire extinguishers shall be inspected monthly, records shall be kept on a tag or label attached to the extinguisher and a inspection check list maintained on file. Defective or used extinguishers must be remove from jobsite and replaced immediately.			
		No employee shall fight a fire where the he/she is imminent danger.			
6. Special Conditions	Injury from ignited flammables/combustible.	Fire extinguishers shall be placed within 50' of all stored flammables/combustibles.			
		All hot work shall have a compatible fire extinguisher. Area is to be free of, or protection provided for, combustible materials, flammable gases, vapors, liquids or dusts.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Approved Fire Extinguishers for type of work.	Fire Extinguishers to be inspected monthly.	Activity hazard training of each worker.	
		Employer shall provide training for proper use of fire extinguishers.	Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Oxyfuel Gas Cutting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers	Workers who are not trained in the safe execution of their task	Use this Activity Hazard Analysis, and other formal and informal training to train workers.			
2. Roll out equipment and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas clear of cords, hoses, and other equipment.			
		Clean up scrap materials and debris before and after working in an area.			
		Do not place compressed gas cylinders in traffic lanes or where they can be hit by vehicles or equipment.			
	Electric Shock	Power tools must be run on a GFCI protected circuit.			
3. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
4. Fire Control- move work or set up shielding or other controls	Fires, explosions- burns	If possible move objects to be brazed or cut to an area free of dangerous combustibles.			
		Clean up combustible trash and debris before working in an area.			
		Install noncombustible shielding to protect combustible wall or floor assemblies from flashes, sparks, and molten metal.			
		Always have an ABC rated fire extinguisher ready adjacent to the work.			
		Do not place cylinders where they will could be reached by sparks, hot slag or flames.			
5. Inspect tools and equipment	Injuries from defective equipment	Do not use defective tools or equipment. Remove them from jobsite.			
	Cuts, flying particles	Chop saws and grinders have properly functioning manufacture installed guards.			
	Interchanging of hoses	Gas hoses and the hose connections to the manifold shall not be interchangeable, and should be easily distinguishable from each other (oxygen-green, acetylene-red)			
	Fires due to oil or grease	Keep hose connections, cylinders, fittings, cylinder caps, valves, couplings, and regulators clean and free of oil and grease.			
	Leaking hose-fires and burns	Do not use a single hose having more than one gas passage.			
		Make sure hoses are free of cuts and abrasions. Do not use a defective or potientially defective hose.			
	Leaking torch-fires and burns	Torches shall be inspected at the beginning of each shift for leaking valves, hose couplings and tip connections.			
6. Inspect compressed gas cylinders	Mistakes in the use of compressed gas	Learn how to read the stamping at the top of the cylinder.			
		Use cylinders with oldest delivery date first.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Oxyfuel Gas Cutting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Surges in gas pressure	Make sure that cylinders are equipped with suitable regulators.			
7. Lift and move materials and equipment	Pulls and Strains from lifting	Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Be aware of your surroundings while moving materials, watch where you are going.			
8. Move or hoist a compressed gas cylinder	Fires and explosions	Unless the cylinder is secured in a cart the regulators must be removed and the valve protection caps installed before the cylinder is moved.			
		Do not hoist cylinders by their valve protection cap, or by using a magnet, or choker sling.			
		Move cylinders by tilting them and rolling them on their bottom edges.			
		Do not drop cylinders or premit them to strike together violently.			
		Never hoist a cylinder over or above workers.			
9. Prep and test surface of work	Hazardous fumes, flammable coatings	Do not cut any surface covered by a preservative coating that is highly flammable. Test by burning scrapings of the coating in a non-flammable container.			
		When cutting through preservative coatings the coating must first be stripped or a respirator must be worn. (this includes galvanized steel)			
10. Clamp and/or brace materials to be brazed into position	Steel falling or shifting before weld can be made	Brace, shim, clamp, or otherwise secure the materials that you are cutting so that they do not fall or move before the cut is completed.			
11. Cut	Eye injury.	Wear goggles with the proper level of shading (3-4).			
	Burns	Wear long gloves for hand and arm protection.			
	Asphyxiation, airway irratation	Ensure that there is natural or mechanical exhaust to the work area when cutting.			
	Burns	Be careful not to touch or rub against hot work.			
	Fires or explosions	Cylinders must be secured in an upright position at all times. A convient way to accomplish this is to use a welding cart with the cylinders chained to the cart.			
		Do not disable any safety appliances attached to a gas cylinder such has check valves, indicating devices, or control devices.			
	Inability to quickly shut off gas in case of an emergency	Be careful not to damage the regulator by opening and closing valves too quickly. If a special wrench is required to open the valve it should be left in place for shutting the valve off.			
	Leaking gas- fire or explosion	If a fuel gas cylinders is leaking at the valve stem, valve seat or in any other way the gas shall be shut off and the leak fixed. If the leak can not be fixed the cylinder shall be tagged as defective and removed from the jobsite.			
		Do not light a torch by matches or from hot work use an approved friction lighter.			
12. Grind steel	Flying particles- Eye injury	Wear safety goggles or a face shield.			
	Burns, cuts or abrasions	Wear gloves when handling metal that is hot or has sharp edges.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Oxyfuel Gas Cutting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Hazardous noise, hearing loss	Wear foam ear plugs grinding, cutting or working in noisy areas.			
13. Cutting from a ladder	Ladders tipping or shifting while in use causing the worker to fall	All step and extension ladders are equipped with ladder shoes.			
		Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
	Electric shock	Nonconductive ladders are recommended.			
	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
14. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
15. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
16. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never weld, cut, or burn through any Lead-containing material.			
17. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
18. Store compressed gas cylinders, or fuel gas hoses	Fires and explosions	Store compressed gas cylinders secured in an upright position with valve protection caps in place.			
		Store fuel gas cylinders and oxygen cylinders in separate locations (20' apart) or incompartments divided by a fire rated wall.			
		Storage locations should be well-protected, ventilated, dry, and at least 20' from highly combustible materials.			
		Boxes used to store gas hose shall be ventilated.			
19. Clean up	Tripping -- waste and debris, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	**Oxyfuel Gas Cutting**

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A

Equipment to be Used	Inspection Requirements	Training Requirements
Compressed gas cylinders	Inspect cylinders and other equipment prior to each shift	Activity hazard training of each worker
safety appliances		
gas hoses		
torch and striker		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Laborer

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Laborer	Laborers not trained in the safe execution of their tasks	Use this Activity Hazard Analysis, and other formal and informal training to train laborers.			
2. Put on your personal protective equipment.	Head, foot, or eye injury and/or hearing loss	You must wear a hard hat and work boots at all times. Have Safety glasses with side shields or goggles, and foam ear plugs and/or ear muffs handy for when the work requires special protection.			
	Clothing or jewelry being caught or snagged	Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery.			
3. Receive material deliveries, shake out material	Crushing or pinching hands or feet	When moving material keep hands and feet clear of pinch points.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
	Excessive material handling	Stage material as close to its final destination as possible.			
4. Roll out tools and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas free of cords, hoses, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
	Poor illumination	Set up lighting in a location or in such a manner that provides good illumination but will not fall over, or create a trip hazard.			
5. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
6. Inspect tools	Injures from defective or broken tools	Tag Defective tools/equipment as unsafe, and remove them from the jobsite.			
		Wooden handles for tools are secured tightly in the tool and free of cracks and splinters.			
		All Saw blades have properly functioning manufacture installed guards.			
		Hand held power tools (saws, air impact, drills) equipped only with constant pressure switch.			
	Electric shock	Use only GFCI protected outlets			
7. Use hand and power tools	Sprains, cuts, bruises	Always use the right tool for the job. If you don't have the right tool or don't know what to use ask your supervisor.			
		Never disable the built in safety features on a tool.			
		Hand tools to coworkers handle first; do not throw them.			
8. Use power and pneumatic tools	Puncture wounds	Pneumatic nailers have a functioning safety device on the muzzle to prevent ejection unless muzzle in contact with work surface.			
	Impact injuries	Use a wire or other locking device to prevent air hoses from being accidentally disconnected.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Laborer

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Cuts, abrasions	Take your finger off the switch when carrying a plugged in tool.			
		Unplug all tools before making any repairs or adjustments.			
	Electric Shock	Do not carry or hoist tools by their power cords.			
9. Use power and pneumatic tools	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields for the following types of work: hammers, chipping tools, grinders, chemicals, hazardous substances which create dust, mist, and fumes			
10. Lift and moving materials and equipment	Pulls and Strains from lifting	Get help when moving heavy materials, use a mechanical lift when possible.			
		Convert lifting and lowering tasks to pulling and pushing. (use ramp or conveyor).			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
	Striking and injuring co-workers with materials	Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers.			
11. Working from a ladder	Ladder tipping, shifting, or sliding causing the worker to fall	Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. The top of the ladder is tied off and the side rails extend 36" above the landing.			
		Step ladders used only in full open position.			
		Set up ladders on firm level footing			
		Don't work from a step ladder leaned against a wall.			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Choose the correct size of ladder for the job			
	Ladder failure- Falling	Ladders must be inspected regularly and tagged “do not use” if defective. Remove defective ladders from the jobsite.			
12. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
	Electric shock	Nonconductive ladders used when working near energized electrical lines or equipment.			
13. Working in noisy areas or using noisy equipment.	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted ave. over 8 hrs. When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.			
14. Administering First-Aid	Exposure to Bloodborne Pathogens	Use appropriate PPE when administering first aid such as gloves, masks, eye protection, and/or resuscitation equipment especially when blood is present.			
		Wash after contact with blood or other body fluids.			
14. Administering First-Aid	Exposure to Bloodborne Pathogens	Dispose of soiled material in a labeled leak proof container.			
		Clean up accident area including tools.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Laborer

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
	Failure to abate a hazard	Report all accidents to your supervisor immediately.			
16. Confined Spaces	Asphyxiation, incapacitation, or impairment of ability to self rescue.	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
17. Working around asbestos-containing materials	Asbestos Inhalation	Never grind, sand, scrape, drill, break, or cut any asbestos containing material.			
		Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement.			
		Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980.			
		Check with your supervisor before working with any material that may contain asbestos.			
18. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never grind, sand, scrape, cut, or burn any Lead-containing material.			
19. Working with Hazardous Chemicals	Burns, dizziness, nausea, sickness, or cumulative damage due to long term occupational exposure	Read through the MSDS for every chemical/material that you will be using. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.			
		Wear the personal protective equipment required by the MSDS when handling the chemical.			
		Use the appropriate signage and warning labels			
20. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
21. Working with combustible materials	Fires and explosions- burns	Ensure that a portable an ABC rated fire extinguisher is always within 100 ft. of your working area.			
		Know how to operate the fire extinguisher			
		Always heed “No Smoking or Open Flame” warning signs.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Laborer

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Remove combustible scrap and debris from work areas daily. Store combustibles in approved locations/containers.			
		Use approved metal safety cans used for handling and use of flammable liquids.			
22. Hot work- welding, cutting, soldering, brazing.	Fires and explosions- burns	Always have an ABC rated fire extinguisher adjacent to where the work is being performed			
		Remove all combustibles from your work area prior to beginning and hot work.			
23. Working with compressed gases	Fires and explosions	Do not place compressed gas cylinders in traffic lanes or where they can be hit by vehicles or equipment.			
		Use cylinders with oldest delivery date first.			
		Store cylinders upright and secure to prevent falling.			
		Do not disable any safety appliances attached to a gas cylinder such has check valves, indicating devices, or control devices.			
24. Using compressed air	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
25. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air.			
		Stand up wind from the air nozzle.			
26. Working from an elevated location	Falling	Whenever you are working on open-sided floor, platform, or other location that is 6’ or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system.			
		For guardrail requirements see scaffolding			
		The personal fall arrest system, which consists of a body harness and shock absorbing lanyard, must prevent the user from falling more than 6', or from contacting any lower level			
		Secure lifelines to a structural member capable of supporting a dead weight of 5400 lbs.			
		100% tie off is required when working at or above 25'. This requires the use of 2 lanyards.			
27. Inspect fall protection equipment prior to use	Equipment failure- falling	Lanyard, harness, D-rings, and other personal fall arrest equipment is in good condition and suitable for use			
		Remove equipment from service that has sustained a fall.			
28. Working on or around scaffolding	Falling from the scaffold, or workers below scaffold struck by falling objects	Maintain the top rails, midrails, and toeboards on the scaffold from which you are working. Top rails must be 42" high ± 3" and capable of withstanding a lateral force of 200 lbs., midrails are midway between floor surface and top rail.			
		Do not horse play on or around scaffolding.			
		Do not drop tools or material from the scaffold			
		See AHA on Scaffold Erection and Use			
29. Working from a rolling scaffold	Falling due to scaffold racking unexpectedly	All diagonal & horizontal bracing is in place to square the scaffold & prevent racking.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	General Jobsite Laborer

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
	Falling due to scaffold moving unexpectedly	Wheel brakes are set whenever the scaffold is stationary.			
	Scaffold failure- falling	Forklifts, trucks, or other motor vehicles are not used to push the scaffold			
	Falling from scaffold, crushed by tipping scaffold.	**Never ride on the scaffold except under the following conditions:**			
		The floor across which the scaffold is moved is within 3 degrees of level, and is clean and free of all obstacles, such as cords, debris, holes, depressions ect.			
		When pushing scaffold force is applied as close to the base as possible			
		Height to width ratio is 2 to 1 or less. (ie. a 10' high scaffold is 5' wide)			
		No employee shall ride on any part of the scaffold that extends beyond the wheels.			
		Castor stems are pinned/secured to the scaffold legs.			
		Before the scaffold is moved all riders are made aware of the move.			
30. Getting on and off the scaffold	Falling while getting on or off the scaffold	Always use a ladder to gain access to scaffold work platforms			
		Ladders rails extend 3' above the platform and are tied off securely			
31. Clean up	Tripping -- waste materials, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Ladders, scaffolding	Tools & equipment prior to use	Activity hazard training for each laborer	
Drills			Inspector's Signature
Chipping hammer/drill			
reciprocating saw			
grinders			
compressors			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Using Power Acctuated Tools

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train & Certify Operator	Operators not trained in the safe use of the tool	Never use a powder actuated tool unless you have been trained and certified in its use.			
2. Review the operating instructions	Forgetting how to properly use the tool	Always keep the operating instruction with the tool (in the case)			
3. Put on your personal protective equipment.	Eye or head injury and/or hearing loss	The operator and bystanders must wear a hard hat, Safety glasses with side shields or goggles, foam ear plugs and/or ear muffs.			
4. Inspect the tool	Injuries due to broken or improperly functioning tool	Inspect the tool prior to use to ensure that the parts are in the proper operating condition.			
		Do not use a tool that is incomplete.			
5. Choose the tool, loads, and fasteners to use for the job.	Using the incorrect tool, loads, or fasteners for the job.	Use the manufacture supplied literature to select the proper loads and fasteners for the application. Ask your supervisor if you are not sure.			
6. Hold the tool in place	Shoulder or wrist injury- tool kick back	Hold the tool firmly but keep your arm flexed (bend your elbow slightly).			
	Material ricocheting off work surface	Hold the tool perpendicular to the work surface.			
		Use the stabilizer when possible.			
7. Fire the tool	Accidental firing	Never cock or depress the tool against your hand or any other part of your body.			
		Never point the tool at yourself or anyone else.			
	Shatter or ricochet of the fastener	Do not fasten through an existing hole.			
		Do not re-drive the fastener			
	Delayed ignition of cartridge	If a cartridge fails to ignite when the tool is actuated, keep the tool pressed against the work for 30 seconds and try again. If the cartridge still does not ignite, remove from the work surface and advance the strip manually.			
8. Fastening into concrete	Spalling concrete, fastener ricocheting	Never fasten closer than 2" from the edge of the concrete.			
9. Work breaks- unloading the tool	Accidental firing of loaded tool left lying around	Never leave a loaded tool unattended. Unload tool before work breaks and at the end of the day.			
	Explosion	Never try to pry a cartridge or magazine strip from the tool.			
10. Working around other trades	Fastener penetrating through work surface	Make sure no one stands on the opposite side of the surface where fastening are being made.			
	Explosion or fire	Never operate the tool in an explosive of flammable atmosphere.			
11. Clean up	Ignition of unspent cartridges	Never leave magazine strips with unspent cartridges lying around. Dispose of them in a bucket of water.			
		Place the tool in its case in a safe place at the end of the day.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Using Power Acctuated Tools

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
Equipment to be Used	Inspection Requirements	Training Requirements
Powder Actuated Nail Gun	Tools - Prior to each shift	AHA Training
		Manufacture's Training and Certification for each operator

Activity Safety Inspection

Y	N	N/A

Inspection Date

Inspector's Signatu

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Abrasive Blasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers	Workers not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots during preparatory work prior to blasting.			
3. Check tools for safe operation	Defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		The blasting nozzle must be bonded and grounded			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps.			
		Check that the ground prong is in tact.			
5. Refuel air compressors	Fires, explosions- burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
6. Roll out hoses and cords and set up equipment	Hazardous noise- hearing loss	Wear foam ear plugs when working around the compressor, or near the blasting operations.			
	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points and moving machine parts.			
	Tripping - Hoses, Cords, Compressor	Keep corridors and high traffic areas free of hoses and other equipment.			
		Arrange hoses and cords in an orderly fashion.			
	Pulls and Strains from lifting	Know how much you can lift. Get help when moving heavy equipment.			
		Convert lifting and lowering tasks to pulling and pushing.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
7. Fill/tend blasting pot, man compressor	Silicosis	A dust filter respirator must be worn when dumping abrasives into the blasting pot.			
	Suffocation	At all times during blasting operations when a supplied air respirator is in use a qualified person will tend the equipment that supplies air to the respirator.			
8. Set up scaffolding	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points, especially when setting up scaffolding and moving planking.			
	Scaffold tipping or shifting, falling from the scaffold	The working platform on scaffolds less 4' high must be at least 2 planks wide. Scaffolds between 4' and 6' high must have a fully planked work platform at least 45" wide.			
		Horse or trestle scaffolds should only be one tier high.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Abrasive Blasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Space horses (or plaster jacks) so that planking does not deflect more than 1/60th of the span. (5' span would deflect less than 1 inch)			
		Scaffolds including job built scaffolds must be capable of supporting 4 times the intended load.			
	See AHA for Scaffold Erection and Use				
9. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a respirator and goggles in addition to the standard PPE when cleaning with compressed air.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
10. Set up dust containment barriers	Smashed fingers	Keep hand several inches away from whatever you are hitting with a hammer			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
	Dust migrating to adjacent areas	Make sure the barriers are complete with no gaps or voids.			
		When dust leaks are noted repair the barrier as soon as possible.			
11. Set up exhaust ventilation system	Hazardous levels of dust or fumes in the blast cleaning area or room	Set up exhaust equipment that will ventilate the blast cleaning room and which will reduce the air pressure in the space.			
		The ventilation system must include a dust collecting component and be exhausted to the exterior of the building.			
		Set up dust collectors so that the dust can be emptied without contaminating other work areas.			
12. Post signs	Unauthorized persons entering the blast cleaning area or room	Post warning signs reading, "Danger Abrasive Blasting, Authorized Personnel Only" at all entrances.			
13. Layout, communication, and preparatory instructions	Lack of coordination between Workers- mistakes.	Once blasting operations have commenced communication will be difficult. Make sure each worker understands what needs to be done and how the work will proceed before beginning.			
14. Begin abrasive blasting	Impact injuries- abrasive	Never point a blasting nozzle at yourself or other workers even it is not shooting.			
	Injury from rebounding abrasive. Foot injuries.	You must wear long pants, heavy canvas or leather gloves, apron, and work boots at all times.			
	Eye and face injuries from rebounding abrasive. Hazardous dust inhalation	Wear an abrasive-blasting respirator hood that covers your head , neck, and shoulders when blasting in an interior space (blast-cleaning room). This is a supplied air type respirator.			
	Hazardous dust inhalation	Abrasive blasting of materials with low toxicities done outside in open air, with nonsilica abrasives may be done with a half-face dust-filter respirator.			
	Hazardous noise- hearing loss	Wear foam ear plugs under your blasting hood.			
	Tripping and falling	Watch your step.			
		Keep the surface you are standing on clear of equipment, debris, or unused material			
15. Blasting which creates flammable dusts	Fires, explosions- burns	Increase the capacity of the ventilation equipment or add additional equipment in order to bring the flammable dust concentration below the safe limit.			
		Remove all forms of sparks or ignition, and keep a fire extinguisher handy.			

JOB SAFETY ANALYSIS

Project Description	JSA Description
East County Substation Project	Abrasive Blasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
16. Exiting the blasting area	Dust migrating to adjacent areas	Turn off the blasting equipment and allow the ventilation equipment to clear the air before exiting the enclosure.			
17. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
18. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
19. Take down dust barriers and clean up	Trips, slips, falls	Clean up steel shot a similar abrasives that might create a slip hazard as soon as possible.			
	Hazardous dusts- Silicosis	Wear a respirator and goggles during clean up operations. Dismantle barriers in a manner that traps as much of the dust as possible.			
	Puncture wounds- nails	Clean up scrap lumber used in dust barriers and remove protruding nails.			

Equipment to be Used	Inspection Requirements	Training Requirements
Air compressor	Inspect tools and equipment	AHA training of each operator
Material hose		
Blasting nozzle		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Scaffold Erection and Use

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train scaffold erectors	Scaffold erectors not trained in the safe execution of the task.	Train scaffold erectors			
2. Set foundation for scaffolding	Scaffold tipping or shifting while in use.	Scaffolds must be adequately supported by an firm, level foundation bearing on plates or mud sills.			
		Do not support scaffold jacks, frames, or planking on stacks of wood, boxes, bricks, blocks, barrels or any other unstable materials.			
3. Erect the scaffold frame	Workers falling from the scaffold, or scaffold parts falling	Secure and brace each section of scaffolding as soon as possible.			
		Planking used as a walkway for scaffold erection shall be at least 2 planks wide or 18".			
		Planks overlap the end of the scaffold no less than 12".			
4. Brace the scaffolding.	Scaffold tipping or falling	Scaffolds are restrained from tipping by ties, guys, or braces when the height exceeds 4 times the width of the base and then every 26’ vertically and 30’ horizontally.			
5. Erecting scaffolding from a ladder	Falling from a partly constructed scaffolding	Erect scaffold components from a ladder when this provides a greater degree of safety than working from the scaffold itself.			
	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
		Set up extension ladder so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. Make sure the top of the ladder is tied off.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
6. Working from an elevated position	Falling	During scaffold erection activities when you are not working from a ladder or lift or not otherwise protected from falling you should be protected by a personal fall arrest system, unless this would create a greater hazard.			
		If used the personal fall arrest system, which consists of a body harness and shock absorbing lanyard, must prevent the user from falling more than 6', or from contacting any lower level			
		Vertical lifelines shall be fastened to a fixed safe anchorage independent of the scaffold.			
		Horizontal lifelines must be secured to two or more structural members of the scaffold.			
7. Inspect fall protection equipment prior to use	Equipment failure- falling	Inspect personal fall arrest equipment (lanyard, harness, D-rings), for frays, burns, hair line cracks, or other defects prior to use.			
8. Build the work platform	Falling	Enclose all open sides of the work platform with top rails, midrails, and toeboards.			
		Top rails must be 42" high ± 3" and capable of withstanding a lateral force of 200 lbs., midrails are midway between floor surface and top rail.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description	Activity Safety Inspection		
	East County Substation Project	**Scaffold Erection and Use**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
		Ensure that scaffolds platforms are fully planked with no spaces between planks greater than 1"			
		The working platform on scaffolds less 4' high must be at least 2 planks wide. Scaffolds between 4' and 6' high must have a fully planked work platform at least 45" wide.			
	Displaced planking slipping of end of frame.	Planks overlap the end of the scaffold no less than 12".			
	Plank failure	Use only certified scaffold planking.			
	Tools or materials falling to a lower level	Install 3 1/2" high toe boards, tight against the platform planking.			
		Where tools or materials will be stacked next to the toeboard higher than the top edge of the board, install paneling or screening to provide falling object protection.			
		Toe boards may be omitted where there is some alternate form of falling object protection such as barricades, debris nets, or canopies.			
9. Getting on and off the scaffold	Falling while getting on or off the scaffold	Always use a ladder to gain access to scaffold work platforms			
		Do not use cross bracing to climb onto a scaffold.			
		Ladders rails extend 3' above the platform and are tied off securely			
10. Setting scaffold components using a boom lift.	See Job Hazard Analysis on operating a boom lift.				
11. Working from the scaffold	Defective scaffold components	Inspect scaffolds and scaffold components for defects before each work shift. Replace defective components.			
	Falling	Do not horse play on or around scaffolding.			
		Do not work on a scaffold during storms or high winds.			
		Do not use a ladder on a scaffold to increase your working height.			
	Falling objects	Be careful to not drop tools or material from the scaffold			
	Slipping, tripping, or falling.	Remove debris and waste materials from work platform at regular intervals and at the end of each shift.			
12. Working from a horse scaffold	Scaffold tipping or shifting while in use causing the worker to fall	Horse scaffolds shall not be constructed more than two tiers in height. Only one tier is recommended			
		On two tiered scaffolds horses must be placed directly over the horse below, the legs of each horse must be nailed to prevent displacement, and each tier crossed braced.			
		On one tier horse scaffolds planking must be at least 2 planks wide.			
		Space horses so that planking does not deflect more than 1/60th of the span. (5' span would deflect less than 1 inch)			
		Scaffolds including job built scaffolds are capable of supporting 4 times the intended load.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Scaffold Erection and Use

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
13. Using a rolling scaffold	Falling from scaffold, crushed by tipping scaffold.	Never ride on the scaffold except under the following conditions:			
		All diagonal & horizontal bracing is in place to square the scaffold & prevent racking.			
		The floor across which the scaffold is moved is within 3 degrees of level, and is clean and free of all obstacles, such as cords, debris, holes, depressions ect.			
		When pushing scaffold force is applied as close to the base as possible			
		Height to width ratio is 2 to 1 or less. (ie. a 10' high scaffold is 5' wide)			
		No employee shall ride on any part of the scaffold that extends beyond the wheels.			
		Castor stems are pinned/secured to the scaffold legs.			
		Before the scaffold is moved all riders are made aware of the move.			
14. Working from a rolling scaffold	Scaffold tipping or shifting while in use causing the worker to fall	Wheel brakes are set whenever the scaffold is stationary.			
		All mobile scaffolds have guard rails, toeboards, and full width planking.			
		A ladder (or scaffold frames designed as a ladder) is used to access the work platform.			

Equipment to be Used	Inspection Requirements	Training Requirements
Ladders	Fall protection equipment- prior to use	AHA training
Scaffold components	Scaffolding- each shift	
Scaffold frames		
Certified scaffold planks		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Shotblasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train workers	Workers not trained in the safe execution of the task.	Use this Activity Hazard Analysis, and other formal and informal training to train Workers.			
2. Put on your personal protective equipment.	Head, or foot injury	You must wear a hard hat, long pants, and work boots during preparatory work prior to blasting.			
3. Check tools for safe operation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace. Do not use a defective tool.			
		The blasting nozzle must be bonded and grounded			
4. Check electrical cords	Electrocution- faulty electrical cords	Do not use electrical cords with cuts, worn insulation, or visible conductors.			
		Use cords rated for hard or extra-hard usage.			
		Use factory-assembled cord sets as much as possible. Repairs must preserve the original electrical and mechanical integrity of the cord. Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief c			
		Check that the ground prong is in tact.			
5. Refuel air compressors	Fires, explosions- burns	Use only approved metal safety cans to store and dispense fuel.			
		Place oily or fuel soaked rags and other combustibles in approved containers.			
		Do not smoke while refueling			
6. Roll out hoses and cords and set up equipment	Hazardous noise- hearing loss	Wear foam ear plugs when working around the compressor, or near the blasting operations.			
	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points and moving machine parts.			
	Tripping - Hoses, Cords, Compressor	Keep corridors and high traffic areas free of hoses and other equipment.			
		Arrange hoses and cords in an orderly fashion.			
	Pulls and Strains from lifting	Know how much you can lift. Get help when moving heavy equipment.			
		Convert lifting and lowering tasks to pulling and pushing.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
7. Fill/tend blasting pot, man compressor	Silicosis	A dust filter respirator must be worn when dumping abrasives into the blasting pot.			
	Suffocation	At all times during blasting operations when a supplied air respirator is in use a qualified person will tend the equipment that supplies air to the respirator.			
8. Set up scaffolding	Crushed or pinched	Keep fingers, hands, and other body parts away from pinch points, especially when setting up scaffolding and moving planking.			
	Scaffold tipping or shifting, falling from the scaffold	The working platform on scaffolds less 4' high must be at least 2 planks wide. Scaffolds between 4' and 6' high must have a fully planked work platform at least 45" wide.			
		Horse or trestle scaffolds should only be one tier high.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Shotblasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		Space horses (or plaster jacks) so that planking does not deflect more than 1/60th of the span. (5' span would deflect less than 1 inch)			
		Scaffolds including job built scaffolds must be capable of supporting 4 times the intended load.			
	See AHA for Scaffold Erection and Use				
9. Cleaning surfaces with compressed air	Airway irritation, silicosis	Wear a respirator and goggles in addition to the standard PPE when cleaning with compressed air.			
	Injection of foreign material into the body through the skin	Never use compressed air to blow dirt from hands, face, or clothing			
10. Set up dust containment barriers	Smashed fingers	Keep hand several inches away from whatever you are hitting with a hammer			
	Cut by utility knife	Cut away from yourself. The blade should always be pointed in a direction opposite any body parts.			
	Dust migrating to adjacent areas	Make sure the barriers are complete with no gaps or voids.			
		When dust leaks are noted repair the barrier as soon as possible.			
11. Set up exhaust ventilation system	Hazardous levels of dust or fumes in the blast cleaning area or room	Set up exhaust equipment that will ventilate the blast cleaning room and which will reduce the air pressure in the space.			
		The ventilation system must include a dust collecting component and be exhausted to the exterior of the building.			
		Set up dust collectors so that the dust can be emptied without contaminating other work areas.			
12. Post signs	Unauthorized persons entering the blast cleaning area or room	Post warning signs reading, "Danger Abrasive Blasting, Authorized Personnel Only" at all entrances.			
13. Layout, communication, and preparatory instructions	Lack of coordination between Workers- mistakes.	Once blasting operations have commenced communication will be difficult. Make sure each worker understands what needs to be done and how the work will proceed before beginning.			
14. Begin abrasive blasting	Impact injuries- abrasive	Never point a blasting nozzle at yourself or other workers even it is not shooting.			
	Injury from rebounding abrasive. Foot injuries.	You must wear long pants, heavy canvas or leather gloves, apron, and work boots at all times.			
	Eye and face injuries from rebounding abrasive. Hazardous dust inhalation	Wear an abrasive-blasting respirator hood that covers your head , neck, and shoulders when blasting in an interior space (blast-cleaning room). This is a supplied air type respirator.			
	Hazardous dust inhalation	Abrasive blasting of materials with low toxicities done outside in open air, with nonsilica abrasives may be done with a half-face dust-filter respirator.			
	Hazardous noise- hearing loss	Wear foam ear plugs under your blasting hood.			
	Tripping and falling	Watch your step.			
		Keep the surface you are standing on clear of equipment, debris, or unused material			
15. Blasting which creates flammable dusts	Fires, explosions- burns	Increase the capacity of the ventilation equipment or add additional equipment in order to bring the flammable dust concentration below the safe limit.			
		Remove all forms of sparks or ignition, and keep a fire extinguisher handy.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Shotblasting

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
16. Exiting the blasting area	Dust migrating to adjacent areas	Turn off the blasting equipment and allow the ventilation equipment to clear the air before exiting the enclosure.			
17. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
18. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
19. Take down dust barriers and clean up	Trips, slips, falls	Clean up steel shot a similar abrasives that might create a slip hazard as soon as possible.			
	Hazardous dusts- Silicosis	Wear a respirator and goggles during clean up operations. Dismantle barriers in a manner that traps as much of the dust as possible.			
	Puncture wounds- nails	Clean up scrap lumber used in dust barriers and remove protruding nails.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Air compressor	Inspect tools and equipment	AHA training of each operator	
Material hose			
Blasting nozzle			Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	SWPPP

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
1. TRAIN THE WORKER	WORKERS NOT TRAINED IN SWPPP MAY RESULT IN STORM WATER RUNOFF AND NON-STORM WATER DISCHARGES	USE AHA AND SITE INSPECTION TO MAINTAIN BEST MANAGEMENT PRACTICES.
2. ESTABLISH SITE PERIMETER CONTROLS	FAILURE TO PROTECT OR CONTAIN SITE PERIMETER MAY RESULT IN SITE RUNOFF AND TRACKING DIRT INTO STREETS AND ROADWAYS	SET UP & MAINTAIN SITE PERIMETER WITH SILT FENCE AND/OR GRAVEL BAGS.
	TRACKING INTO STREET	ESTABLISH SITE ENTRANCES INTO PROJECT AND MAINTAIN BY SWEEPING
	DISCHARGE INTO STORM DRAIN SYSTEM	IDENTIFY DRAIN INLETS AND PROTECT USING BMP'S SUCH AS FILTER CLOTH, SILT FENCE AND/ OR GRAVEL BAGS.
3. ESTABLISH BEST MANAGEMENT PRACTICES	STORAGE OF MATERIALS AND STOCKPLIES.	MATERIALS TO BE STORED OFF GROUND OR ON PALLETS. SPOIL PILES TO BE CONTAINED. VISQUEEN TO BE ON-SITE TO COVER MATERIALS OR PILES IN CASE OF RAIN/STORM.
	VEHICLE AND EQUIPMENT PARKING	PARK ON HARD SURFACES OR USE ESTABLISHED CONSTRUCTION ENTRANCES TO PREVENT TRACKING.
	FUELING AREAS / SPILL CONTROL	ESTABLISH CONTAINMENT PIT / LINED DIKE TO CAPTURE FUEL OR CHEMICAL SPILLS
	CONCRETE, STUCCO, PAINT, GROUT OPERATIONS	ESTABLISH CONCRETE WASHOUT PITS / MAINTAIN TO PREVENT OVERFLOWING
4. PERFORM INSPECTIONS	LACK OF BMP MAINTENANCE	DURING NON-RAINY SEASON, PERFORM AND DOCUMENT MONTHLY INSPECTIONS. UPDATE SWPPP MAP AT LEAST MONTHLY.
		DURING RAINY SEASON, PERFORM AND DOCUMENT WEEKLY INSPECTIONS. UPDATE SWPPP MAP AT LEAST MONTHLY.

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	SWPPP

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls
		DURING STORM EVENT, INSPECT SITE PRIOR TO FORECAST OF 50 % OR MORE, INSPECT DURING STORM, AND POST STORM. DOCUMENT CORRECTIONS TO BMP'S AND UPDATE MAP.
5. PRE-PLANNING	FAILURE TO UNDERSTAND SWPPP REQUIREMENTS AND BMP'S TO BE USED.	MAINTAIN ON SITE 125% OF BMP'S TO BE DEPLOYED OR USED IN IMPLEMENTATION OF SWPPP PLAN.
		VISQUEEN TO BE ONSITE TO COVER STOCKPILES
		VISQUEEN TO BE ONSITE TO CONSTRUCTION WASHOUT AREAS.
		FIBER ROLLS AND GRAVEL BAGS TO BE ONSITE TO CONTAIN RUNOFF AND PROTECT INLETS.
		SPILL KIT TO BE ONSITE TO CLEAN UP / CONTAIN CHEMICAL SPILLS.
		STORE MATERIALS ON PALLETS, IN BINS, OFF GROUND OR UNDER COVER TO PREVENT NON-STORM DRAIN RUN OFF
		HAVE DELIVERED MATERIALS COVERED BY SUPPLIER WHEN DELIVERED ONSITE

Equipment to be Used	Inspection Requirements	Training Requirements

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Welding and Cutting - Electric Arc

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Welders	Welders who are not trained in the safe execution of their task	Use this Activity Hazard Analysis, and other formal and informal training to train Welders.			
2. Roll out cords and equipment and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas clear of cords, leads, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
		Set up welding machine where it will not be run into by vehicles or equipment.			
	Electric Shock	The welding machine and other equipment must be run on a GFCI protected circuit.			
	Ionizing Radiation	Set up welding screens to shield workers and public from welding rays, or barricade off area to prevent persons from entering the area.			
3. Fire Control- move work or set up shielding or other controls	Fires, explosions- burns	If possible move objects to be welded or cut to an area free of dangerous combustibles.			
		Clean up combustible trash and debris before working in an area.			
		Install noncombustible shielding to protect combustible wall or floor assemblies from flashes, sparks, and molten metal.			
		Always have an ABC rated fire extinguisher ready within a few feet of the work.			
4. Check leads and electrical cords	Electrocution, burns	Electrode holders, wire feeds, leads, and connectors are free of cuts, gouges, and worn insulation, and are insulated against the maximum voltage for the machine.			
		Leads have no splices or repaired insulation within 10 feet of the working end.			
		Ground clamps are in good condition.			
	Electric shock due to electrical cords with cuts or worn insulation	Dispose of faulty electrical cords			
		Check that ground prong is in tact.			
5. Inspect Tools	Injuries from defective equipment	Do not use defective tools or equipment. Remove them from jobsite.			
	Cuts	Chop saws have properly functioning manufacture installed guards.			
	Twists, sprangs	Grinders and Drills are equipped only with a constant pressure switch.			
6. Lift and move materials and equipment	Pulls and Strains from lifting	Get help when moving/heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers unless precautions have been taken to protect workers.			
7. Move materials with a forklift.	See Job Hazard Analysis on forklift operation				

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Welding and Cutting - Electric Arc

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
8. Prep and test surface of work	Hazardous fumes, flammable coatings	Do not weld or cut any surface covered by a preservative coating that is highly flammable. Test by burning scrapings of the coating in a non-flammable container.			
		When welding or cutting through preservative coatings the coating must first be stripped or a respirator must be worn. (this includes galvanized steel)			
9. Clamp and/or brace materials to be welded into position	Steel falling or shifting before weld can be made	Brace, shim, clamp, or otherwise secure the materials that you are welding so that they do not fall or move before the weld is completed.			
	Crushed or pinched	Do not place body parts in places where they might be crushed if the steel were to move suddenly.			
10. Set the ground	Electrocution- Inadequately grounded work surface	Ensure that the ground clamp is secured tightly, and that the path to ground is continuous.			
11. Welding	Burns, eye injury.	In addition to the standard PPE you are required to wear a welding helmet, or goggles with the proper shading for the work you are performing, and leathers for hand and arm protection.			
	Asphyxiation,	Ensure that there is natural or mechanical exhaust to the work area when welding or cutting.			
	Burns	Be careful not to touch or rub against hot work.			
12. Grind welds, & cut steel with a chop saw.	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields.			
		Wear gloves when handling steel that is hot or has sharp edges.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels exceed 85 dB(A).			
		Keep fingers at least 8 inches from the blade			
		Properly support long pieces before cutting			
		Cut short pieces from long stock and hold the long end of the piece.			
		Don't try to cut too quickly			
13. Welding from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
	Electric shock	Nonconductive ladders are recommended.			
14. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
15. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Welding and Cutting - Electric Arc

Activity Safety Inspection

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Y	N	N/A
16. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
17. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never weld, cut, or burn through any Lead-containing material.			
18. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
19. Clean up	Tripping -- waste and debris, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements
Forklift	Forklift prior to each shift	Activity hazard training of each welder
Ladders	Ladders prior to use	
Tin snips	Tools and equipment prior to use	
Steel cutoff saw		
Vise grips		

Inspection Date

Inspector's Signature

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Welding

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
1. Train Welders	Welders who are not trained in the safe execution of their task	Use this Activity Hazard Analysis, and other formal and informal training to train Welders.			
2. Roll out cords and equipment and set up workplace	Slipping, Tripping, or falling, and Delayed Egress	Keep corridors and high traffic areas clear of cords, leads, & other equipment. Completely unroll all cords to avoid tangles.			
		Clean up scrap materials and debris before and after working in an area.			
		Set up welding machine where it will not be run into by vehicles or equipment.			
	Electric Shock	The welding machine and other equipment must be run on a GFCI protected circuit.			
	Ionizing Radiation	Set up welding screens to shield workers and public from welding rays, or barricade off area to prevent persons from entering the area.			
	EMF Fields	Electro-magnetic fields may interfere with some pacemakers. People with pacemakers should consult their physician before entering the weldng areas			
3. Fire Control- move work or set up shielding or other controls	Fires, explosions- burns	If possible move objects to be welded or cut to an area free of dangerous combustibles.			
		Clean up combustible trash and debris before working in an area.			
		Install noncombustible shielding to protect combustible wall or floor assemblies from flashes, sparks, and molten metal.			
		Always have an ABC rated fire extinguisher ready within a few feet of the work.			
4. Check leads and electrical cords	Electrocution, burns	Electrode holders, wire feeds, leads, and connectors are free of cuts, gouges, and worn insulation, and are insulated against the maximum voltage for the machine.			
		Leads have no splices or repaired insulation within 10 feet of the working end.			
		Ground clamps are in good condition.			
	Electric shock due to electrical cords with cuts or worn insulation	Dispose of faulty electrical cords			
		Check that ground prong is in tact.			
5. Inspect Tools	Injuries from defective equipment	Do not use defective tools or equipment. Remove them from jobsite.			
	Cuts	Chop saws have properly functioning manufacture installed guards.			
	Twists, sprangs	Grinders and Drills are equipped only with a constant pressure switch.			
6. Lift and move materials and equipment	Pulls and Strains from lifting	Get help when moving/heavy materials, use a mechanical lift when possible.			
		Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. Keep the weight close to your body.			
		Be aware of your surroundings while moving materials, watch where you are going.			
		Never move materials over or above workers unless precautions have been taken to protect workers.			

JOB SAFETY ANALYSIS

	Project Description	JSA Description
	East County Substation Project	Welding

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
7. Move materials with a forklift.	See Job Hazard Analysis on forklift operation				
8. Prep and test surface of work	Hazardous fumes, flammable coatings	Do not weld or cut any surface covered by a preservative coating that is highly flammable. Test by burning scrapings of the coating in a non-flammable container.			
		When welding or cutting through preservative coatings the coating must first be stripped or a respirator must be worn. (this includes galvanized steel)			
9. Clamp and/or brace materials to be welded into position	Steel falling or shifting before weld can be made	Brace, shim, clamp, or otherwise secure the materials that you are welding so that they do not fall or move before the weld is completed.			
	Crushed or pinched	Do not place body parts in places where they might be crushed if the steel were to move suddenly.			
10. Set the ground	Electrocution- Inadequately grounded work surface	Ensure that the ground clamp is secured tightly, and that the path to ground is continuous.			
11. Welding	Burns, eye injury.	In addition to the standard PPE you are required to wear a welding helmet, or goggles with the proper shading for the work you are performing, and leathers for hand and arm protection.			
	Asphyxiation,	Ensure that there is natural or mechanical exhaust to the work area when welding or cutting.			
	Burns	Be careful not to touch or rub against hot work. Aluminum does not discolor when heated, always check for heat coming off the work piece before picking up or moving .			
12. Using shielding gas	Asphyxiation	Know where the MSDS is for the type shielding gas being used. Make sure ther is adequate ventilation.			
	Cylinders may explode if damaged	Keep cylinders upright and secure them to a fixed support.			
		Locate cylinders away from where they may be struck or subjected to physical damage.			
		Valve protection caps should always be in place and hand tight except when the cylinder is in use or being connected for use.			
		Never let the electrode, electrode holder or any other electrically "hot" parts touch a cylinder.			
13. Grind welds, & cut steel with a chop saw.	Flying particles- Eye injury	Wear safety goggles or a safety glasses with side shields.			
		Wear gloves when handling steel that is hot or has sharp edges.			
	Hazardous noise, hearing loss	Wear foam ear plugs when working in an area where sound pressure levels exceed 85 dB(A).			
		Keep fingers at least 8 inches from the blade			
		Properly support long pieces before cutting			
		Cut short pieces from long stock and hold the long end of the piece.			
		Don't try to cut too quickly			
14. Welding from a ladder	Ladders tipping or shifting while in use causing the worker to fall	Set up ladders on firm level footing			
		Choose the correct size of ladder for the job			

JOB SAFETY ANALYSIS

Project Description	JSA Description
East County Substation Project	Welding

Principal Steps	Potential Safety Hazard	Safe Procedure & Recommended Controls	Activity Safety Inspection Y	N	N/A
		All step and extension ladders are equipped with ladder shoes.			
	Falling from ladder	Don't work from the top two steps of a step ladder.			
		Don't work from a step ladder leaned against a wall.			
		Step ladders used only in full open position.			
	Electric shock	Nonconductive ladders are recommended.			
15. Moving ladders	Tools or Materials falling from ladders	Do not move a ladder while you are on it			
		Do not move ladder with tools on it			
16. Responding to an emergency	Delayed emergency response- further injury or loss of life	Respond quickly and decisively in case of an accident. Call 911 immediately.			
		Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid.			
		Only persons trained in first aid should be allowed to administer first aid.			
17. Confined Spaces	Asphyxiation or carbon monoxide poisoning	Never enter a confined space ei. Man-holes, vats, silos, vaults, tunnels, ductwork, ect. Except as direct by your supervisor and in accordance with the requirements of the AHA Working In Confined Spaces			
		Always heed warning signs for confined spaces.			
18. Working around materials that contain lead	Lead poisoning, and/or cumulative damage from long term occupational exposure	Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing.			
		Never weld, cut, or burn through any Lead-containing material.			
19. Working in hot weather	Heat Stroke	Make sure you always have an adequate supply of cold water available. If your water supply is running low talk to your supervisor.			
		Take scheduled cool down breaks			
		Provide ventilation or air cooling equipment for enclosed work areas.			
	Sunburn	Use sunscreen			
20. Clean up	Tripping -- waste and debris, improperly stored materials	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Forklift	Forklift prior to each shift	Activity hazard training of each welder	
Ladders	Ladders prior to use		
Tin snips	Tools and equipment prior to use		
Steel cutoff saw			
Vise grips			
Bandsaw			

Inspector's Signature

JOB SAFETY ANALYSIS			Activity Safety Inspection		
	Project Description	**JSA Description**			
	East County Substation Project	**Overhead Steel Transmission**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
1. Train Craft	Ironworkers not trained in the safe execution of the task	Train linemen and groundsmen			
2. Receive material deliveries, shake out steel.	Crushing or pinching hands or feet	When moving steel keep hands and feet clear of pinch points. Stack steel on stickers.			
		Stay clear of moving machinery, heed backup alarms and get out of the way.			
		Stack steel flat or make sure that it will not roll			
	Excessive material handling	Stage material as close to its final destination as possible.			
3. Carrying and lifting steel	Strains from lifting	Know how much you can safely lift. Get help with heavy pieces.			
		Use a forklift, crane, or other lift as necessary.			
4. Communication and preparatory instructions	Lack of coordination between ironworkers and the resulting misunderstandings.	Before beginning each phase of work the foreman will explain to the workers what needs to be done and how the work will proceed.			
5. Hoisting steel into position	Falling	Before moving steel make sure that all workers are in a secure position, are aware of the move, ready to make the connection and are tied off.			
		Linemen must wear a full body harness and shock absorbing lanyard secured to a structural member capable of supporting a dead weight of 5400 lbs.			
		If a retractable lanyard is used it should be non-shock absorbing and should be adjusted so that it will not allow the worker to fall further than 2 feet.			
	Equipment failure- falling	Inspect personal fall arrest equipment (lanyard, harness, D-rings), for frays, burns, hair line cracks, or other defects prior to use.			
	Steel striking and injuring linemen	Assure that there is good communication between groundsmen and lift or crane operator.			
		Use a tag line when moving steel.			
	Rigging failure- steel falling	Know about how much each piece of steel weighs and make sure rigging and connections are adequate.			
		Barricade area where steel erection is ongoing.			
6. Positioning steel - prying, lifting, twisting	Crushing or pinching body parts	Keep fingers, hands, and feet clear of all pinch points.			
		Be aware of how the steel may move suddenly.			
7. Bolting structure to foundation	Injury due to defective or improperly functioning power tools	Tag defective tools and remove them from the workplace.			
		Only use tools for their intended use.			
	Dropping nuts, bolts, or tools on workers	Barricade area where steel erection is ongoing.			
8. Using tools and equipment	Injury to personnel or damage material	Use right tool for job. Inspect tool before use. Testing certificate is within test dates.			
9. Installing stringing sheave	Dropping nuts or hardware on workers	Barricade areas under where sheave is being installed until installation is complete.			
10. Pulling rope/conductors	Rope/conductor breaking or falling	Do not walk or stand under rope/conductor while stringing.			
		Do not stand in line or behind puller while stringing.			
11. Clipping	Pinching hand/fingers	Wear gloves and keep fingers and hands clear of pinch points.			
	Falling	Wear appropriate fall protection.			

JOB SAFETY ANALYSIS			Activity Safety Inspection		
	Project Description	**JSA Description**			
	East County Substation Project	**Overhead Steel Transmission**			
Principal Steps	**Potential Safety Hazard**	**Safe Procedure & Recommended Controls**	Y	N	N/A
12. Installing/removing grounding	Shock or electrocution	Install or remove grounding conductors at both sides of dead-ends using insulated hot-stick. Grounds shall have flagging for clear visibility.			
	Falling	Wear appropriate fall protection.			
13. Operating a forklift	See Activity Hazard Analysis on forklift operation				
14. Working with a crane	See Activity Hazard Analysis on working with a crane.				
15. Working from a boom lift	See Activity Hazard Analysis on operating a boom lift.				
16. Clean up	Tripping, cuts, and scrapes	Clean up work area at the end of each shift. Stack materials in designated lay down areas.			
	Burns- fires due to combustibles	Place combustibles in approved containers.			

Equipment to be Used	Inspection Requirements	Training Requirements	Inspection Date
Forklift with jib	Forklift- prior to each shift	AHA training	
Crane	Crane - prior to each shift	NCCCO, Rigging	
Boom lift	Boom lift- prior to each shift		Inspector's Signature
Personal Fall Protection Sys.	Visual	Per CAL/OSHA	

26. Forms

SUSPENDED PERSONNEL PLATFORM PERMIT

Project Name

Requirements:

1. It has been proven that conventional means of reaching the work site have been exhausted and are more hazardous that hoisting employees in a personnel platform.

2. All employees who intend to be lifted, the Job Supervisor, and the crane operator have attended a Pre-Lift Meeting and signed the form.

The Pre-Lift Meeting will cover the following areas in detail:

A. Operational criteria

B. Instruments and components

C. Platform specifications

D. Personnel platform loading

E. Rigging

F. Trial lift, inspection and proof testing

G. Work practices

H. Traveling

After all areas are discussed a ***SUPERVISOR TASK EVALUATION FORM***

will be completed, signed and attached to this permit.

Subcontractor has conducted a Pre-Lift Meeting and completed all the above mentioned requirements.

_____ _____

Subcontractor Authorized Representative Date and Time

_____ _____

Beta Engineering Authorized Representative Date and Time

CRANES AND DERRICKS

A. OPERATIONAL CRITERIA:

_____ 1. Hoisting shall be performed in a slow, controlled cautious manner.

_____ 2. Load lines shall be capable of supporting at least four (4) times the maximum intended load.

For rotation resistant rope, load lines shall be capable of supporting ten (10) times maximum intended load.

_____ 3. Load and boom hoist drum brakes, swing breaks and locking devices such as pawls or dogs shall be engaged when the occupied personnel platform is in a stationary working position.

_____4. The load line hoist drum shall have a system or device on the power train, other than the load line hoist brake, which regulates the lowering rate of speed. ***FREE FALL IS PROHIBITED.***

_____5. Crane shall be level within one percent of grade and on firm footing. Cranes equipped with outriggers shall have then fully extended.

_____6. Total weight of loaded personnel platform and rigging shall not exceed fifty (50) percent of rated capacity for radius and configuration of the crane or derrick.

_____7. Use of machine with live booms is prohibited.

B. INSTRUMENTS AND COMPONENTS:

_____1. Cranes and derricks with variable angle booms shall be equipped with a boom angle indicator visible to the operator.

_____2. Cranes with telescoping booms shall be equipped with a device to indicate the booms extended length, or an accurate determination of the load radius shall be made prior to housing personnel.

_____3. A positive acting device, such as an anti-two-blocking, shall be used which prevents contact between the load block and overhaul ball and boom tip, or a system shall be used which deactivates the hoisting action before damage occurs.

C. PLATFORM SPECIFICATIONS:

_____1. Employees shall be protected by overhead protection when exposed to falling objects.

D. PERSONNEL PLATFORM LOADING:

_____1. Personnel platform shall not be loaded in excess of its maximum intended load. The personnel platform should meet the design criteria of OSHA standard 1926.550.

_____2. Personnel platform shall be used only be employees, their tools, and material to do their work, and shall not be used to hoist only material or tools when not hoisting personnel.

_____3. Materials and tools shall be secured to prevent displacement.

_____4. Materials and tools shall be evenly distributed within the platform.

E. RIGGING:

_____1. Rigging associated with the platform shall not be used for any other purpose.

F. TRIAL LIFT, INSPECTION AND PROOF TESTING:

_____1. A trial lift to each location where platform is to be hoisted with at least the anticipated lift weight. The trial lift shall be performed immediately prior to placing personnel on platform.

_____2. Trial lift shall be repeated whenever the crane or derrick is moved and set-up in a different location.

_____3. After trial lift and just prior to hoisting personnel, the platform shall be hoisted a few inches and inspected to insure that it is secure and properly balanced.

a) Hoist ropes free of kinks.

b) Multiple part lines not twisted.

c) Primary attachment center over platform.

d) Inspect hoisting system if load line is slack.

e) Visually inspect crane or derrick, rigging, personnel platform and base support and ground.

f) ***ANY DEFECTS FOUND DURING INSPECTION WHICH CREATE A SAFETY HAZARD SHALL BE CORRECTED BEFORE HOISTING PERSONNEL***

g) Proof-test platform and rigging to 125 percent of platform maximum intended load in a suspended position for five (5) minutes if any repairs or modifications are made to the platform. The platform shall be inspected per paragraph 3, a to e, above.

G. WORK PRACTICES

_____1. Employees shall keep all parts of their body inside the platform during hoisting.

_____2. Before employees exit or enter platform that is not landed, platform shall be secured to the structure; unless securing creates an unsafe situation.

_____3. Tag lines shall be used unless it creates an unsafe situation.

_____4. The crane of derrick operator shall remain at the controls at all times when the engine is running and platform is occupied.

_____5. Hoisting of employees shall be properly discontinued upon indication of any dangerous weather conditions or other impending danger.

_____6. Employees being hoisted shall remain in continuous sight of and in direct communication with operator or signal person. Where direct visual contact with the operator is not possible and use of a signal person would create a hazard, direct communication may be used.

_____7. Employees occupying the platform shall remain ***tied-off*** when hoisted or while suspended.

_____8. No lifts shall be made on another of the crane's or derrick's load lines while personnel are suspended on a platform.

H. TRAVELING

_____1. Hoisting of employees while the crane is traveling is prohibited except where employer demonstrates that there is no less hazardous way to perform work.

_____2. Under circumstances where a crane would travel while hoisting personnel, refer to 1926.550.

PRE-LIFT MEETING ATTENDANCE

Project Name

NAME	CRAFT	DATE

Job Name: _____

Telephone: _____

Address: _____

Ambulance: _____

Fire: _____ Police: _____

Office: _____

Approved Emergency Facilities: (Name / Address Phone)

_____

_____

Approved Providers (Name / Address / Phone)

Doctor: _____

Clinic: _____

Hospital: _____

Drug Collection: _____

Emergency Procedure

- Call for ambulance if injury is serious.
- Render first aid if qualified to do so. Do not move injured if not in danger
- Direct ambulance to the injured.
- Call office to notify team leader as required by the emergency action plan.

Report All Injuries Immediately
(24 Hours)

HOT WORK PERMIT

Project Name

All temporary operations involving open flames or producing heat and/or sparks require a Hot Work Permit. This includes, but is not limited to, Brazing, Cutting, Grinding, Soldering, Thawing, and Welding.

INSTRUCTIONS FOR FIRE SAFETY SUPERVISOR

1. **Verify precautions listed at right (or do not proceed with the work).**
2. **Complete page 1 and retain for job files.**
3. **Post page 2 in vicinity of hot work.**

DATE	JOB NO.

LOCATION (Be Specific)

DESCRIPTION OF WORK BEING PERFORMED

NAME OF PERSON DOING HOT WORK

The above location has been examined, the precautions checked on the Hot Work Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED: _____
(SDG&E Fire Marshall)

SIGNED: _____
(Person doing Hot Work)

SIGNED: _____
(Fire Watch)

TIME STARTED: Date: _____ Time: _____ AM/PM

Date: _____ Time: _____ AM/PM

FIRE WATCH SIGNOFF
Work area and all adjacent areas to which sparks and heat might have spread were inspected during the fire watch period and were found fire safe.
Signed: _____

FINAL CHECKUP (minimum 30 minutes after Hot Work)
Work area was monitored for ___ hour(s) following Hot Work and found fire safe.
Signed: _____

FILL OUT EMERGENCY INFORMATION ON BACK OF Page 2.

HOT WORK CHECKLIST

OK	N/A	
☐	☐	Sprinklers and hose streams in service/operable.
☐	☐	Hot Work Equipment in good condition (e.g., power source, welding leads, torches, etc.)
☐	☐	Multi-purpose fire extinguisher and/or water pump can.

REQUIREMENTS WITHIN 35 FEET OF WORK

☐	☐	Dust, Lint, Debris, Flammable Liquids and oily deposits removed; floors swept clean.
☐	☐	Explosive atmosphere in area eliminated.
☐	☐	Combustible floors (e.g., wood, tile, carpeting) wet down, covered with damp sand or fire blankets.
☐	☐	Remove flammable and combustible material where possible. Otherwise protect with fire blankets, guards, or metal shields.
☐	☐	All wall and floor openings covered.
☐	☐	Walkways protected beneath hot work.

WORK ON WALLS OR CEILINGS

☐	☐	Combustibles moved away from other side of wall.

WORK IN CONFINED SPACES

☐	☐	Confined space cleaned of all combustibles (example: grease, oil, flammable vapors).
☐	☐	Containers purged of flammable liquids/vapors.
☐	☐	Follow confined space guidelines.

FIRE WATCH/HOT WORK AREA MONITORING

☐	☐	Fire watch will be provided during and for 30 minutes after work, including any coffee or lunch breaks.
☐	☐	Fire watch is supplied with an extinguisher, and/or water pump can, also making use of other extinguishers located throughout work area.
☐	☐	Fire watch is trained in use of this equipment and familiar with location of sounding alarm.
☐	☐	Fire watch may be required for opposite side of walls, above, and below floors and ceilings.

OTHER PRECAUTIONS TAKEN

☐	☐	
☐	☐	
☐	☐	

WARNING!

HOT WORK IN PROGRESS
WATCH FOR FIRE!

IN CASE OF AN EMERGENCY:

CALL: SDG&E Base (619) 717-8118

WARNING!

ASSURED EQUIPMENT GROUNDING PROGRAM

Project Name

Company Name _____

Job or Job Address

_____

Job Name or Number

_____

Description or Identification of Equipment	Date Tested	Action, If Any	Reason for Test: A,B,C,D	Tested By: Signature (Initials)

Reason for Test:

A. Before first use.

B. Before Moment is returned to service following any repairs.

C. Before equipment is used after any incident which can reasonably be suspected to have caused damage.

D. At intervals not to exceed 3 monthly except that cord sets and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

DAILY EXCAVATION AND TRENCHING PERMIT

Project Name

Date: _____ Competent person: _____

Shift: _____ Signature: _____

Company: _____ Weather: _____

Was one Call System used? Yes _____ No _____

Protective System:
- Trench Shield (Box) _____
- Wood shoring _____
- Sloping _____
- Other _____

Purpose of Trenching:
- Drainage _____
- Water _____
- Sewer _____
- Gas _____
- Other _____

All soil shall be classified as Type C.

Surface encumbrances: Yes _____ No _____
If yes, what type? _____

Water Conditions: Wet _____ Dry _____

Hazardous atmosphere exist: Yes _____ No _____ (If yes, refer to confined space entry procedures policy, complete Confined Space Entry Permit, monitor for toxic gases.)

Is trenching or excavation exposed to vehicular traffic (exhaust emission) Yes ____ No ____ (If yes, refer to confined space entry procedures policy, complete Confined Space Entry Permit, monitor for toxic gases.)

Measurements Of trench: Depth _____ Length _____ Width _____

Is ladder within 25 feet of all workers: Yes ____ No _____

Is excavated material stored 2 feet or more from edge of excavation: Yes _____ No _____

Are employees exposed to vehicular traffic: Yes _____ No _____(if yes, warning vest required)

Are other utilities protected: Yes _____ No _____ Not required _____ (Water, Sewer, Gas, or other structures)

Are sewer, or natural gas-lines exposed: Yes _____ No _____ (If yes, refer to confined space entry procedures policy, complete Confined Space Entry Permit, and monitor for toxic gases.)

PERIODIC INSPECTION; Yes _____ No _____ LAST DATE: _____
Authorized Beta Engineering Representative

LIST OF HAZARDOUS CHEMICALS

Project Name

Contractor _____

Job Location _____

Trade Name	Hazardous Chemical	MSDS Number Or ID

Acknowledgment Of Receipt Of Safety Program

I certify that I have received, read and understand the provisions of the Safety Program and agree to abide by these provisions.

_____ _____

Signature Date

Print Name: _____

Social Security Number: _____

Company Name: _____

Handling Instructions: Forward this form to the Safety Department and file with the employee's personnel records and job records.

SUBCONTRACTOR SAFETY AGREEMENT

Project Name

It is the policy of Beta Engineering to furnish a safe workplace and to prevent injuries not only to Beta Engineering employees and subcontractors, but to protect the general public as well.

By signing this agreement, the subcontractor agrees to follow all of Beta Engineering safety regulations for this site and the subcontractor personnel have read and understood the Site Specific Health and Safety Plan.

Further, the subcontractor agrees to comply with all federal, state, and local statutes, executive orders, codes, regulations, and ordinances in effect where the Work is to be performed, including all safety laws regulating the performance of the Work and the safety of the workplace. The term "safety laws" shall also include, without limitation, all OSHA standards, including the OSHA General Duty Clause, and all national trade or industry conformance standards applicable to the work and the workplace. Should the subcontractor fail to comply with applicable safety laws, contractor shall have the right, to suspend the work, at the subcontractor's risk and expense, until the subcontractor brings itself into compliance with such safety laws.

Subcontractor shall also be responsible for the payment of all licenses, permits, bonds, fees, taxes, pensions, retirement funds, or similar payments necessary for the proper conduct of the subcontractor's business and the successful completion of the work.

Subcontractor shall furnish Contractor with proper documentation evidencing subcontractor's compliance with all the requirements described in the paragraphs above. Subcontractor shall also give all notices required by law, the General Contract, or this Subcontract agreement.

I am an authorized agent of the company listed below and can enter into the above agreement on behalf of my company.

Subcontractor Name: _____

Responsible Party: _____

Date: _____

HEALTH AND SAFETY ACKNOWLEDGEMENT FORM

Project Name

Project Name: _____

Project Location: _____

I have read and understand the Beta Engineering Safety and Health Program. I have been briefed and fully understand all of the aspects and expectations of the project.

Please initial each section:

Health hazards associated with the project. _____
Personal Protective Equipment Requirements. _____
Emergency Procedures and Contacts. _____

Signature of employee: _____

Printed name: _____

Date: _____

VISITOR/WORKER SITE LOG

Project Name

Site: _____

Date: _____

I have been informed, understand, and will abide by the procedures set forth in the Beta Engineering Safety and Health Program.

Printed name	Signature	Representing	Date	Time

SAFETY MEETING RECORD FORM

Project Name

Date: _____

Meeting Conducted By: _____

Topics Discussed: _____

_____

_____

Attendance:

Name:	**Company:**

Signature of Site Manager: _____

Date: _____

SAFETY DEPARTMENT INCIDENT REPORT

Project Name

Type Of Incident: _____

Date Of Incident: _____

Exact Location Of Incident: _____

Name Of Person Involved: _____

Address: _____ **Phone:** _____

Jobtitle: _____ **Supervisor's Name:** _____

Time On This Job In Weeks: _____ **Years Experience In Craft:** _____

Describe Location And Type Of Injury: _____

Medical Treatment Given By: _____

Is Injured On Light Or Restricted Duty? Yes No

If Yes, Describe Duty & Duration: _____

Was This Incident Due To A Violation Of Safety Procedures? Yes No (If Yes, Any Action Taken? _____ **)**

Describe Incident: _____

_____

_____

_____

_____

Corrective Action Taken: _____

_____

_____

Case Status: _____

Copies To: _____

Submitted By: _____ **Title:** _____

PROJECT SAFETY JOB-SITE INSPECTION

Project Name

PROJECT: _____

CONTRACTOR: _____

DATE: _____

SUPERVISOR: _____

		Yes	No
1.	PPE: proper for task, required protection		
2.	Fire Prevention: extinguishers charged, flammables stored properly		
3.	Excavation: permit on hand, daily inspections		
4.	Ladders: condition, used correctly, placement, tie-off at 6”		
5.	Scaffolding: secure, correct setup, tie-off in use		
6.	Barricades: proper protection, condition, secure		
7.	Electrical: GFCI, power cords in good condition		
8.	Tools: condition, proper use, guards in place		
9.	Mobile Equipment: daily inspections, seat belts, back-up alarm working		
10.	Material Storage: stacked neatly on dunnage, proper storage, protected from severe weather		
11.	Welding/Cutting/Burning: hot work permit, extinguishers, proper PPE, welding shield		
12.	Housekeeping: paper/trash picked up, loose material, tripping hazards, total area free of debris		
13.	Fire prevention mitigation measures in place		

Comments: _____

27. Attachments

Attachment “A”

SDG&E East County Construction Fire Prevention Plan

EAST COUNTY SUBSTATION PROJECT
CONSTRUCTION FIRE PREVENTION PLAN

August 14, 2012

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Table of Contents

1. CONSTRUCTION FIRE PREVENTION PLAN DEFINITIONS

1. **Activity Risk:** An activity risk includes those activities that present a risk of igniting a wildfire.

2. **"Elevated" Fire Risk Conditions:** Fire conditions will be considered to be elevated when the average live fuel moisture content in the service territory is equal to or less than 75%.

3. **ESP 113.1 SDG&E Wildland Fire Prevention & Fire Safety Plan (SDG&E ESP 113.1):** This is an internal San Diego Gas & Electric (SDG&E) standard practice or procedure outlining fire suppression tools and equipment required for its employees and contractors, fire prevention requirements, and fire related training. It serves as an attachment to this Plan.

4. **Fire Marshal:** An SDG&E employee who serves as liaison or agency representative to the fire agencies and other emergency services during an emergency and with other fire related activities in non-emergency situations.

5. **Project Fire Marshal:** An SDG&E employee assigned full-time during the construction phase to monitor compliance with this plan, to continually evaluate fire prevention and fire safety issues, and to be the primary contact with the fire agencies.

6. **Fire Patrols:** SDG&E shall implement ongoing fire patrols during the fire season as defined each year by local, state, and federal fire agencies. An individual will be assigned as "Fire Patrol" specifically to monitor work activities when an Activity Risk exists for fire compliance. This person verifies proper tools and equipment are on-site, assesses any fire agency work restrictions, and serves as a lookout for fire starts, including staying behind to make certain no residual fire exists.

7. **Fire Suppression Resource Inventory:** SDG&E will provide the fire agencies with 24 hour contact information and on-site fire suppression equipment, tools, and personnel list, updated on a quarterly basis, and make amendments as changes occur.

8. **"Normal" Fire Risk Conditions:** Since fire season is no longer officially proclaimed SDG&E will identify normal fire risk conditions as the average live fuel moisture content in the service territory (as determined by CALFIRE & USFS) is greater than 75% or formal determination that area has received sufficient rain to adequately mitigate fire danger.

9. **Plan:** This Construction Fire Prevention Plan, designated as Mitigation Measure FF-1 in the joint CPUC/BLM Final Environmental Impact Report/Environmental Impact Statement issued in December 2010.

10. **Red Flag Warning (RFW):** A Red Flag Warning is issued for a stated period of time by the National Weather Service (NWS) using pre-determined criteria to identify particularly critical danger in a particular geographic area. All construction and maintenance activities shall cease during RFWs, as discussed in the plan.

11. **ECO or Project:** The East County Substation Project that includes the ECO Substation, Boulevard Substation, the transmission line between ECO Substation and Boulevard Substation and the transmission loop-in of the existing Southwest Powerlink (SWPL) into the ECO Substation.

2. PROJECT DESCRIPTION

General location: The East County Substation Project (Project) will be constructed and later maintained in south eastern San Diego County. It will consist of the rebuild of SDG&E's existing Boulevard Substation located in the community of Boulevard, the new East County Substation (ECO) to be constructed just east of the community of Jacumba, a new 138 kV transmission line from the rebuilt Boulevard Substation ECO, and an interconnect (loop-in) to the SDG&E's existing 500kV Southwest Powerlink (SWPL) at the ECO Substation. The total distance of the new 138kV transmission line is 13.9 miles with an affected right of way area that ranges from 60 to 100 feet across (see Attachment 1). The Project will be constructed and maintained within the wildland areas of southern San Diego County including areas determined to be moderate, high, and very high Fire Hazard Severity Zones (see Attachment 2). The Project will be located in fire jurisdictional and land management responsibility areas for the following departments or agencies; Bureau of Land Management (BLM), California Department of Forestry and Fire Protection (CALFIRE), San Diego County Fire Authority (SDCFA), and the San Diego Rural Fire Protection District (SDRFPD). The fire suppression and cost recovery for suppression for the BLM land is contracted to CALFIRE. Other fire management services for the BLM land, such as, Fire Mitigation, Fire Education and fuels management remain the responsibility of BLM.

Table 1- Fire jurisdiction & land ownership

Ownership/Responsibility within Project	Fire Suppression Responsibility	Approximate. Miles in Project Area
Private land (SRA)	CALFIRE (DPA)	12.0
Private land (LRA)	SD RURAL FIRE	7.9
Private land (LRA)	SD County Fire Authority	6.0
Bureau of Land Mgmt. (FRA)	CALFIRE (DPA)	0.1

(DPA, Direct Protection Area, SRA, State Responsibility Area; FRA, Federal Responsibility Area; LRA, Local Responsibility Area)

Scope and Intent of Proposed Project: The proposed ECO Substation site is located approximately 0.5 miles south of Interstate 8 (I-8) and 4 miles east of the community of Jacumba. The substation will be located on private land, just east of Old Highway 80, 0.5 miles west of the Imperial County border, and 0.5 miles north of the U.S.–Mexico border in southeastern San Diego County (see Attachment 4). Privately owned, undeveloped land borders the northern, western, and southern sides of the ECO Substation site and undeveloped land managed by the BLM is located to the east. Attachment 4, *ECO Substation Temporary and Permanent Footprint Map*, shows the fenced portion of the ECO Substation, which will encompass approximately 58 acres. The permanent impacts of the ECO Substation will be approximately 83.56 acres and will include the fenced substation, a 20-foot buffer around the perimeter of the substation yards, permanent slope and grading impacts, permanent access roads to the substation from Old Highway 80, and drainage facilities.

The SWPL loop-in will be constructed in the same general location as the ECO Substation. A short transmission connection to the existing 500 kV SWPL transmission line into the new

substation will begin along the existing SWPL right-of-way (ROW), traverse south-southwest for approximately 1,600 feet, then will turn westerly for 770 feet, and enter at the east side of the new substation.
An approximately 13.9-mile-long 138 kV transmission line will be constructed from the ECO Substation to the rebuilt Boulevard Substation (located within the unincorporated community of Boulevard in southeastern San Diego County), The line will travel west out of the ECO Substation for approximately 800 feet and then turn north until reaching the SWPL ROW. The 138 kV line will then go underground for approximately 2.8 miles. It will be constructed along Old Highway 80 heading west toward Carrizo Gorge Road. At Carrizo Gorge Road, the new underground transmission line will turn North and continue along Carrizo Gorge Road until it reaches the SWPL ROW. At this point, the new transmission line will continue overhead parallel to the south side of the SWPL for approximately 3.4 miles. At this point, the line will cross under the SWPL and continue parallel for approximately 3.2 miles along its north side until it intersects with an existing dirt access road. At this point, the line will go underground and turn to the north. The transmission line will continue heading north along existing dirt roads for approximately 4 miles to the rebuilt Boulevard Substation.

The new 138 kV transmission line will require a 60 foot wide permanent ROW for the underground segments and a100 foot wide permanent ROW for the overhead segments. Approximately 6.8 miles of the new transmission line that parallels the SWPL will be adjacent to SDG&E's existing easements. This area is predominantly privately owned, undeveloped open space.

The existing Boulevard Substation and its rebuild site are located approximately 12 miles northwest of the proposed ECO Substation site. SDG&E has acquired one 8.5 acre parcel immediately east of the existing Boulevard Substation to rebuild the substation. The fenced portion of the new substation will encompass approximately 2 acres. Nine existing structures located on this property will be removed prior to substation construction. In addition, the existing Boulevard Substation will be dismantled and removed after the new substation is put in service. Single-family residences on large lots surround the existing and rebuilt substation sites. The site can be accessed by traveling east from San Diego on I-8, heading south on Highway 94 (Jewel Valley Road), and then heading west on Old U.S. Highway 80.

As a result, the Project will traverse through wildland areas of various hazard classes, including approximately 0.5 miles within the moderate, 3.7 miles within the high, and 9.7 miles within the very high Fire Hazard Severity Zones, see attachment 2, *Fire Hazard Severity Zone Map.* The construction phase will involve multiple operations that can present a fire ignition risk. The intent of this Plan is to identify those potential ignition risks and plan reasonable mitigation measures to eliminate or reduce such risks as much as possible. It is also the intent of this Plan to look at the pre-existing hazards along the route and plan Project activities in a manner that best minimizes the risk of fire. In the higher hazard areas avoidance of hazards, scheduling, vegetation management work, or other means will be used to minimize fire risk. Lastly, it is the intent of the Plan to identify tools, equipment, and training requirements necessary to rapidly extinguish a small fire, should one start during any of the Project operations.

Project Timeframes: This Project is scheduled to begin construction in mid 2012 and is expected to be completed by the end of 2013. However, this projected construction schedule is dependent upon licensing and permitting for the Project. Regardless of this proposed schedule, construction will continue until the project is complete. Work on the Project will take place during all seasons within the proposed time frames including summer and fall, when wildland fire concerns are generally elevated. Although there will be a heightened concern when the annual grasses cure each year, fire mitigations will be addressed for two distinct conditions; "NORMAL", when live fuel moistures are equal to or above 75% (determined by USFS/CALFIRE sampling data) and "ELEVATED", when live fuel moistures are less than 75%. During the "ELEVATED" time of the year there will be more restrictive operations combined with additional fire risk mitigation requirements. SDG&E will assign a Project Fire Marshal for the Project duration. The Project Fire Marshal will oversee all fire related activities for SDG&E and their contractors.

Description of work activities that will take place in the SDG&E Wildland Fire Area: The following work activities will take place in areas considered to be wildland as referenced by the SDG&E Wildland Fire Area *(*see attachment 3*).*

Construction Phase

- Vegetation removal; chain saws, brush cutters, chippers, excavators, tractors
- Road, tower pad, & staging area development; bulldozers, graders, loaders, other equipment
- Aviation activities; helicopter heavy lift and cargo transportation, landing zones, fueling activities
- Other construction related activities with the potential to ignite a wildfire:
    - Generators, augers
    - Grinding, welding, and blasting
    - Staging areas with fuel and/or other hazardous or flammable materials (emphasis on flammable)
    - ECO and Boulevard Substation construction specific fire related issues
    - Other, as determined by Project Fire Marshal, Project Supervisor, or Fire Agency

3. PROJECT FIRE RISKS:

During the construction phase of the Project, SDG&E shall implement ongoing Fire Patrols during the fire season as identified each year by local, state, and federal fire agencies when performing any activity in the SDG&E Wildland Fire Area (see Attachment 3). The following describes activities creating fire risks associated with the Project that will occur within the SDG&E Wildland Fire Area; where they apply, to what extent they apply, and what time frame they are applicable. Others will be added as they become identified by SDG&E or a participating fire agency.

Activity Risk:	Location on Project:	Miles or Acres on Project:	Time of year and duration:
1. Working on energized or de-energized electrical equipment.	Entire Project	13.9 miles	All year
2. Any off-road vehicle use within Project area.	Entire ECO Project	13.9 miles	All year
3. Any on highway vehicle use within project area.	Entire ECO Project	13.9 miles	All year
4. Chain saw use of any kind.	Entire ECO Project	13.9 miles	All year
5. Use of generators, pumps, augers, or other equipment capable of ignition.	Entire ECO Project	13.9 miles	All year
6. Other tree removal equipment; whole tree grinders, chippers, skidders, etc.	Entire ECO Project	13.9 miles	All year
7. Grinding or welding.	Entire ECO Project	13.9 miles	All year
8. Blasting or other explosive work.	Entire ECO Project	13.9 miles	All year
9. Aviation activities.	Entire ECO Project	13.9 miles	All year
10. Pad clearing accessible areas	Entire ECO Project	13.9 miles	All year
11. Pad clearing inaccessible Areas	Entire ECO Project	13.9 miles	All year
12. ECO Substation	Substation	83.56 acres	All year
13. Personnel smoking areas	Across entire ECO Project	13.9 miles	All year

4. PROJECT FIRE RISK MITIGATION MEASURES:

The following pre-identified "Activity Risk" tool and equipment requirements are based on the *Forest Standard Practice Rules 2008* and in most cases exceed those requirements. Activity Risks identified after Project initiation shall be added to this section with appropriate mitigation measures mutually determined by the Project Fire Marshal and the appropriate fire agency with jurisdictional responsibility.

Activity Risk:	**Risk Mitigation Description:**
1. Working on energized electrical equipment in or adjacent to wildland vegetation.	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box (sealed box of tools) on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [1 (5) gal. backpack pump w/H_2O, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of 1 (5) gallon backpack pump p/3 persons on site and a water reserve that totals 2 refills for each (5) gallon backpack pump w/H_2O.
2. Any off-highway vehicle use within Project area.	"NORMAL", have required tools and equipment available in vehicle, 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O. Visually confirm that no fire has started behind the path of travel. Vehicles must be highway legal and equipped w/spark arresters if required. "ELEVATED", same as above with the additional requirement of having a "Fire Patrol" (individual w/shovel and/or backpack pump w/H_2O) to lag behind vehicle and insure no fire has started and to extinguish rapidly if one has. Use lookouts for early detection of fire starts.
3. On highway activities in particularly hazardous areas.	May not be applicable to this Project, however still prudent to carry all required tools and equipment on vehicles. Work with Fire Agency involved to mitigate any delays to fire response equipment during underground construction near roadways.
4. Chain saw use of any kind in or immediately adjacent to wildland vegetation. (Must comply with PRC Code Div. 4, Ch. 6, 4431 & 4442)	"NORMAL" & "ELEVATED", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. Have 1 round point shovel within 25' of the chainsaw operation or 1 serviceable fire extinguisher in the operator's immediate possession. Refuel chain saw after cooling and in a minimum 10' area cleared of all flammable vegetation. Assign spotter or swamper "Fire Patrol" duties during chain saw operations. Tools utilizing internal combustion engines will be provided with spark arrestors.

Activity Risk:	**Risk Mitigation Description:**
5. Use of generators, pumps, augers, or other equipment capable of ignition and located in or adjacent to wildland vegetation. (Must comply with PRC Code Div. 4, Ch. 6, 4442)	"NORMAL" & "ELEVATED", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. Place equipment in a minimum 10' area cleared of all flammable vegetation. Tools utilizing internal combustion engines will be provided with spark arrestors.
6. Other tree removal equipment; whole tree grinders, chippers, skidders, etc. working in or adjacent to wildland vegetation. (Must comply with PRC Code Div. 4, Ch. 6, 4442)	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump w/H_2O p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of 1 (5) gallon backpack pump w/H_2O p/3 persons on site and a water reserve that totals 2 refills for each (5) gallon backpack pump. Tools utilizing internal combustion engines will be provided with spark arrestors.
7. Grinding or welding, in or immediately adjacent to wildland vegetation (see Forest Std. Practice Act 918.7, 938.7, 958.7 Blasting and Welding and NFPA51B-2009)	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site for remote sites (delivered by air if necessary). This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. All welding, cutting and other hot work will require a Hot Work Permit as described in NFPA 51B with SDG&E designated as the Authority Having Jurisdiction and the SDG&E ECO Project Fire Marshal designated as the Permit Authorizing Individual. "ELEVATED", same as above with the additional requirement of assigning a "Fire Patrol" or observer during grinding or welding operation.
8. Blasting or other explosive work in or adjacent to wildland vegetation. (see Forest Std. Practice Act 918.7, 938.7, 958.7 Blasting and Welding)	Any blasting or explosive work will require a separate and independent fire mitigation plan. The contents of this Plan can serve as the foundation, but each proposed blasting event will require specific direction and mitigation requirements. Fire Agency having authority shall be notified prior to any blasting.
9. Aviation activities	All aviation activities and mitigation requirements will be addressed separately in the "Helicopter Operations Safety Plan" later in this document.
10. Pad clearing accessible areas in or adjacent to wildland vegetation.	"NORMAL", have required tools and equipment on site, either available on vehicles within 100' or in a fire box on site. This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [3 (5) gal. backpack pump,1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of a standby water truck w/pump and hose (minimum 50 gals.) staged, available, and

	within 1 mile of work site, 250 gallons within 3 miles and 500 gallons within 5 miles. (can serve more than 1 work site)

Activity Risk:	**Risk Mitigation Description:**
11. Pad clearing inaccessible areas in or adjacent to wildland vegetation.	"NORMAL", have one fire box on site p/5 personnel containing [1 (5) gal. backpack pump, 1 Pulaski, 1 McCleod, 2 round point shovels]. "ELEVATED", same as above with the additional requirement of 1 (5) gallon backpack pump p/3 persons on site and a water reserve that totals 2 refills for each (5) gallon backpack pump.
12. ECO and Boulevard Substation construction	A site inspection prior to project initiation will determine any additional fire mitigation requirements for the ECO and Boulevard Substations and documentation of those will serve as an amendment to this document. The following minimum requirements however will apply. "NORMAL", have required tools and equipment on site, either available on vehicles within 50' or in a fire box on site. This would be 1 round point shovel, 1 Pulaski, and 1 (5) gallon backpack pump p/vehicle or 1 firebox [1 (5) gal. backpack pump, 1 Pulaskis, 1 McCleod, 2 round point shovels] p/5 personnel on job site. "ELEVATED", same as above with the additional requirement of a standby water truck w/pump and hose (minimum 50 gals.) staged, available, and within 5 miles of work site. (can serve more than 1 work site)
13. Personnel smoking areas	Where permitted, smoking will be in designated areas only, 10' cleared circle, with ash cans, and no butts left on ground.

5. STAGING AREAS, FLY YARDS, AND MAJOR OPERATION WORK SITES:

List all staging areas and major operations work sites within Project that are located throughout the Project area; San Diego County entries are located in the SDG&E Wildland Fire Area:

NAME	COUNTY	Fire Agency With Jurisdiction	Township/Range/Section	Acreage
Airstrip	San Diego	SD County FA/CAL FIRE	SE ¼ SW ¼, S33, T17S, R7E	5.50
Boundary Peak	San Diego	SD County FA/CAL FIRE	NW ¼ SW ¼ S9, T18S, R7E	5.66
Jacumba	San Diego	SD Rural/CAL FIRE	NE ¼ SW ¼, S4, T18S, R8E	0.89
ECO Substation	San Diego	SD Rural/CAL FIRE	SW ¼ S1, T18S, R8E	101.91
Boulevard	San Diego	SD County FA/CAL FIRE	SW ¼ NE ¼, S28, T17S, R7E	4.30

The following precautions will take place at each fly yard, staging area, or major operations work area;

- The site will be assessed by the Project Fire Marshal for wildland fire threat and/or risk prior to beginning operations associated with that site.
- Each site will have a minimum of one fire box with tools for 5 personnel and additional tools and equipment as determined by the Project Fire Marshal and/or jurisdictional fire agency. Requirements will be posted visibly at location.
- If a risk of fire propagating out from the staging area into the wildland exists, the Project Fire Marshal will invite the jurisdictional fire agency out for an inspection and additional recommendations or requirements.
- The Project Fire Marshal and appropriate fire agency representative will determine if any hazard reduction will be completed around site perimeter to reduce chance of fire escaping into the wildland.
- Additional specialized tools and/or equipment will be identified during the inspection and requirements posted visibly at the location.
- Additional fly yards, staging areas, or major operation work areas not covered by this document will be reported to the appropriate fire agency prior to initializing activity in those areas. The fire agencies will be given the opportunity to assess these new sites.
- SDG&E will provide the fire agencies with a Fire Suppression Resource Inventory which will include 24 hour contact information and a list of on-site fire suppression equipment and make amendments as changes occur throughout the Project.

6. ECO AND BOULEVARD SUBSTATIONS:

- The site will be assessed by the SDG&E Fire Marshal and the responsible fire agency for wildland fire threat and/or risk prior to beginning operations associated with that site.
- A determination will be made as to additional tools and equipment requirements in addition to those discussed in the "Activity Risks" section of this document.
- A determination will be made as to any hazard reduction measures required around site perimeter to reduce risk of fire escaping into wildland.

7. OTHER PROJECT TOOLS & EQUIPMENT REQUIREMENTS:

(Describe any special tool & equipment requirements above those required of the California State Forest Standard Practice Act)

The following equipment may be required to be staged as proximate as possible to on-going Project activities during "ELEVATED" fire conditions to supplement basic requirements already addressed in this Plan. These items should be strategically placed to afford the best opportunity to help to expeditiously extinguish any fire resulting from Project activities. The Project Fire Marshal, with consultation from jurisdictional Fire Agency will determine additional needs.

- Water storage or water reserve, use water buffalos, (5) gallon cubi-tainers, or fixed tanks to maintain 1,000 gallons of water in the staging areas, fly yards, or major operations work sites for any work activities proximate to that site.
- Pole protection truck, meets the specifications for a Type 6 Fire Truck, or equivalent should be available for staging by the Project Fire Marshal when conditions and work warrant.
- A cache of hose, pumps, fittings, etc. will be available at staging sites. Amount to be determined by consultation between the Project Fire Marshal and responsible fire agency.
- A construction Helicopter should be available for fire suppression as determined by the Project Fire Marshal when conditions and work warrant.
- Each crew member will carry at all times a laminated, Fire Prevention Plan card listing 24-hour contact information, telephone numbers for reporting fires and immediate steps to take if a fire starts. Information on the Fire Prevention Plan card will be updated as needed, redistributed and outdated cards destroyed. On the day the information change goes into effect, the Project Fire Marshal will assure this redistribution is conducted before the initiation of any construction activities.

8. PROJECT SPECIFIC SCHEDULE RESTRICTIONS:

All work will cease should any of the following take place:

- The initiation of a Red Flag Warning for the area involved for the entire duration of the RFW. (See section 10 for work on the substation pads.)
- A special proclamation from an appropriate fire official declaring certain work activities cease for a given period of time due to extreme weather or fire resource availability is at a draw down.

Consideration should be given anytime fire danger is elevated to completing work in early morning hours and not conducting any activities with fire risks during the hot, dry, and breezy part of the afternoon.

Fire Patrols and Fire Suppression Resource Inventory: During the construction phase of the Project, SDG&E will implement ongoing Fire Patrols during those times the State and Federal fire agencies elevate their resource staffing patterns due to the seasonal fire conditions. These dates vary from year to year, generally occurring from late spring through mid-November. Fire Patrols will be conducted by the Fire Marshal, or a qualified employee as assigned. See description under Fire Plan Definitions. At all construction areas requiring a Fire Patrol, a standardized form will be used to document t Fire Patrols, including any preventative actions. Fire Patrols will also verify the Fire Suppression Resource Inventory is maintained; that all crew members have the Fire Prevention Plan card with 24-hour contact information, including numbers for reporting fires and directions for immediate steps to take if a fire starts. See the section in this Plan for Project Fire Risk Mitigation Measures and for Staging Areas, both of which identify an Inventory of Fire Suppression Resources.

9. AGENCY SPECIFIC REQUIREMENTS:

CALFIRE: The Project activities must comply with Title 14 of the California Code of Regulations; California Forest Practice Rules 2011, in its entirety for the duration of the Project with particular attention to Subchapter 4, 5, & 6 Article 8 Fire Protection and Public Resource Codes (PRC) 4427 Operation of Fire Causing Equipment, PRC 4431, Gasoline Powered Saws and Equipment, and PRC 4442, Spark Arrestors. Also requirements for Smoking and Matches in 918.4, 938.4 & 958.4. The project design will comply with applicable NFPA standards and the California Fire Code.

BUREAU OF LAND MANAGEMENT: The same requirements as described for CALFIRE above.

San Diego Rural Fire Protection District: The same requirements as described for CALFIRE above.

San Diego County Fire Authority: The same requirements as described for CALFIRE above.

10. RED FLAG WARNINGS AND OTHER CRITICAL FIRE DECLARATIONS:

All Project activities that would take place in or adjacent to wildland vegetation for the entire duration of any “Red Flag Warning” (RFW) will cease. Project managers and supervisors will be responsible for exchanging their contact information with Grid Operations, to insure they are notified of these events. At the end of the RFW, confirmation should be obtained from the on-call Fire Coordinator that work can begin again and under what continued restrictions.

Other critical declarations can be made by any jurisdictional Fire Chief for a given period of time, due to unusual circumstances or conditions. As soon as these declarations are shared with the SDG&E Fire Marshal, Distribution Operations, Grid Operations, or Service Dispatch; they will be communicated to Project personnel by Grid Operations in the same manner as RFWs. Upon notification, all work activities that apply to the specific declaration will cease in those areas identified.

SDG&E Fire Marshals (company-wide fire managers) have the authority to stop any Project work activity that appears to pose a particular fire risk or hazard not uniquely covered by this Plan. The SDG&E Fire Marshal will contact the Project Fire Marshal, on site supervisor or Project Manager directly and identify clearly what will not be allowed, the projected duration, and the circumstances making this action necessary.

11. HELICOPTER OPERATIONS SAFETY PLAN:

When the Project requires the use of helicopters and involves landing or taking off in areas within or adjacent to wildland fuels and vegetation within the SDG&E Wildland Fire Area, special mitigations may be required. A plan specific to the safety related to the helicopter operations will be completed and serve as a supplement to this document. It will include at a minimum the following:

- Identification of all landing areas within the SDG&E Wildland Fire Area
- Wildland hazard assessment for each site
- Fueling safety plan; this plan will follow *Interagency Helicopter Operations Guide – June 2009, Chapter 13 Fueling Operations, ref. 15.3.*
- Identification of special tool and/or equipment requirements for each landing site where applicable.
- Designate a “Helicopter Safety Officer” or manager responsible for compliance with the plan during all helicopter operations.
- A communications plan will be developed to coordinate air operations with the surrounding fire agencies. Air operations will cease upon request by a fire agency

12. TRAINING REQUIREMENTS FOR SDG&E & CONTRACT PERSONNEL

Prior to Project initiation and each spring prior to the curing of the annual grasses; all Project supervisors *(SDG&E & Contractors)* will receive a minimum of 1 hour training on Wildland Fire Prevention and Safety *(ref. SDG&E ESP113.1).* This training will be provided by

an SDG&E Fire Marshal or their qualified designee. This training will then be shared with all construction personnel either by the Project supervisors or an SDG&E Fire Marshal or designee. Each member of the construction crew shall be:

- Trained in fire reporting
- Trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats.
- Trained in fire prevention
- Trained in Initial Attack Firefighting
- At all times within 100' of required fire related tools and equipment

This supervisory training will be conducted by the Project Fire Marshal or other qualified fire expert and compliance and documentation for all training will be monitored by the Project Fire Marshal.

13. SAFETY BRIEFINGS, INSPECTIONS & COMPLIANCE PLAN

A formal pre-Project inspection and plan review will take place with a minimum of the SDG&E Contract Administrator, the contract Project Manager, the SDG&E Project Manager, the SDG&E Fire Marshal, the ECO Fire Marshal, the Helicopter Manager, and invitations to the respective fire agencies. Monthly inspections of work sites and/or when a new site is initiated will take place with a minimum of the SDG&E Contract Administrator, Fire Marshal, and the contract Project Manager. The ECO Fire Marshal will conduct routine unannounced inspections a minimum of twice weekly. The ECO Fire Marshal will develop an inspection check sheet to document these inspections.

Prior to Project initiation, all Project personnel will receive a ½ hour presentation on the contents of this Plan along with additional fire safety and fire prevention information provided by an SDG&E Fire Marshal. Supervisors will be responsible for sharing its content with transient Project personnel throughout the duration of the Project. A review of the content of this Plan will take place at a formal safety briefing; a minimum of once each month the "ELEVATED" condition. Each daily safety tailboard session should include an assessment of the day's fire related risks or hazards and the mitigation for each. The contractor Project Manager will submit in writing to the Fire Marshal a review of the upcoming month's work activities, a brief fire risk & hazard assessment, and a mitigation plan for the month using the guidance in this Plan.

Compliance with this Plan is mandatory. Monitoring compliance with this Plan is everybody's responsibility. All levels of project management have the authority to shut down any operation that presents an inappropriate amount of fire risk or hazard until it can be properly mitigated. Violations of any of the requirements of this Plan will be addressed immediately. Appropriate consequences for repeated or serious negligence in respect to this Plan will be dealt with accordingly. All project-related vegetation fires, regardless of size, shall be promptly reported to the California Public Utility Commission and Bureau of Land Management to determine if appropriate mitigation measures are being taken.

The Fire Marshal shall develop an inspection checklist that will include daily checks, weekly, and monthly as appropriate. These inspections will conducted, documented, retained and compliance audited by the ECO PROJECT Construction Safety Manager.

14. COMMUNICATIONS PLAN

The ability to communicate with all Project personnel working with the SDGE Wildland Fire Area is mandatory. Cell phone, Satellite phone, and/or radios are all acceptable means provided they work appropriately within the area of the work. Communications must be maintained even if it requires the use of portable repeaters, human repeaters, or other technological means for this to happen. The Fire Marshal, Contract Administrator, or contract Project Manager must be able to contact the appropriate Emergency Communications Center immediately in the event of an emergency. If one of the three is not available to perform this function, the task must be officially delegated for the duration of the absence. SDG&E will provide the fire agencies with a Fire Suppression Resource Inventory which will include 24 hour contact information and a list of on-site fire suppression equipment and make amendments as changes occur throughout the project.

All construction crews and inspectors will be required to have radio and cellular telephone access that is operational along the entire length of the approved route to allow for immediate reporting of fires. As part of the Fire Patrol duties, communication pathways and equipment will be tested and confirmed operational each day prior to initiating construction activities at each construction site. All fires will be reported to the fire agencies with jurisdiction in the Project area immediately upon ignition.

Community Education and Outreach Program: The SDG&E Construction Notification Plan, the Community Fire Safety Program and the Sempra Utilities Wildland Fire Prevention and Fire Safety Guide all are avenues that will be used to communicate SDG&E fire prevention practices. The Construction Notification Plan will be mailed to all residents, property owners or tenants within 1,000 feet of the right-of-way of this Project and provide advance notice to residents, property owners and tenants within 300 feet of construction activities. Additionally, a public affairs officer and a dedicated public affairs contact number have been appointed to address community education and outreach.

15. REFERENCES:

California Forest Standard Practice Rules;
http://www.fire.ca.gov/resource_mgt/downloads/2011_FP_Rulebook_with_Diagrams_with_Tech_Rule_No_1.pdf

Interagency Helicopter Operations Guide; http://www.nifc.gov/ihog/

ECO Substation Final EIR/EIS;
http://www.cpuc.ca.gov/environment/info/dudek/ECOSUB/ECO_Final_EIR-EIS.htm

16. PLAN REVIEW AND APPROVAL:

The signatory reviewing officials are acknowledging that SDG&E has a Construction and Fire Prevention Plan that is necessary to mitigate fire hazard and risk for the ECO project construction

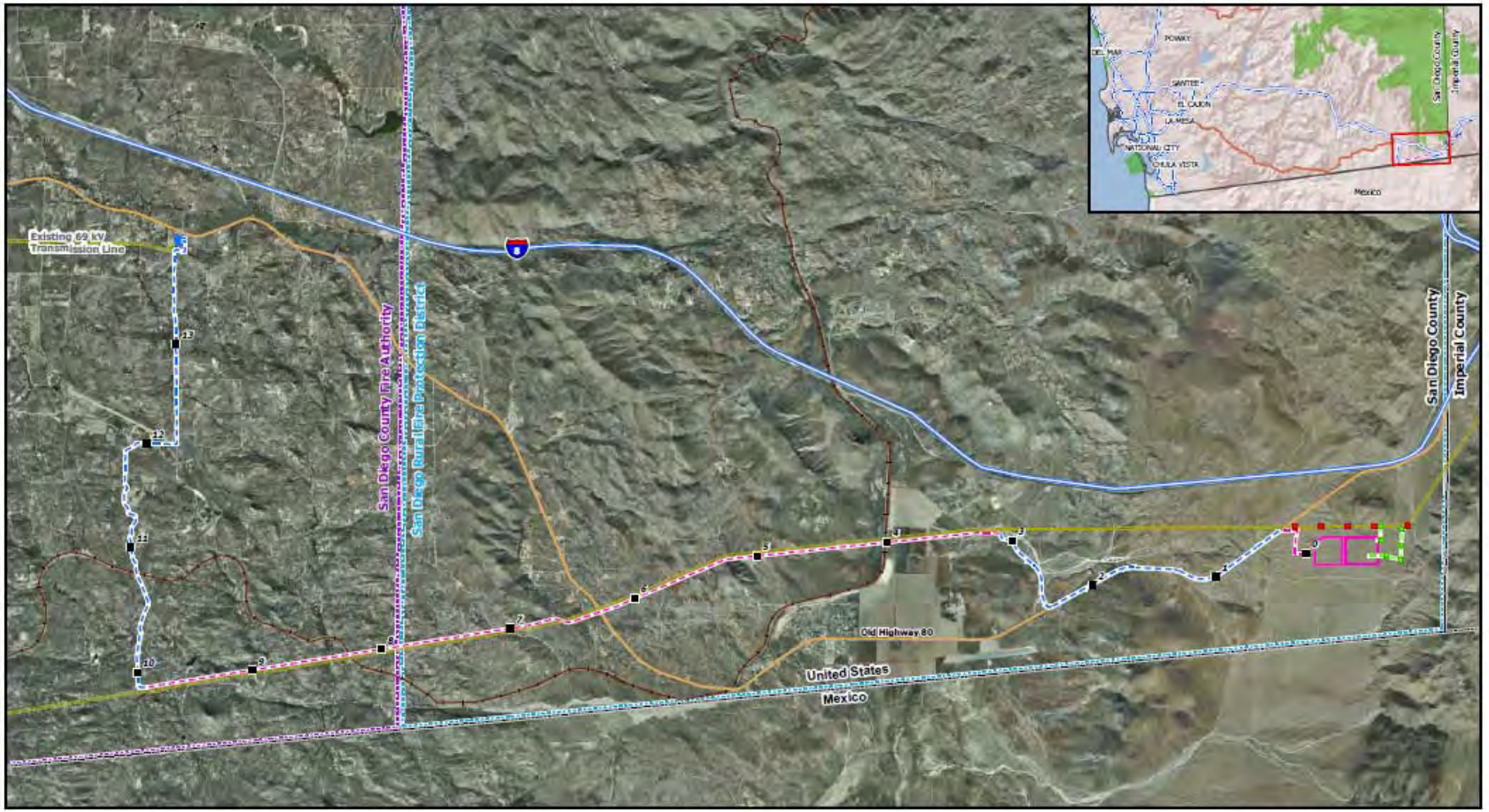
and maintenance activities. They do not accept any responsibility for SDG&E interpretation or implementation of this plan during the construction and maintenance of the ECO project or for any resulting actions associated with these activities.

Reviewed by:

SDG&E Fire Program Manager	Date
San Diego Rural Fire Protection District Chief	Date
CAL FIRE Chief	Date
San Diego County Fire Authority	Date
California Public Utilities Commission	Date
Bureau of Land Management	Date

Approved by:

SDG&E ECO Project Manager	Date
SDG&E ECO Fire Marshal	Date



Attachment 1: Project Vicinity/Overview Map

East County Substation Project

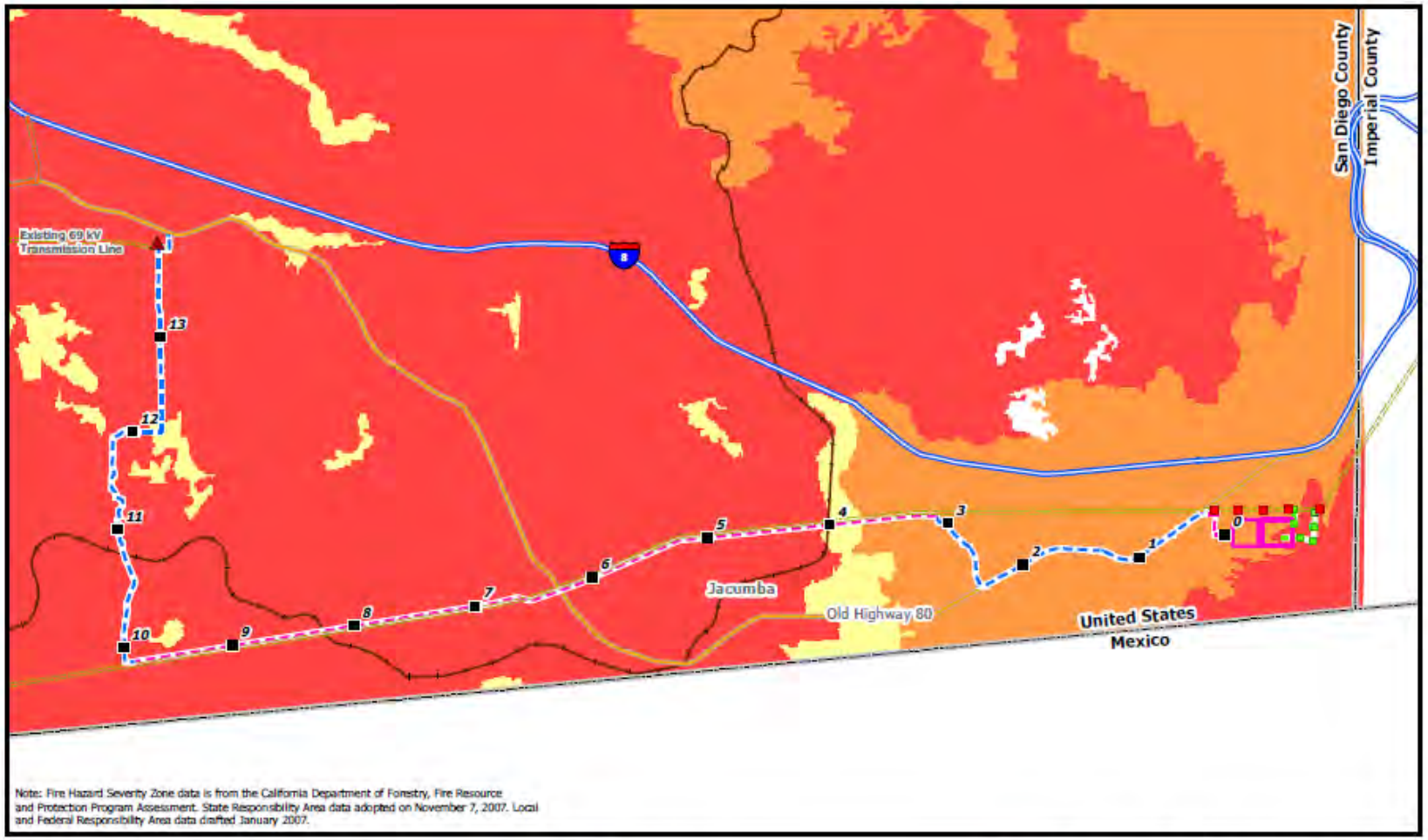
- Proposed 138 kV Line Milepost
- Existing SWPL Structure
- Proposed SWPL Loop-In Structure
- Boulevard Substation Rebuild
- Substation Yard
- Proposed 138 kV Overhead Line
- Proposed 138 kV Underground Line
- Proposed SWPL Loop-In
- Existing Transmission Line
- San Diego County Fire Authority
- San Diego Rural Fire Protection District
- Interstate
- Major Road
- Railroad

SDGE

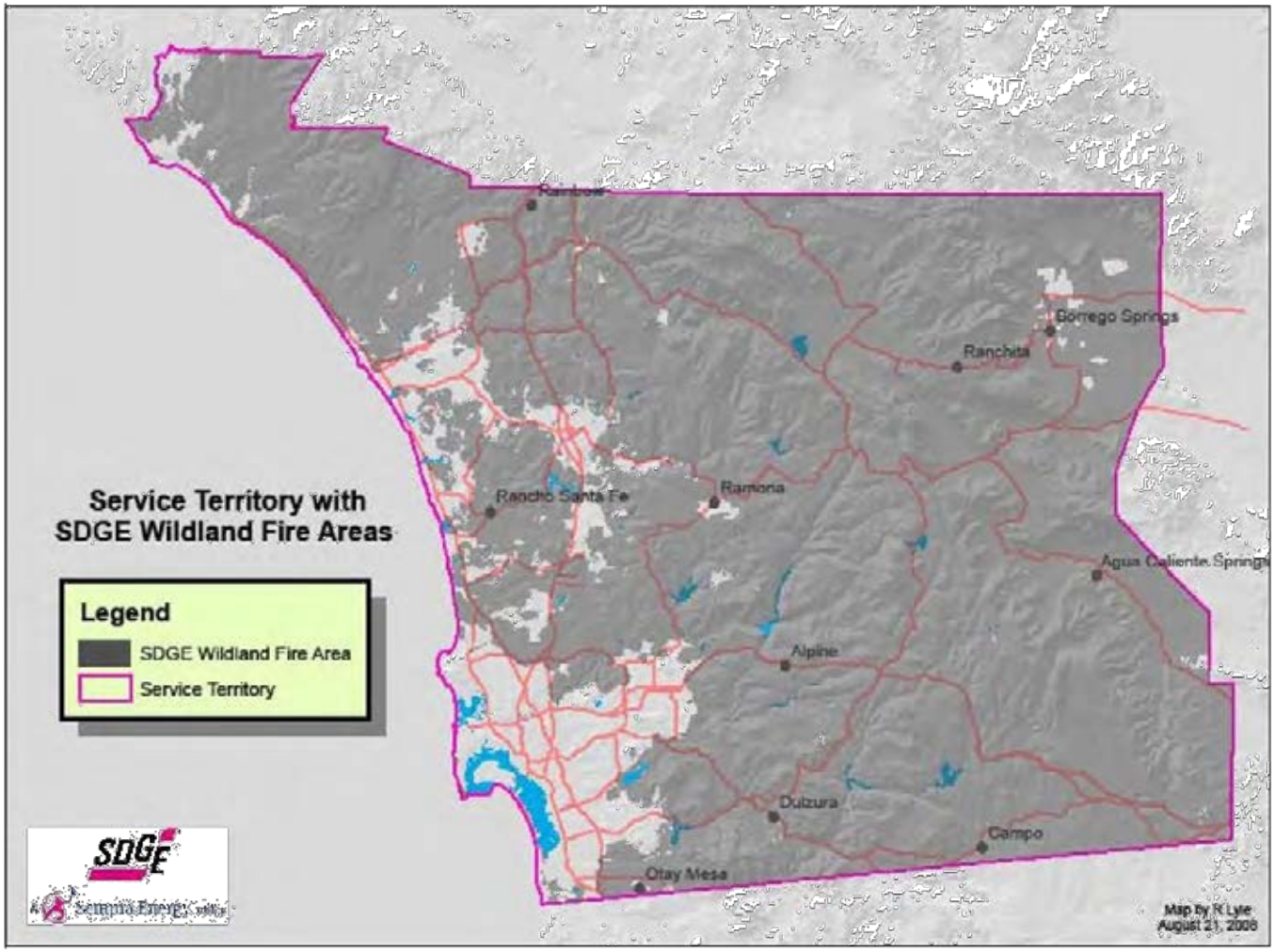
INSIGNIA ENVIRONMENTAL

1:45,000

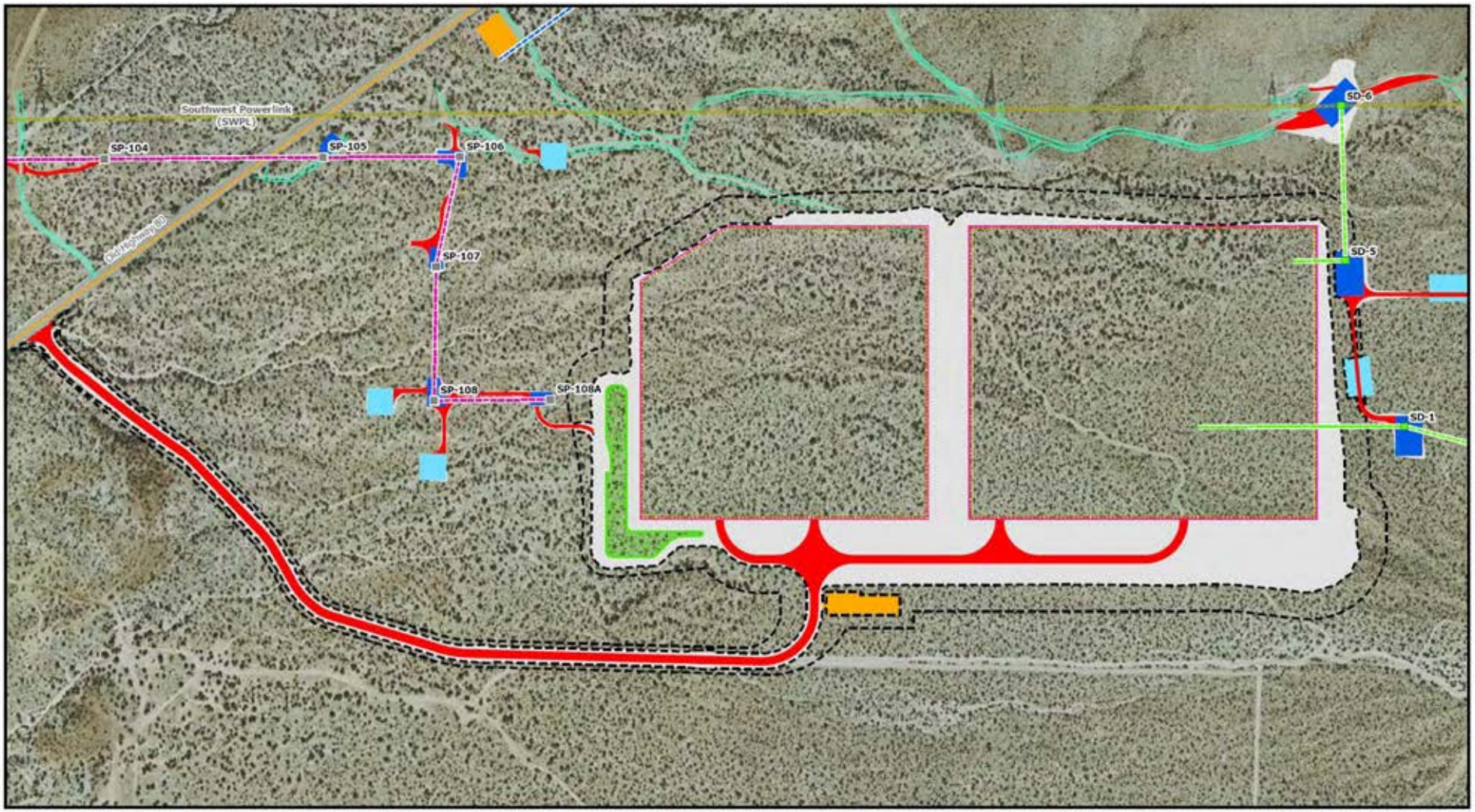
0 0.5 1 2 3 4 Miles



Attachment 2
Fire Hazard Severity Zones



Attachment 3
SDG&E Wildland Fire Areas



Attachment 4

ECO Substation Temporary and Permanent Footprint Map

Attachment 5
National Interagency Fire Council – Helicopter Operations
Guide, June 2009
Chapter 13 – Fueling Operations)

IHOG

Interagency Helicopter Operations Guide

NFES 1885

June 2009

IHOG

Interagency Helicopter Operations Guide

NFES 1885
June 2009

The agencies would like to acknowledge the assistance of the many product manufacturers, as well as the National fire Protection Association, the International Fire Service training Association, and the United State Department of the Army, who kindly furnished material used in the production of this document.

National Interagency Aviation Council
3833 South Development Avenue
Boise, Idaho 83705

June 3, 2009

To: IHOps Steering Committee

Subject: IHOG

The IHOG and IHOG Supplemental Forms Package have been revised for new publication in May of 2009. All policy changes become effective at this time. Published hardcopies will be available in June 2009. Changes include revisions proposed by the IHOG Working Group, coordinated by the National Interagency Aviation council, and approved by the U.S. Forest Service and the Department of the Interior. Some revisions to the IHOG were necessary to be compatible with changes made to the national helicopter contracts. Other revisions were based on proposals submitted by field personnel and agency program managers.

Additional or altered language for 2009 is noted with an arrow (→) at the beginning of each section that has been revised.

The IHOG is a dynamic document and will be reviewed again in 2012. Please forward suggested changes for the 2012 revision to the appropriate agency reprehensive from the IHOG Working Group.

Publication as a cache item and placement on the NIFC Website is authorized. The forms package will be maintained in NFES 0660, Air Operations Branch Kit, and NFES 3521, Helicopter Support Kit, Box 2. The IHOG and IHOG Forms Package are available for downloading at http://aviation.blm.gov/library.

A copy of this memo will be included in the front of the IHOG.

Mark L. Bathrick
Associate Director
Aviation Management Directorate
National Business Center
U.S. Department of the Interior

Karyn L. Wood
Assistant Director, Operations
Fire and Aviation Management
U.S. Forest Service
U.S. Department of Agriculture

NIAC Chair

IHOG Revision 2009

Background

The IHOG Working Group met in March and November of 2008 to review and consolidate proposed revisions to the IHOG that were generated from the field and from user agencies at all levels. The process allowed almost a full year for the field to propose changes. Each proposal was analyzed and either approved or rejected. The IHOG Working Group was represented as follows:

- Dianne MacLean, FWS, Chair
- Carrie Vernon, NPS, Vice Chair
- Cameron Dingman, BLM,
- Bob Quirino, USFS
- Todd Couture, BIA
- Meg Gallagher, USDOI/AMD

The IHOP Steering Committee reviewed and approved the proposed revisions in February, 2009.

- Vince Welbaum, USFS Chair
- Bryan Bitting, BLM
- Dave Underwood, BLM
- Arlyn Miller, AMD
- Chuck Taylor, USFS
- Mike Jefferies, FWS
- Kris Damsgaard, AMD
- Tom Monterastelli, NPS
- Dan Boyle, States

There is no revision summary included in this document, but each change is noted with an ➔.

Table of Contents

CHAPTER 7: HELICOPTER LOAD CALCULATIONS AND MANIFESTS

CHAPTER 8: HELICOPTER LANDING AREAS

CHAPTER 9: EQUIPMENT REQUIREMENTS AND MAINTENANCE

CHAPTER 10: PERSONNEL TRANSPORT

CHAPTER 17: SEARCH AND RESCUE OPERATIONS

APPENDIX A: HELICOPTER MANAGEMENT FORMS AND CHECKLISTS 17-4

CHAPTER 13: FUELING OPERATIONS.

I. Introduction.

Fueling operations, whether conducted by government or vendor personnel, have the potential to result in environmental damages or catastrophic accidents.

It is the responsibility of all personnel, both vendor and government, to ensure that fueling operations are conducted in accordance with procurement document specifications, agency fueling directives, and all other applicable local, state, and federal regulations. Special attention must be paid to federal, state, and local hazardous materials regulations and to agency-specific fuel spill avoidance requirements.

Chapter 15, Helibase and Helispot Management and Operations, contains guidance on location of fueling operations. Appendix I, Remote Fuel Site Reminders List, is a job aid that can be utilized by Helibase Managers and Fueling Specialists.

II. Responsibilities.

A. Management.

Agency heads are ultimately responsible for the management and effective implementation of a Fuel Quality Control Program within their respective agency. Supervisors and managers at all levels are responsible for the safe delivery of uncontaminated fuels during aviation operations under their jurisdiction or control. Within this responsibility is the practical requirement to provide safe working conditions, prevention of injury to persons, and the protection of property.

B. Employees.

To enhance safety, employees of participating agencies who become aware of any fuel-related mishaps (for example, fuel spills, fires, damage to aircraft or fueling facilities or vehicles, incorrect fueling of aircraft, incorrect fuel put in an aircraft, etc.) should report such occurrences utilizing the agency incident/hazard report. Where imminent danger situations exist, the operation should be suspended immediately.

C. Fuel Vendors.

Vendors conducting business for the transportation, storage or dispensing of aviation fuels, including into-aircraft operations, shall adhere to the provisions and specifications for such operations as provided within the procurement document. For the most part, all such operations shall be in accordance with the standards and procedures specified in applicable American National Standards Institute (ANSI) or National Fire Protection Association (NFPA) publications.

D. Pilots.

The Pilot is personally responsible for ensuring that the proper type and grade of clean, dry fuel is pumped into the aircraft.

III. Fuel or Oil Pollution Prevention.

General Environmental Protection Agency (EPA) Requirements. Agencies must be cognizant of the Environmental Protection Agency's (EPA) regulations found in 40 CFR 112.

Regardless of the size or location of an operation, it is necessary that an assessment be made to determine whether or not provisions of the regulations are applicable.

Basically, the criteria is if it can be reasonably expected that a discharge of fuel or oil will enter navigable waters, a facility is subject to the regulations. These regulations require the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) Plan. Exceptions to this requirement are:

- Aboveground facilities having a total aboveground storage capacity of 1,320 gallons or less of fuel, provided no single container has a capacity in excess of 660 gallons.

- Underground facilities having a total storage capacity of less than 42,000 gallons.

Agencies are encouraged to contact their local EPA office for detailed information concerning these regulations.

A. Fuel Spill Prevention Guidelines and Requirements in Environmentally-Sensitive Areas.

Check with the local aviation manager for additional fuel spill prevention guidelines and requirements in place for various geographic locations due to local or national environmental concerns and constraints.

Prior to the start of a project or upon arrival at an incident, the air operations staff should consult with the local Resource Advisor regarding any restrictions that may apply.

Restrictions may include, but are not limited to:

- Locating fueling sites at predetermined locations, occasionally at some distance from the helibase. Since this may have a significant impact on operations, additional planning and helicopters may be required.

- Prohibitions on fuel vehicles traveling on certain roads (usually adjacent to streams and rivers).

- Requirements for containment dikes around fueling pads.

- Proper containment and disposal of fuel samples.

IV. Types Of Fuel.

There are currently two categories of aviation fuel in use: aviation gasoline, commonly called AVGAS, and turbine or jet fuel.

A. Aviation Gasoline (AVGAS).
Aviation gasolines are used in reciprocating engine-powered helicopters. There are currently three grades of aviation gasoline in use:

- 80/87
- 100 Low Lead (100 LL)
- 100/130

B. Turbine (Jet) Fuel.
Aviation turbine fuels are used to power turbofan, turbojet, and turboprop aircraft engines. There are two types of turbine fuel in use:

- A kerosene base (Jet A, Jet A-50, JP-8, and Jet A-1)
- A blend of gasoline and kerosene (Jet B and JP-4)

Most commercial operators use Jet A or Jet A-50. The military normally uses JP-4 and JP-8. The specifications for JP-8 are similar to Jet A except that JP-8 has required additives for anti-icing, corrosion inhibitor, and anti-static.

V. Requirements for and Methods of Identifying Types of Fuel.

A. By Color.
If sample is not the right color, suspend the operation immediately. The following colors are indicative of the type of fuel:

Aviation Gasoline			Turbine Fuel
80/87	100 Octane Low Lead	100/130	(Jet A, Jet A-50, Jet A-1, Jet B, JP-4, and JP-8)
Red	Blue	Green	Clear or straw-colored

➔ WARNING: The Environmental Protection Agency (EPA) and Internal Revenue Service (IRS) have required that certain types of high and low sulpher diesel are colored blue and red. Aviaiton grade 100 LL (low lead) and 80/87 fuels are also colored blue and red respectively. The potential exists for a supplier to furnish diesel fuel instead of 100 LL. The FAA has issued a Notice to Airmen (NOTAM) and a special alert bulletin to pilots warning of the color conflict.

B. By Markings of Fuel Type and Grade.
In addition to coloring fuels, a marking and coding system has been adopted to identify the various fuel handling facilities, pieces of equipment, containers, inlet-outlet joints, and aircraft fuel filler openings according to the type and grade of fuel they contain.

1. Fuel Servicing Vehicles. Each aircraft fuel servicing vehicle shall be conspicuously and legibly marked with an identification decal to indicate the product contained in the vehicle. The markings shall be on each side and the rear of the fueler tank in letters at least 3" high. Vehicles must be marked as follows:

   - JET A - Combustible
   - JET B - Flammable
   - AVGAS - Flammable

Decal color markings are as follows:

Aviation Gasoline			Turbine Fuel
80/87	100 Octane Low Lead	100/130	(Jet A, Jet A-50, Jet A-1, Jet B, JP-4, and JP-8)
White Letters On A Red Background	White Letters On A Blue Background	White Letters On A Green Background	White Letters On A Black Background

2. Valves and Piping at Permanent Storage Facilities. Valves, loading and unloading connections, switches, and other control equipment shall be color-coded to identify the grade and type of fuel they control. The fuel in piping is identified by name and by painted color bands, or a decal placed around the pipe at intervals along its length.

3. Hose Lines. Hose lines shall be marked by decals or labeled adjacent to the nozzle to indicate the type of fuel dispensed. Reference the API Bulletin footnoted below.

4. Portable Storage Facilities - Containers.

   a. Bulk Collapsible Tanks (Bladders and Rollagons). Large fixed collapsible tanking facilities, as well as their accessory fueling lines and equipment, shall be marked or decal attached in accordance with the requirements for fuelers in Section V.B.1.

   b. 250- and 500-Gallon Collapsible Rollagons. Each end of a rollagon shall be marked in letters at least 4" high with the type and/or grade of fuel in the container.

   c. 55-Gallon Barrels. The top head or sides of a 55-gallon barrel shall be marked in letters no smaller than 3/4" with the type and/or grade of fuel, filling date, vendor, and any other pertinent information.

REMINDER: Agency authorization is required for use of 55-gallon fuel barrels.

d. 5-Gallon and Smaller Containers. All containers shall be marked with the type and/or grade of fuel contained in the container. In many cases the 5-gallon containers are marked by the fuel manufacturer.

➔ CAUTION: Portable plastic containers should be used only when refueling is necessary and no alternative exists. If using portable plastic containers, an approved funnel capable of separating water and contaminates, along with bonding capabilities is required.

5. Aircraft. Various FAR's require that aircraft fuel filler openings be marked to show the word "FUEL," the minimum fuel grade or designation for the engine(s), and the tank capacity. In order that these markings retain their effectiveness, they should be kept fresh and clean.

VI. Contamination Testing.

The "Clear and Bright" (Dry) Sampling Test should be utilized by either the vendor or, if government-operated fueling operation, by trained government personnel. This test involves the following steps, in order:

- Collect fuel sample in a clean clear 1-quart glass jar and swirl. Samples are collected from tank and nozzle.
- Check color against the background of the sky. If water is present, free water (water not in solution) will separate and lay in the bottom of the jar.
- Swirl the contents of the jar. Any free water and/or water in solution will cause the color to become cloudy.

IMPORTANT NOTE: If fuel is found or suspected to be contaminated, suspend all operations immediately (including those of other aircraft that may have been fueled from the same source) and contact agency aviation safety representatives.

- If water is detected in the tank sample, sump and continue to test until no more water is detected in sample jar. Do not allow helicopter fueling until the sample is free of contamination.
- If water is detected in the nozzle sample, suspend the operation immediately.
- Particles in the sample can also be visually identified.
- If particles appear in the tank sample, sump tank until sample is clean.

- Do not use fuel if any nozzle sample indicates:
  - Wrong color, not clear or bright
  - Particulates are present
  - Water is present

VII. Fueling Hazards.

➔ When service personnel fuel a helicopter, they transfer extremely combustible liquids from a storage or transportation vessel to the fuel tank(s) of a helicopter. Such operations are hazardous if the proper procedures are not followed.

Servicing personnel should follow servicing instructions and use the proper equipment in accordance with established operating procedures.

While fueling aircraft is not unusually hazardous under normal conditions, certain other conditions may increase the hazard. Fueling personnel should be aware of the potential problems caused by fuel vapors in the presence of ignition sources such as static electricity, certain weather conditions, electromagnetic energy, and open flames.

They should also be aware of other conditions that introduce additional sources of ignition and/or increase the likelihood of fuel or fuel vapors escaping.

A. Fuel Vapors.

Fuel vapors create potentially hazardous situations, so fuelers must be sure to follow prescribed procedures.

When fuel is transferred into an aircraft tank, the incoming fuel forces fuel vapors out through tank vents, with an explosive vapor-air mixture formed in the vicinity of the operation. At some point, the escaping fuel vapors will be within explosive limits, depending upon atmospheric conditions and the type of fuel involved.

> WARNING: Because AVGAS has a flash point of about -50° F, sufficient vapors are liberated to produce a flammable vapor-air mixture under almost all conceivable atmospheric conditions. All that is needed to cause a fire or explosion is a source of ignition.

Additionally, because the rate of vapor generation increases as the temperature of the fuel increases, the risk of fire or explosion increases when atmospheric temperatures rise. Because fuel vapors are heavier than air, they will settle to the ground and accumulate in ditches, pits, or other depressions and may travel great distances before coming into contact with an ignition source.

B. Ignition Sources.

In any area in which aircraft are parked or operating, there are numerous ignition sources that may ignite fuel vapors. These sources include static electricity (such as that caused

by low-conductivity liquids, refueling vehicles, and clothing), adverse weather conditions (lightning), electromagnetic energy (radar), and open flames.

1. Static Electricity. Static electricity is more difficult to control than any other ignition source. The mechanism responsible for this phenomenon is complex, and there are many variables that may increase and decrease the amount of energy generated. Static charges may exceed 50,000 volts and may produce sufficient energy to cause an explosion above the liquid surface fuel.

   When low-conductivity liquids, such as hydrocarbon fuels, flow through a piping system, they tend to become electrostatically charged. Refueling vehicles have developed measurable electrostatic charges exceeding 50,000 volts during filling operations. This high voltage is partially a result of the insulating effect of the vehicle's rubber tires. To eliminate this insulating effect, the refueling vehicle must be properly bonded to the helicopter during these operations.

   During windy conditions, the movement of dust particles and air currents may cause parked helicopter and refueling vehicles to develop larger-than-usual charges of static electricity.

   CAUTION: Personnel should exercise caution when there are thunderstorms or electrical storms in the vicinity. The energy generated by these natural phenomena may ignite flammable fuel vapors.

   When the atmosphere is unusually dry, certain fabrics are notorious for accumulating a static charge. Therefore, personnel who operate refueling vehicles should avoid wearing materials made of polyester, nylon, rayon, silk, or wool when working in cold, windy weather.

2. Electromagnetic Energy. Transferring fuels is hazardous within 300 feet of the source of electromagnetic energy such as that created when high-powered radar operates. However, portable and mobile radio equipment may be used safely beyond 10 feet from fuel filler openings and/or vents.

3. Open Flames. Open flames should be strictly controlled or prohibited in aviation operations areas or within 50 feet of any aircraft fueling operation. Open-flame devices include:

   - Lighted smoking materials of any type.

   NOTE: "No Smoking" signs should be posted at all entrances to fueling areas. At remote sites (off-airport), pennant-type flagging or other barrier should be utilized when a single-use fueling area is established.

   - Exposed-flame heaters whether liquid, solid, or gas-fired devices, including portable and wheeled gasoline or kerosene heaters and open-element electric heaters.

- Welding and cutting torches and blowtorches.
- Grinding equipment, either portable or stationary.
- Flare pots or other open-flame lights.

4. Other Conditions. There are other normal and accepted fueling operations that are hazardous and may require additional safety precautions. Some of these operations are:

   - Defueling an aircraft that requires fuel to be drained into open drums or containers.
   - Defueling an aircraft that requires an auxiliary power unit or the aircraft engine(s) to be operating during the defueling.
   - Servicing an aircraft fuel system that has undergone maintenance but has not been functionally tested before being serviced.
   - Fueling an aircraft or using systems with which servicing personnel are not thoroughly familiar.
   - Performing other potentially hazardous operations, such as maintenance, power plant operation, and energizing the aircraft electrical system, while the aircraft is being fueled/defueled.

VIII. Safety Precautions.

Aircraft batteries, battery chargers, or other electrical equipment should not be connected, disconnected, or operated during fuel servicing. Radios and electronic flash equipment should not be operated with 10 feet of fueling equipment or of the fill or vent points of the aircraft.

A. Grounding Requirements.

The National Fire Protection Association (NFPA) no longer recommends grounding aircraft during refueling operations. Due to the particular difficulty involved in grounding helicopters at off-airport sites, the recommendation of NFPA (not to require grounding) should be followed by participating agencies.

Grounding may still be required procedure at military or civilian airports or by military helicopter crews. Therefore, grounding should be accomplished when required by local regulation.

B. Bonding Requirements and Procedures.

(See Figure 13-1) Bonding involves connecting two or more metallic objects together by means of a conductor that equalizes the electrostatic potential between the objects. Although some fuels being used in aircraft have additives that inhibit static electricity generation, bonding aircraft to the fuel nozzle is required safe practice.

1. Pre-Bonding Inspection. Check condition of the bonding cable and plug. Procurement document language will usually state required bonding equipment condition.

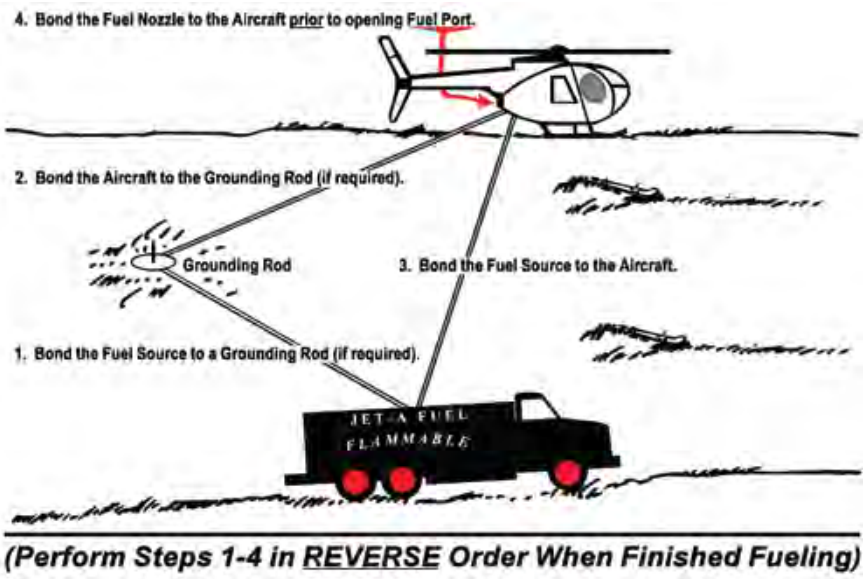
2. Connecting the Bond. Refer to Exhibit 13-1. Bonding must be performed as follows, in order (omit grounding steps if not required):

    - Bond the fuel source to a grounding rod (if available and required).
    - Bond the helicopter to the grounding rod (if available and required).
    - Bond the fuel source to the helicopter.
    - Bond the fuel nozzle to the helicopter prior to opening the fuel port.

3. Disconnecting the Bond. Disconnect the bond in reverse order (omit grounding steps if not required):

    - Disconnect the fuel nozzle bond from the helicopter after closing the fuel port.
    - Disconnect the fuel source bond from the helicopter.
    - Disconnect the helicopter from the grounding rod (if used).
    - Disconnect the fuel source from the grounding rod (if used).

Exhibit 13-1: Correct Bonding Procedure



NOTE: Bonding to grounding rod may not be required.

C. Rapid Refueling.
Hot refueling of helicopters is permitted if requested by the Government.

Review the procurement document for requirements prior to any hot refueling operations.

Government personnel shall not refuel Contract aircraft unless the pilot requests Government assistance due to an emergency situation; or when the Government provides the fuel servicing system and dispensing personnel.

IX. Vendor Fueling Operations.

A. Vendor Responsibility.
Vendors are responsible for maintaining equipment and conducting refueling operations in accordance with the procurement document and, when appropriate and when not in conflict with the procurement document, in accordance with the safety procedures stated in this guide.

B. Government Responsibility.
The government representative (for example, the Helicopter Manager, Helibase Manager) is responsible for ensuring that:

- Vendor equipment meets specifications and is correctly maintained in accordance with the procurement document; and

- Fueling operations are conducted in accordance with the procurement document and, when appropriate and when not in conflict with the procurement document, in accordance with the safety procedures stated in this guide.

C. Government Participation.
The government shall not participate in vendor fueling operations. Personnel shall maintain a distance of at least 50 feet from the fueling site until such time as the operation is completed. A “fire guard” (for example, a Parking Tender with fire extinguisher) may be posted at the edge of this 50-foot safety circle.

D. Vendor Service Truck Requirements and Specifications.
It is essential that the government representative ensures that all fueling operations involving a service truck are conducted in accordance with the procurement document. The following is provided as a guide only. For specific requirements, each individual procurement document must be consulted. Procurement documents usually contain the following requirements.

- An approved service truck is provided with each helicopter.

- The service truck is suitable for and capable of handling the terrain encountered (e.g. mountainous roads).

- The service truck meets the licensing criteria of each individual state in which they travel. This requirement can result in delays in arrival of the service truck if not anticipated in advance.

- For fire, the service truck tank capacity is usually required to be able to sustain 8 hours of flight (14 hours when a two or more Pilot crew is required). For projects, this requirement may be adjusted according to local need.

- The service truck is properly maintained, clean and reliable. Tanks, plumbing, filters, and other required equipment should be free of rust, scale, dirt, and other contaminants. A trailer used for storage and transport of fuel is usually required to have an effective wheel braking system.

- Spare filters, seals, and other components of the service truck filtering system are stored in a clean dry area. (A minimum of one set is usually required.)

- All tanks are securely fastened to the truck bed and has a sump or sediment settling area of adequate capacity to provide uncontaminated fuel to the filter.

- A 10-gallon-per-minute filter and pump is usually the minimum size acceptable. Filter and pump systems sizes should be compatible with the helicopter being serviced.

- The filter manufacturer's Operating, Installation and Service Manual is available with the service truck.

- Gasoline engine driven pumps have a shielded ignition system and a spark arrestor.

- Tanks erected for above-ground storage and tanks mounted on trucks are equipped with a sump drain valve at the lowest point.

- Only hoses designed for dispensing of fuel should be used. Hoses should be kept in good repair.

- The fuel nozzle should include a 100-micron or finer screen, a dust protective device and a bonding clip or plug. Except for Wiggin closed-circuit nozzles, no hold-open devices be permitted.

- An accurate fuel metering device for registering quantities in U.S. gallons of fuel pumped is provided. The meter shall be positioned in full view of the fuel handler while fueling the helicopter.

- The service truck has bonding cables, and, when required, grounding cables.

- Fire extinguisher is mounted in a manner to make it readily available at all times.

- Fire extinguishers should be provided as specified in the procurement document and in accordance with NFPA 10, Standards for Portable Fire Extinguishers.

- Each fuel servicing vehicle should have "NO SMOKING" signs with 3-inch minimum letters visible from both sides and rear of truck.

- Each vehicle be conspicuously and legibly placarded and marked according to the requirements in Section V.B to indicate the nature of the fuel.

- The first and third stage elements of a three-stage system and the elements of a single-stage system should be new and installed by the contract start or during the annual inspection; the separator element (teflon screen) of the three-stage system should be inspected and tested as prescribed by the manufacturer during the inspection; and the filter assembly must be placarded with that data.

- For three-stage filters, the bottom of the filter assembly should be mounted to allow room for at least a quart size jar to be inserted under the drain for draining and pressure flushing of the unit or may be drained overboard clear of the truck wheels and exhaust system; water sight gauge balls be visible.

- Depending on whether the system is a single- or three-stage (coalescer, water separator, monitor) systems, specific pumps and monitor systems are usually specified.

E. Fuel Servicing Vehicle Driver Qualifications:
Fuel servicing vehicle drivers shall comply with Department of Transportation Safety Regulation Part 390-399, and any duty limitations imposed by the helicopter procurement document (contract). Refer to the appropriate procurement document for specific requirements.

X. Government Fueling Operations.

There are situations, especially in Alaska, where the government is responsible for supplying fuel and a government-operated fueling operation must be set up to accommodate refueling needs. There may be other situations where the government, though not responsible for supplying fuel, must do so. An example would be an incident so remote, or where helibases have no road access, that the government is supplying fuel via aerial delivery.

A. General Guidance and Requirements.

- Prior to the start of operations, the manager of the refueling site (for example, Fueling Specialist) may utilize the Remote Fuel Site Reminders List in Appendix I to ensure that operations are set up and are being conducted correctly. Parts of the Reminders List may also be used by Helibase Managers to correctly locate fueling pads and to monitor vendor refueling operations.

- Minimizing ground time of both the helicopter and of the service truck in close proximity to other helicopters in the refueling area or on the helibase is important to minimize exposure and risk.

- Refer to Aviation Fuel Management Handbook for additional information.

B. Personnel Requirements at a Government-Operated Fueling Site.

The following personnel are required on a government operated fueling site:

- Two people are required to conduct the actual refueling of the aircraft (one may be the Fueling Specialist). One person operates the fuel nozzle; the other is required to be near the emergency fuel shutoff valve.

- Depending on the size of the operation, the fueling operation may also require the following:

- An Aircraft Base Radio Operator

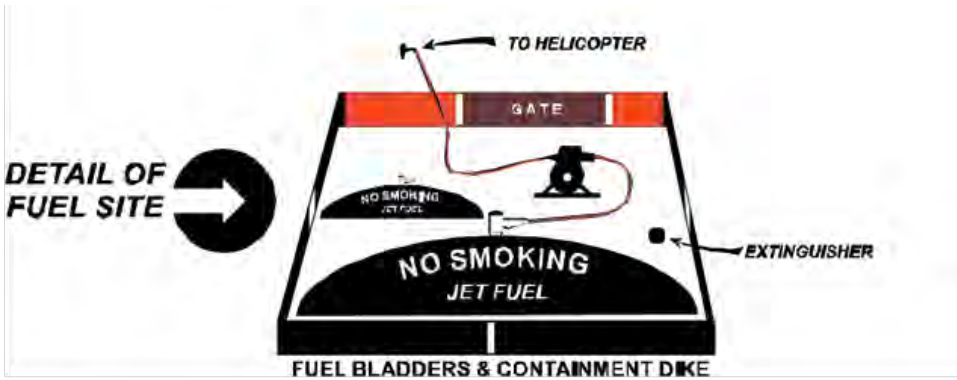
- A Parking Tender

C. Personal Protective Equipment.
Government fuelers shall wear protective clothing as required in Chapter 9.

D. Fueling Site Layout.
Fueling sites should be laid out according to the following general guidelines: (See Aviation Fuel Management Handbook for additional information)

- The fueling site should be separate from the main area of helicopter operations.
- There should be a minimum of 140 ft separation between Type 1 helicopters if the aircraft are parked nose to tail and 200 ft of separation if parked side by side.
- There should be a minimum of 90 feet of separation between aircraft for Type 2 or 3 helicopters.
- The fueling equipment at a fixed fueling site (pump, fuel source) should be at least 25 feet outside the rotor disk of the nearest helicopter.
- The wind direction must be considered when setting up refueling points. Landing and takeoff directions must be selected to provide a direct or quartering head wind.
- Fueling activities generate a considerable amount of vapor. Because the vapor is an explosive hazard, the fueling activity should be situated to allow vapors to be dispersed by the prevailing wind.

Exhibit 13-2: Government Fueling Site Layout



E. Equipment Required.

Equipment at the typical fueling site consists of the following:

- A fuel source, which may consist of 55-gallon drum(s), three 500-gallon collapsible fuel bladders, permanent or temporary tanks, or a fuel tanker.
- Pump Assembly.
- Filter and separator unit. The filter and the separator must be compatible with the pump assembly.
- Hoses, fittings, valves and nozzles. Enough equipment must be available to support the refueling setup that is envisioned; for example a one-point, two-point, three-point or four point set-up.
- Support equipment. This equipment will include items such as fire extinguishers, grounding rods, waste pans, five gallon containers of water, and absorbent material.
- Fuel sampling kit.
- Fire extinguishers should be located at each refueling nozzle and at the pump and filter assembly.
- A waste fuel pan should be located at each refueling point to wash dirt off the nozzles. The waste fuel pan or barrel is required to limit fuel spillage. Fuel spills should be handled according to the procedures outlined later in this chapter.

F. Equipment Setup.

1. Distances.
   - As stated, the fueling equipment (pump, fuel source) should be at least 25 feet outside the rotor disk of the nearest helicopter.
   - The fuel source should be downwind of the aircraft exhaust to reduce the explosion hazard.
2. Pump Assembly
   - The pump assembly and filter separator must be properly grounded and checked for leaks before operation.
   - Fittings should be properly sealed and free of cracks.
   - Sandbags should be used to elevate the fittings to facilitate pre-operational checks and detection of fuel leaks.
   - Hose clamps should be checked for proper fit.

- All shutoff valves should be serviceable and properly in place.

G. Equipment Checks.

These checks should be made for fueling operations conducted by the government. Some, but not all, may be applicable per the procurement document for vendor fueling operations.

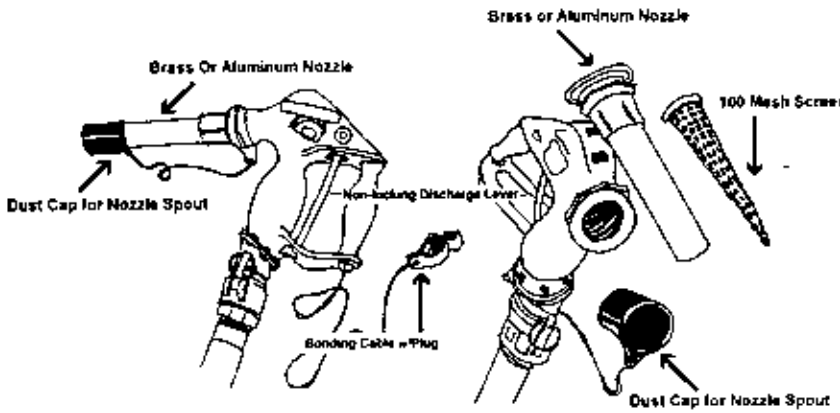
1. Aviation Fuel Nozzle Requirements. (See Exhibit 13-3.) If all of these items are not present and in good condition, discontinue the operation until corrected:

   - A non-locking discharge lever
   - A bonding cable with plug
   - A brass or aluminum nozzle
   - A 100-micron screen in nozzle
   - A serviceable dust cap for nozzle spout
   - For government-operated fueling operations, it is advantageous if each nozzle has all fittings needed to conduct both closed-circuit and open-port fueling.

   WARNING: Static electricity builds up on an aircraft as the aircraft moves through the air. Static electricity also builds up on the refueling equipment when the fuel is pumped through the hoses. The aircraft, fuel nozzle, and pump assembly must be bonded to prevent sparks and explosions. Additionally, static electricity buildup is greater in cold, dry air than in warm, moist air.

   - Each nozzle has two ground wires (not a procurement document requirement). One wire has an alligator clip on the end of it; the other wire should have a plug. These wires are used to bond the aircraft to a grounded 5-foot grounding rod (if available; not mandatory). The nozzle can be kept off the ground by hanging it on the grounding rod.

Exhibit 13-3: Fuel Nozzle Requirements



2. Nozzle Spout Screen. Check for cleanliness by:

    - Unscrewing nozzle spout and remove screen
    - Tapping screen and collecting contents (if any) for indication of filter by-pass debris or hose deterioration.

3. Portable Fueling Equipment Pressure Differential Gauge(s). When this gauge is installed, check the pressure difference between the inlet side of filter (high psi) and the outlet side (low psi). Perform the following test:

    - Recirculate fuel through the nozzle into the tank at maximum flow rate and note the difference. Some use two gauges, which requires that the operator perform mathematical calculations. Others use a single gauge, allowing a direct differential reading.
    - When pressure differentials are at, or exceeding the manufacturer's recommendations, there is cause for concern. It is a very good indication the filter is holding back water and/or particles. The following should be performed:
        - Sample fuel in tank
        - Replace the element
        - Recheck the pressure differential with new element in place.

4. Flow Rate. Per specification on pump rating, determine flow rate in gallons per minute (GPM):

    - Recirculate fuel through the nozzle and into the tank, and time the GPM.

    - Substantially reduced flow rates from the minimum specified may be a good indication of a restriction in the element caused by particulate or water contamination. The following should be considered:

        - The filter may need to be changed.

        - The pump may not meet specifications.

    - Remove filter element in the single cartridge Velcon or the monitor 3rd stage (inside the Teflon screen) and replace with new element.

> CAUTION: When changing elements, do not touch elements with dirty hands or gloves. Use clean gloves. Leave new element in package until the last step of placing element in canister.

    - Re-check the GPM flow.

    - While recirculating check total system for leaks.

H. ➔ Inspections and Quality Control.

Every possible precaution must be taken to maintain quality assurance for fuel. Items which must be checked and maintained on a daily, weekly, monthly, annual, or as-needed basis are covered in the discussion of Form HCM-3, Aircraft Fuel Facility Inspection Log (in Appendix A). Inspections must be performed on the required basis, unless this is not feasible due to the remote location and infrequent use of a fueling site. In that case, a combination daily, weekly, and monthly inspection shall be performed prior to each use of the fueling site.

1. Daily Inspections. Fuel site and equipment must be visually checked daily for leaks. If found, local procedures for hazardous materials spills should be followed. In addition, check for water or particulate contamination in the fuel source by:

    - Checking the bottom of storage facilities tanks for water, using water draw-off connections (sumps) and a visual test on a water-finding paste (allow the paste to remain in contact with the fuel for 30 seconds). Look for paste to change colors.

    - Checking for and removing any water from fueler tanks. A water check should also be performed after every reloading of the fuel container, washing of equipment, and after a heavy rain or snowstorm. Utilize the “clear and bright” test explained earlier in this chapter.

- Visually checking for particulates as explained earlier in this chapter.
- Checking all three-stage and Velcon filter/separator manual water drains for water and other contaminants after each receipt of fuel, as well as on a daily basis. Draw off any accumulation of water.
- Checking and recording all fueler and fixed filter and filter/separator differential pressures while under full flow conditions. A graph-type log may be used in plotting differential pressure daily. Any sudden change or decrease in pressure differential may indicate a ruptured filter.
- Visually inspecting fueler and storage facilities, pumps, valves, and pipelines for leaks.
- Checking and cleaning hose nozzle screens, and if breaks are found, replacing the screens.
- Inspect all hoses for abrasions, separations, or soft spots. Weak hoses should be replaced.
- Drawing off a sample daily from the downstream side of the filter. Sample should be collected in a clean, clear glass bottle and examined visually. Any visual water, dirt or filter fibers is not acceptable.
- Checking that dust caps are in place.

2. Weekly Inspections. All of the daily inspections, plus:
   - Inspect all fire extinguishers for broken seals, proper pressure, and recharge date. Recharge as necessary.
   - Check fuel flow rate GPM to nearest 1/10 gallon.
3. Monthly Inspections. All of the daily and weekly inspections, plus:
   - Check the condition of bonding and grounding wires, grounding clips, jacks and bonds.
   - Check condition of pumps, motors, and valves.
   - Check fuel source and fueling facilities for general condition, safety and appearance.
4. Annual Inspections. All of the daily, weekly, and monthly inspections, plus:
   - Check electrical continuity with an ohmmeter

I. Record Keeping.

See Appendix A, Form HCM-3, Aircraft Fuel Facility Inspection Log, for required record-keeping. The individual responsible for fueling and/or the fuel source will keep a record containing the following information:

- Condition (clean, clear, bright, etc.) of:
  - Tank sump sample
  - Filter sump sample
  - Nozzle sample
  - Flow rate in gallons per minute to the nearest 1/10 gallon
  - Filter change, reason and date

XI. Fuel Spills.

The information in this section is consistent with National Fire Protection Association (NFPA) Publication 407-90, “Standard For Aircraft Fuel Servicing,” and should be utilized for both Vendor and government fueling operations.

Fuel spills are often the result of improper or careless operation of fueling equipment and lack of preventive maintenance of the fueling equipment. Close attention on the part of every person responsible for fueling is required to prevent fuel spillage. Personnel shall follow the guidelines listed below. See Chapter 12 for crash-rescue and firefighting procedures regarding fuel spills.

CAUTION: All fuel spills, regardless of size, should be considered a fire hazard.

Procedures for handling fuel spills are subject to the regulations and procedures established by the authority having jurisdiction.

WARNING: Report all spills immediately; do not attempt to hide the fact that a spill occurred. There are severe civil and criminal penalties if a spill is not reported promptly.

Each incident is somewhat unique, but certain general principles apply in all cases. Every fuel spill involves several variables:

- Size of the spill
- Terrain on which the spill occurred
- Equipment
- Weather conditions
- Type of fuel and its flammability

- Proximity to aircraft or personnel
- Aircraft accident involved
- Emergency equipment and personnel available.

A. Prevention.

Following good spill prevention practices will significantly reduce the chances of one occurring:

- Devote full attention to the fueling operation.
- Never leave any fuel nozzle unattended.
- Never tie or wedge the nozzle trigger in an open position.
- Frequently check the amount of fuel in the tank to prevent overfilling.
- Pumps, hand- or power-operated, shall be used when aircraft are fueled from drums Pouring or gravity flow shall not be permitted.
- Kinks and short loops in fueling hose should be avoided.
- At remote fueling locations using portable fueling equipment, sandbags should be used to elevate the fittings to facilitate pre-operational checks and detection of fuel leaks.
- At remote fueling locations using portable fueling equipment, construct a berm around the fuel bladder to contain fuel in case of rupture for both temporary and semi-permanent systems.

B. Mitigation Procedures in the Event of a Spill.

If a fuel leak develops or a fuel spill occurs during aircraft servicing, initiate the following emergency procedures without delay:

> WARNING: During any spill or leak, extreme caution must be exercised to avoid actions that could provide ignition sources for the fuel vapors. See Chapter 12, Fire Protection And Crash-Rescue, for procedures to follow to avoid ignition of a fuel spill resulting from a crashed aircraft.

- Maintain, keep current, and post a spill contingency plan (the procedures outlined below, with the addition of local, specific material, will suffice).
- Have absorbent material at the helibase or fueling location.

- If the leak continues, or the spill is a large one, all non-essential personnel should leave the area immediately until the hazard is neutralized, repairs are made, and the area is safe.

- Alert the airport fire crews or follow established emergency procedures applicable to a remote fueling operation, as outlined below.

- Stop the flow of fuel and the fueling operation immediately upon discovering leakage or spillage:

    - If fuel is leaking or spilling from a fuel servicing hose or equipment, the emergency fuel shutoff valve must be actuated immediately.

    - If the fuel is leaking or spilling from the helicopter at the filler opening, vent line, or tank seam, fuel delivery must be stopped immediately.

- If the spill occurs during open port (“hot) refueling operations, the Pilot will make the decision on moving or keeping the helicopter in place. If the latter, then all electrical power must be shut down and the helicopter evacuated.

- Before the helicopter is put back into service, it must be thoroughly checked for damage and for flammable vapors that may have entered fuselage areas.

- Small spills involving an area less than 18” in any plane dimension normally involve minor danger. However, personnel manning fire extinguishers during start-up procedures should stand by until the helicopter departs the area of the spill because engine exhaust could ignite the spill. These spills contain such a small amount of fuel that they may be absorbed, picked up, and placed in an approved container.

NOTE: New products to absorb fuel spills are available that will reduce or eliminate the need for hazardous material containers. These new products should be considered for most fuel spills.

- A fire guard should be posted for other small or medium static spills - not over 10 feet in any dimension nor over 50 square feet in area. The fire guard should have one or more fire extinguishers with at least a 20 B rating. Local regulations and procedures must be followed, but in most cases absorbent materials or emulsion compounds should be used to absorb the spilled fuel, especially if aviation gasoline (AvGas) or low flash point fuels are involved. The contaminated absorbent should be picked up and placed in an approved container to await disposal.

- Large spills - over 10 feet in any dimension or over 50 square feet in area - or smaller spills continuing to enlarge (non-static) should be handled by the fire department, or if in a remote location, by a ground engine. Anyone in the area of a large spill should move upwind of the spill at once.

NOTE: Aircraft fuels will damage some types of ramp surfaces. Spilled fuel should be picked up as quickly as possible if operating from a hard-surfaced ramp.

- All fuel spills occurring as a result of a aircraft crash or ground collision should be blanketed with foam, if available, to prevent ignition, and to prevent further damage to the equipment. See Chapter 12 for further information.

CAUTION: Wildland fire foams are not adequate suppressants for fuel spills. Foams must be approved for hydrocarbon fuels.

C. Fuel Spillage on Personnel.

If the fuel handler's clothing becomes soaked with fuel, the individual should:

- Avoid ignition sources;
- Leave the fueling area immediately.
- The act of removing clothing creates static electricity. Wet the clothes with water before removing. If water is not available, the person should be grounded to prevent sparks when they remove their clothes.
- Wash fuel off skin with soap and water as soon as possible.
- Seek medical attention.

WARNING: Entering a warm room wearing fuel-soaked clothing can be dangerous. Chances of a fire starting because of static electricity are increased.

Attachment 6
San Diego Gas & Electric
Electric Standard Practice ESP 113.1
July 5, 2012

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION
GENERAL PRACTICES

SUBJECT TITLE
WILDLAND FIRE PREVENTION & FIRE SAFETY

REVISION HISTORY

This Electric Standard Practice has been revised by the SDG&E Fire Program Manager.

1.0 PURPOSE

1.1 Southern California presents one of the most dangerous natural wildland fuel scenarios and explosive fire weather potential in the world. The period for active fire conditions can exist all year long depending on rainfall totals and other dynamic weather factors. The fall months and at times extending into early winter historically host the region's largest fires. Extended dry periods can bring us into or back into critical fire conditions essentially any time of the year. SDG&E facilities, equipment, and activities can present a potential wildland fire ignition risk which must be minimized to the extent reasonably possible. In the event a fire occurs, we must also be equipped to suppress small fires, thus potentially preventing a major fire. Most importantly, we must provide the resources and training necessary to keep our employees safe while working in the wildland areas. This plan is for all system Operations & Maintenance work and can be used for low complexity Construction projects when additional mitigation is not required (see 4.7 SDG&E PROJECT SPECIFIC FIRE PLANS). The intent of this document is to formalize procedures and routine practices that will:

1.1.1 Assist SDG&E employees in their understanding of fire prevention and to improve their ability to prevent the start of any fire. The emphasis will be on wildland fires, especially during the critical times of the year when the fire risk is high.

1.1.2 Set standards for certain tools and equipment to be present in our vehicles and on our work sites, when performing identified high risk work activities. This will assist with rapid response to small fires in the event one should occur.

1.1.3 Incorporate State, Federal, and local requirements into our standard way of doing business to provide compliance with rules and regulations on a daily basis no matter where our work is taking place. This would include, but not be limited to: pertinent laws, Forest Standard Practice Regulations, and "Special Use Permit" or "Right of Way" fire related requirements.

1.1.4 Define or reference restrictions mandated by "Red Flag Warnings", "Project Activity Levels", or other unique fire danger scenarios. Provide the means for determining when these restrictions are in effect, what activities they prohibit, the precise locations to which they apply; and identify the notification procedures for all affected employees and contractors. (See TMC 1320)

1.1.5 Establish communication requirements when working in the wildland areas.

1.1.6 Discuss procedure to identify when a Construction project specific "Fire Plan" is required and the process for developing the document. (See 4.7)

1.1.7 Share some common sense practices, with regards to fire safety, that should be used in all activities to reduce the risk of fires and to prevent injury to employees as a result of fire.

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2.0 APPLICABILITY

2.1 This applies to SDG&E field personnel who will work in the wildland areas of the service territory during the periods described that are conducive to wildland fire occurrence. This also includes Distribution and Transmission operating personnel who will be involved with field personnel in regards to safety, system reliability and/or restoration. Contractors performing work for SDG&E will be expected to comply with this Standard Practice as it relates to their activities as well.

3.0 DEFINITIONS

Wildland Areas: This term refers to any area within the SDG&E service territory that has wildland fuels available for ignition.

3.1 **Fire Threat Zone (FTZ):** This is a CALFIRE developed rating of wildland threat based on a combination of potential fire behavior (fuel rank) and expected fire frequency. SDG&E has established practices within the FTZ on how SDG&E constructs facilities and also determines certain construction practices to be used within the FTZ. See attachment 1.

3.2 **SDG&E High Risk Fire Areas (HRFA):** This area will be an assortment of GIS polygons that represent the zones of greatest concern within the SDG&E service territory, blending fuels, topography, wind, and system information. (The areas can change annually and the map will be labeled with the appropriate year, “SDG&E 20XX Highest Risk Fire Area” and is always a subset of the Fire Threat Zone). The HRFA helps to determine how SDG&E operates the electric system, as a function of weather conditions. See attachment 2.

3.3 **Fire Season:** Fire season is no longer officially designated by the wildland fire agencies. California is considered to be in fire season on a year long basis. CAL FIRE adjusts their staffing patterns as fire conditions moderate or escalate and this can be used as an indicator of potential fire activity.

3.4 **Elevated Fire Condition:** The SDG&E Fire Preparedness Plan uses a combination of live fuel moisture content information, other fuel condition data and input from Fire Coordination and SDG&E Meteorology to enter into what is termed “Elevated Fire Condition”. This condition is usually achieved during the month of August or September and is curtailed later the same year, or early the next year, with the arrival of substantial rain.

3.5 **Elevated Wind Condition**: This condition occurs when the combination of high wind and lower Relative Humidity’s necessitate an increase staffing or staging, but not to the level of a Red Flag Warning.

Red Flag Warning Condition (RFW): The National Weather Service will declare a RFW for;

- Wind- if the relative humidity is 15% or less with sustained winds equal to or greater than 25 mph, or frequent gusts equal to or greater than 35 mph for a period of 6 hours or more.
- Dry Lightning- for a lightning event that is not accompanied by enough precipitation to significantly wet fuels that have been identified as critically dry. This is common within the inland and mountain zones.

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WILDLAND FIRE PREVENTION & FIRE SAFETY

Project Activity Levels: This is a federal program designed to reduce the risk of fire starts during forest related work on high fire danger days and only applies to work on the Cleveland National Forest. (See 4.8)

3.6 **Pulaski:** The Pulaski is an axe-like fire hand tool used primarily for cutting or grubbing forest fuels. See Section 4.3.1.

3.7 **McLeod:** The McLeod is a fire hand tool used for raking and scraping forest fuels. See Section

3.8 **Backpack Pump:** A backpack pump is a portable 5 gallon water pack with hose and nozzle used for extinguishing Class A fire and particularly wildland fires. They can be rubber collapsible packs or stainless steel canisters.

3.9 **Major Operations Work Area:** It will be considered a Major Operations Work Area when work activities or staging of resources will be concentrated in and out of a staging facility or site, conducted over multiple days and generally involves multiple crews and resources.

3.10 **SDG&E Incident Commander (IC):** The SDG&E IC will be the positively identified single point of contact for all SDG&E resources (people and equipment) on an emergency incident. The appropriate line authority will identify who the IC will be on moderate or complex incidents. "First-in" supervisor will generally be the IC on low complexity incidents. The IC will be responsible for integrating SDG&E resources into the larger incident structure by serving as the single point of contact for SDG&E to the overall incident.

3.11 **SDG&E EOC:** The Emergency Operations Center (EOC) is activated to varying degrees, depending on the complexity of the incident. It is intended to be a support to the emergency management personnel and houses the Officer in Charge (OIC) in major incidents.

3.12 **Operations & Maintenance (O&M):** O&M refers to post construction care and maintenance of SDG&E facilities.

3.13 **Low Complexity:** This refers to projects that are routine in nature, involve few resources, and have no extraordinary fire risk present.

3.14 **Fire Box:** A fire box can be placed in a staging area or worksite to supplement available fire suppression equipment when necessary due to excessive work activity. It generally contains additional handtools and/or backpack pumps as deemed appropriate.

3.15 **Fire Patrol:** Also referred to as Fire Watch or Guard; is a designated person assigned specifically to assess and mitigate fire risk, observe for immediate detection of fire starts, have fire equipment readily available, and insure rapid extinguishment of fires. No special qualifications required.

3.16 **SDG&E Fire Coordinator (FC):** The SDG&E Fire Coordinator serves as a conduit or liaison to the emergency service agencies, including fire and law enforcement, for the utilities on emergency incidents. The FC will help the emergency service agencies obtain their needs related to the utility and represent the utility needs to the emergency service agencies.

3.17 **Grass Cured:** This is grass that is dry (generally yellow or light brown in color) and is at its highest danger for fire ignition and spread.

3.18 **Hazardous Areas:** Any "wildland" or unincorporated area within SDG&E service territory identified by the State Division of Forestry as being particularly susceptible to the danger of fire during certain seasons of the year.

4.0 PROCEDURE

4.1 EQUIPMENT & FACILITY RISK:

4.1.1 The nature of utility equipment operations and facilities can pose a fire risk. As a result there are laws and regulations governing utilities in this regard. The following Public Resource Code (PRC) sections exist to reduce utility specific risks involved with wildland fire. SDG&E is proactive, insuring compliance with each of these on a continual basis.

- PRC Section 4290 - Regulations Implementing Minimum Fire Safety Standards Related to Defensible Space Applicable to State Responsibility Lands.
- PRC Section 4291 – Reduction of Fire Hazards Around Buildings.
- PRC Section 4292 – Power Line Hazard Reduction, 10' ground clearance around power poles with non-exempt hardware.
- PRC Section 4293 – Power Line Radial Clearance Required, between vegetation and conductors, 4' for 2,400-71,999 volts, 6' for 72,000-109,999 volts, and 10' for 110,000 and above.

4.1.2 Some departments are assigned the responsibility for compliance with these regulations. The SDG&E Vegetation Management Program, in the Construction Services Department, has an extensive tree pruning and removal program to provide adequate line clearance. They also treat all non-exempt power poles in the specified area to maintain the 10' clearance required by PRC 4292. Personnel from Land Services, Facilities, and Fire Coordination work together to meet defensible space requirements, as well as other fuel hazard reduction measures where applicable. **However, it is the responsibility of all SDG&E employees and contractors to support the company's efforts to comply with these regulations.**

4.2 ACTIVITIES THAT POSE A FIRE RISK:

4.2.1 The Control Centers, Dispatch Center, and Fire Coordinator will provide general information to SDG&E employees regarding general fire condition status. When working in the SDG&E FTZ on any warm and dry day and in particular during the "Elevated Operating Condition", the following SDG&E related activities present a risk of fire ignition. Although not prohibited, extra caution is critical during the performance of any of these activities.

4.2.1.1 Working on energized electrical equipment or facilities located within the SDG&E Wildland Fire Area.

4.2.1.2 Any off-pavement vehicle use.

4.2.1.3 On-highway work activities that are located adjacent to particularly hazardous wildland fuel conditions.

4.2.1.4 Chain saw use of any kind.

4.2.1.5 Operation of generators, pumps, augers, compressors, two-cycle motors, or other equipment capable of producing sparks or ample exhaust heat to cause ignition.

4.2.1.6 Other tree removal equipment including but not limited to grinders, chippers, skidders, excavators, etc.

4.2.1.7 Grinding and welding

4.2.1.8 Blasting or other explosive work

4.2.1.9 Smoking

4.3 TOOLS AND EQUIPMENT:

4.3.1 When working in the FTZ identified on the attachment 1; the following tools and equipment will be carried on the vehicles described, when engaged in any of the work activities discussed above. If other fire risks are identified specific to your work project in these same areas, these standards should be applied as well. This does not apply to transient traffic driving on primary road beds through the wildland areas. These items will meet the California Forest Practice Rules; Public Resource Code Division 4, Chapter 6. Making this equipment available at your work sites will also meet the majority of the requirements mandated by the wildland fire agencies within the company service territory. Some additional project specific or weather specific requirements may be necessary and will be discussed later in this plan. Please note that if work project is over 50' from the vehicle location, the mandated equipment should be removed from the vehicle and staged at the work site.

Shovel

Pulaski

MCleod

Indian Pump

Stainless Steel Pump

4.3.2 Passenger Vehicles (performing work in the wildland areas);

- 1 round point shovel with overall length of at least 46”
- 1 serviceable fire extinguisher, minimum U.L. rated “2 BC”; rating found on fire extinguisher label (a “2” rated extinguisher will put out apprx. 2 sq. ft. of combustible material and BC indicates it will work on flammable liquids and is non-conductive for electrical fires)

4.3.3 Trucks & 4 Wheel Drive Vehicles;

- 1 round point shovel with overall length of at least 46”
- 1 axe or “Pulaski” (see picture above)
- 1 (5) gallon backpack pump (see pictures above) or a “2 BC” rated extinguisher; rating found on fire extinguisher label (a “2” rated extinguisher will put out apprx. 2 sq. ft. of combustible material and “BC” indicates it will work on flammable liquids and is non- conductive for electrical fires)

4.3.4 Heavy Machinery or Equipment (including tub grinders, whole tree chippers, drilling rigs, tractors, etc.);

- 1 round point shovel with overall length of at least 46”
- 1 axe or “Pulaski” (see picture above)
- 1 (5) gallon backpack pump (see picture above) or fully charged U.L. rated “4 BC” or larger fire extinguisher; rating found on fire extinguisher label (a “4” rated extinguisher will put out apprx. 4 sq. ft. of combustible material and “BC” indicates it will work on flammable liquids and is non-conductive for electrical fires)

4.3.5 Chain Saw Use;

- 1 shovel within 25 feet of the chainsaw operation with unrestricted access to the tool.
- or 1 serviceable UL rated 2BC fire extinguisher in their immediate possession.

4.3.6 Major Operations Work Area (fire toolbox should be located on site, accessible to all, sealed, labeled, and in addition to vehicle equipment requirements);

- 1 (5) gallon backpack pump (see picture above)
- 2 axes or “Pulaskis” (see picture above)
- 2 “McLeod “ fire tools (see picture above)
- Round point shovels 46” for each employee assigned to work site

4.3.7 Optional Considerations for particularly Hazardous Areas where additional measures are warranted (discuss with Fire Coordinator if applicable);

- Water Supply, recommended 1500 gal. minimum (Tank, truck, or hydrant)
- Fire Hose (and associated fire accessories)
- Dozer or Tractor (capable of producing fire line in an emergency situation if safe to do so.)
- Small Fire Engine or Patrol with 1 or 2 personnel equipped with pump, accessories and a Minimum of 150 gallons of water

4.3.8 Helicopter Operations; Primary helicopter staging areas will be treated similar to other staging areas as far as fire equipment. When working with Temporary Staging Access Pads (TSAP) adequate firefighting equipment shall be carried on the helicopter and made available to personnel working on the ground at those sites.

4.4 FIRE PREVENTION & FIRE SAFETY CONSIDERATIONS:

NOTE: The following Safety considerations will help to reduce the risk of fire start (Fire Prevention), as well as provide for the safety of company employees while working in the wildland areas (Fire Safety).

4.4.1 **Fire Prevention**

4.4.1.1 On projects in the SDG&E FTZ, conduct and document a formal “Tailgate Meeting” addressing the fire concerns as part of the “Tailgate Meeting”. Have regular tailgate meetings for the duration of the project to include fire safety discussions. As usual, these documents must be retained at the district for three years, including formal **Fire Plans** when required.

4.4.1.2 Smoke only in designated smoking areas or in a 10’ clearing void of all grass and other vegetation.

4.4.1.3 Idling or parking in areas of brush, grass, or vegetation litter is prohibited.

4.4.1.4 Consider work hour restrictions where applicable, limiting exposure during the heat of the day and taking forecasted wind conditions into account as well.

4.4.1.5 Use a “Fire Patrol” (person specifically dedicated to mitigate fire hazards, observe for immediate detection of fire starts, and coordinate rapid response for extinguishment) on high fire danger days (days that are warm, dry, and/or windy and present a likelihood for wildfire). Their duties would include: verification of compliance with the **fire plan**, observation of activities for fire prevention & safety, and checking the work area after the day’s activities have been completed.

4.4.1.6 Provide vegetation clearance or reduction around particularly hazardous work activities or work areas. Use special mitigation, as appropriate, to reduce the hazard, following all environmental protocols. Clear 10' circle to mineral soil around compressors, generators, and other equipment when required to use them in the FTZ or provide a non-combustible ground cover 10' diameter minimum.

4.4.1.7 Follow all special requirements associated with Red Flag Warnings (section 4.5), Project Activity Levels (section 4.6), and site specific Project Specific **Fire Plans**.

4.4.1.8 Have all required tools & equipment off the vehicle and on-site or within 50' of the work location, readily available for use when vehicle is 50' or more from actual work site.

4.4.1.9 Ensure exhaust systems are clear of vegetation and other combustible debris before operation of portable equipment.

4.4.1.10 When it is possible, wet down adjacent vegetation when performing at risk work.

CAUTION: DO NOT UNDER ESTIMATE THE ABILITY OF A FIRE TO QUICKLY SPREAD TO AN UNMANAGEABLE SIZE.

4.4.2 **Fire Safety**

4.4.2.1 Use proper Personal Protective Equipment (P.P.E); standard SDG&E requirements apply. When working within or adjacent to uncontrolled fire perimeter company issued fire resistant clothing should be worn. Respiratory protection (painter's mask or bandana) is recommended as well.

4.4.2.2 When working on or adjacent to a wildland fire, positive communications must be maintained internally using SDG&E work protocols. It is critical that employees have the ability to communicate with fire agencies as well, both for reporting fires and for the exchange of critical information for the duration of an incident. Cross communication with the fire agencies is the responsibility of the SDG&E Incident Commander (single point of contact assigned to manage all SDG&E resources), the Fire Coordinator (FC), or the On-Site (pre-designated work supervisor for affected area) Supervisor in the absence of a Fire Coordinator or SDG&E Incident Commander.

4.4.2.3 Know what the fire is doing at all times, observe personally or be in direct communication with a competent person (IC, FC, or On-Site Supervisor) who is monitoring fire activity.

4.4.2.4 Work within the Incident Command System (ICS) while assigned to a fire incident. Understand the chain of command for the incident and who you are accountable to. Check in and check out when entering an uncontrolled fire perimeter after it is determined to be safe by the IC, FC, or On-Site Supervisor.

4.4.2.5 Pre evaluate/designate safety zones (areas large enough to provide a safe retreat) and escape routes (safe access to these safety zones) when working in the wildland areas during high fire danger days.

4.4.2.6 Get proper rest and adequate water during extended fire activity to avoid fatigue and help prevent accidents and/or injuries. It is recommended that you receive an average of 1 hour rest for every 2 hours worked. An individual in hot, dry weather may require up to 1 to 2 gallons of water per day.

4.4.2.7 Exercise extreme caution when driving within a fire area and/or in smoky conditions. Be aware of falling rocks, trees, and other debris as well as road obstructions and other traffic. Keep driving speeds down when visibility is limited.

4.5 **RED FLAG WARNINGS:**

4.5.1 Red Flag Warnings (RFW); a joint effort between state, federal and local fire agencies, was brought about after a very catastrophic 1970 Southern California fire season. The intent is to pass along critical fire weather information to users and occupants in the wildland areas to bring about more prudent actions in all their wildland related activities. The National Weather Service (NWS) is responsible for declaring RFW and identifying the period of time to which they apply. There are currently two criteria established for RFW by the NWS (see definitions). The SDG&E service territory falls into multiple weather zones identified by the NWS and RFW requirements of this document will apply to each zone identified in a declared RFW including Imperial Valley when applicable. Currently SDG&E is operating under the direction of TMC1320 (aka DOP3013, ESP109), SDG&E Fire Preparedness, which addresses specifically the actions SDG&E will take with regard to Red Flag Warnings. The Operations Shift Supervisor (OSS) at Grid Operations will make notifications to company personnel; the following are field related considerations during a declared RFW.

4.5.1.1 All transmission and distribution lines within the SDG&E Wildland Fire Area will not be tested without patrol for the duration of the RFW.

4.5.1.2 A fireguard *(fire patrol)* will be assigned to any operation that could cause a fire. See Section 4.4.1.5.

4.5.1.3 All non-critical line clearance tree pruning and removal activities will cease. (Hand pruning activities are permissible)

4.5.1.4 All Blasting will be discontinued.

4.5.1.5 All grinding and welding will discontinue, except in enclosed buildings or within areas cleared of all flammable material for a radius of 15 feet.

4.5.1.6 Vehicular travel will be restricted to cleared roads except in case of an emergency. In no case will vehicles with hot exhaust systems be driven over or parked in grassy areas.

4.5.1.7 Smoking will not be permitted.

4.5.2 **In addition to these requirements a good rule is; all non-critical "at risk" work should not be done during a RFW except for that work which creates a greater hazard if not accomplished.**

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GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

4.6 **PROJECT ACTIVITY LEVELS:**

4.6.1 The United States Forest Service has a program it utilizes to reduce the risk of fire on National Forest land, particularly in the timber or mountain areas. It is referred to as Project Activity Levels *(PAL's).* Each day, at 4:00 p.m., the PAL level will be determined for the following day. It may be a different level for different geographic areas of the county. This information will be available by calling (619) 557-5262 *(U.S. Forest Service Dispatch)*. Although the intent of the PAL system is to reduce the risk of fire start from timber harvesting activities, restrictions should apply to any potential fire starting activities. The Cleveland National Forest is collaborating with SDG&E to establish Project Activity Levels specific to utility Operation & Maintenance activities and the restrictions and/or appropriate mitigation for each level are detailed in Attachment 2. SDG&E work activities must comply with the guidance of this document or exceptions approved by an appropriate Forest Service Line Officer. The On-duty Fire Coordinator can be used to help discern PAL requirements on a case by case basis.

4.7 **SDG&E PROJECT SPECIFIC FIRE PLANS:**

NOTE: This fire prevention and fire safety standard practice will be sufficient for most routine work conducted by company employees and contractors performing work for SDG&E. On larger more complex work projects and major construction activities in the **Fire Threat Zone**, a project specific "Fire Plan" may be recommended. The Fire Coordinator should be consulted to review the magnitude of your project and determine if a fire plan is needed. A standard template is available from the Fire Coordinator that can be used to help determine;

4.7.1 If a Project Specific **Fire Plan** is required for your particular work activity.

4.7.2 What work activity restrictions will be necessary over and above those required of this plan

4.7.3 What mitigations will be necessary to reduce fire risk potential, specific to that project.

4.7.4 What special tools or equipment are required to be available at work site

4.7.5 What involvement the company Fire Coordinator(s) needs to have in assisting with development and implementation of your Project Specific **Fire Plan**

4.7.6 If an inspection by the jurisdictional fire department for the area of your project is required, recommended, or not necessary.

4.7.7 Any additional site specific instructions or requirements.

4.8 **OTHER CRITICAL FIRE DANGER PROCLAMATIONS:**

4.8.1 The Fire Chiefs with jurisdictional responsibility for a given area have the authority to proclaim certain restrictions in extreme fire conditions or when they are experiencing a critical shortage of resources. These cases will be very rare and it will be incumbent on them to insure we are informed of any temporary changes in fire restrictions for a particular area. Upon notification we would be required to comply as appropriate.

4.9 **RECOMMENDED FIRE RELATED TRAINING:**

4.9.1 It is recommended that all field employees have basic fire safety training and T/D Compliance Training on an annual basis. Managers should assess individually whether an employees work activities would cause this training to be mandatory using the existing ESCMP training tracking system to monitor compliance. This can be accomplished in one hour at a routine safety meeting just prior to fire season. For those employees who are likely to be asked to work within or immediately adjacent to an uncontrolled fire area, the following additional training is recommended: Two hours of Fire Safety, Incident Command System Basic Training, and Basic Fire Behavior. For supervisors, managers, and company officers, who could be assigned as the SDG&E Incident Commander or EOC "Officer in Charge" on a major incident, additional advanced Incident Command System training is recommended. The Fire Coordinator will provide this training or assist with arranging qualified instruction. The fire coordinator may bring in additional qualified instructors, or qualify additional SDG&E employees as instructors, using the "train the trainer" approach to assist with this effort. Documentation of this training shall be done by the work supervisors and recorded in the employees training records.

4.10 **EOC AND CONTROL CENTERS:**

4.10.1 Service Dispatch, Electric Distribution Operations, Electric Grid Operations, & EOC play a vital role in any fire emergency. Communications with these groups, when applicable, is critical. Provide information updates and feedback to each of these groups as their areas of responsibility become affected. This should continue through the duration of the incident.

4.10.2 Early notification to the EOC of potential activation is recommended when appropriate. Notification procedures are identified in ESP 113 FIRE COORDINATION and should be followed as prescribed.

4.11 FIRE COORDINATION:

4.11.1 SDG&E has established three permanent positions in the Fire Coordination group, (1) Fire Program Manager and (2) Fire Coordinators. They are essentially the company liaison to the fire services, both during an emergency and in the course of daily business. Back-up coordinators are available as well to cover off time for the primary coordinators and for when multiple incidents occur. Questions regarding this plan or other fire related inquiries should be made through the Fire Program Manager or Fire Coordination group. The Fire Coordination group would be a key contact for other fire related training as well.

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

5.0 REFERENCES

5.1 State Forest Standard Practice Act (http://www.fire.ca.gov/resource_mgt/downloads/2009_Forest_Practice_Rules_and_Act.pdf)

5.2 TMC 1320 (aka DOP3013, ESP109 – SDG&E Fire Conditions)

5.3 ESP 113 – FIRE COORDINATION

5.4 Power Line Fire Prevention Field Guide – 2008 edition (http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fppguidepdf126.pdf)

6.0 ATTACHMENTS

6.1 Attachment 1: Service Territory with SDG&E 2012 Highest Fire Risk Areas & FTZ

6.2 Attachment 2: CNF Utility specific Project Activity Level guidance matrix (Under development, to be attached in next revision)

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

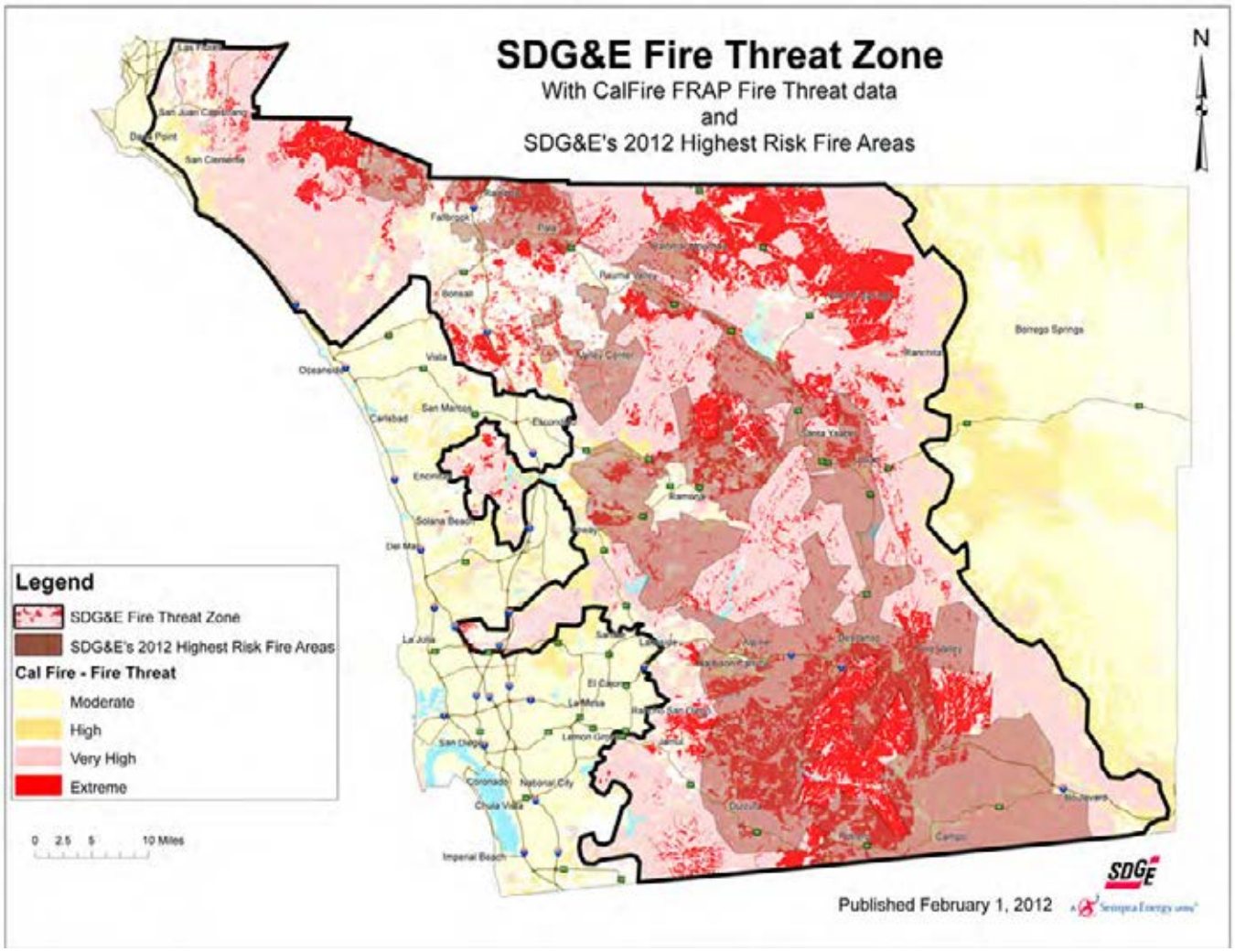
SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

ATTACHMENT 1



ISSUED BY	APPROVED BY
HAL MORTIER/GASPARE CIARAVINO, VINO	*MICHAEL J COLBURN*

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

ATTACHMENT 2

Under development, to be attached in next revision

ISSUED BY	APPROVED BY
HAL MORTIER/GASPARE CIARAVINO, VINO	*MICHAEL J COLBURN*

Attachment “B”

Injury and Illness Prevention Program

Beta Engineering
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fax 318.442.1741
betaengineering.com

EAST COUNTY SUBSTATION PROJECT
SAN DIEGO GAS & ELECTRIC COMPANY

BETA PROJECT NO. B533 & B567

INJURY AND ILLNESS PREVENTION PROGRAM

BETA DOCUMENT NO. B533-IIPP
REVISED AUGUST 31, 2012

1. INJURY AND ILLNESS PREVENTION PROGRAM

1.1. Responsibility

The Injury and Illness Prevention (IIP) Program administrator, Mike Melder has the authority and the responsibility for implementing and maintaining this IIP Program for Beta Engineering California, LP.

Managers and supervisors are responsible for implementing and maintaining the IIP Program in their work areas and for answering worker questions about the IIP Program. A copy of this IIP Program is available from each manager and supervisor.

1.2. **Compliance** All workers, including managers and supervisors, are responsible for complying with safe and healthful work practices. Our system of ensuring that all workers comply with these practices include the following procedures:

1.2.1. Informing workers of the provisions of our IIP Program.

1.2.2. Evaluating the safety performance of all workers.

1.2.3. Disciplining workers for failure to comply with safe and healthful work practices.

1.3. Communication

All managers and supervisors are responsible for communicating with all workers about occupational safety and health in a form readily understandable by all workers. Our communication system encourages all workers to inform their managers and supervisors about workplace hazards without fear of reprisal.

Our communication system includes the following items:

1.3.1. New worker orientation including a discussion of safety and health policies and procedures.

1.3.2. Review of our IIP Program.

1.3.3. Regularly scheduled safety meetings.

1.3.4. Posted or distributed safety information.
Hazard Assessment

Periodic inspections to identify and evaluate workplace hazards shall be performed by a competent observer in the following areas of our workplace:

Periodic inspections are performed according to the following schedule:

1.3.5. When we initially established our IIP Program;

1.3.6. When new substances, processes, procedures or equipment which present potential new hazards are introduced into our workplace;

1.3.7. When new, previously unidentified hazards are recognized;

1.3.8. When occupational injuries and illnesses occur; and

1.3.9. Whenever workplace conditions warrant an inspection.

1.4. **Accident/Exposure Investigations**

Procedures for investigating workplace accidents and hazardous substance exposures include:

1.4.1. Interviewing injured workers and witnesses;

1.4.2. Examining the workplace for factors associated with the accident/exposure;

1.4.3. Determining the cause of the accident/exposure;

1.4.4. Taking corrective action to prevent the accident/exposure from reoccurring; and

1.4.5. Recording the findings and actions taken.

1.5. **Hazard Correction**

Unsafe or unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

1.5.1. When observed or discovered; and

1.5.2. When an imminent hazard exists which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed workers from the area except those necessary to correct the existing condition. Workers who are required to correct the hazardous condition shall be provided with the necessary protection.

1.6. **Training And Instruction**

All workers, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices. Training and instruction is provided:

1.6.1. When the IIP Program is first established;

1.6.2. To all new workers, except for construction workers who are provided training through a construction industry occupational safety and health training program approved by Cal/OSHA;

1.6.3. To all workers given new job assignments for which training has not previously provided;

1.6.4. Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard;

1.6.5. Whenever the employer is made aware of a new or previously unrecognized hazard;

1.6.6. To supervisors to familiarize them with the safety and health hazards to which workers under their immediate direction and control may be exposed; and

1.6.7. To all workers with respect to hazards specific to each employee's job assignment.

1.7. **General workplace safety and health practices include, but are not limited to, the following:**

1.7.1. Implementation and maintenance of the IIP Program.

1.7.2. Emergency action and fire prevention plan.

1.7.3. Provisions for medical services and first aid including emergency procedures.

1.7.4. Prevention of musculoskeletal disorders, including proper lifting techniques.

1.7.5. Proper housekeeping, such as keeping stairways and aisles clear, work areas neat and orderly, and promptly cleaning up spills.

1.7.6. Prohibiting horseplay, scuffling, or other acts that tend to adversely influence safety.

1.7.7. Proper storage to prevent stacking goods in an unstable manner and storing goods against doors, exits, fire extinguishing equipment and electrical panels.

1.7.8. Proper reporting of hazards and accidents to supervisors.

1.7.9. Hazard communication, including worker awareness of potential chemical hazards, and proper labeling of containers.

1.7.10. Proper storage and handling of toxic and hazardous substances including prohibiting eating or storing food and beverages in areas where they can become contaminated.

1.8. **Recordkeeping**

We have checked one of the following categories as our recordkeeping policy.

__X__ Category 1. Our establishment has twenty or more workers or has a workers' compensation experience modification rate of greater than 1.1 and is not on a designated low hazard industry list. We have taken the following steps to implement and maintain our IIP Program:

1. Records of hazard assessment inspections, including the person(s) conducting the inspection, the unsafe conditions and work practices that have been identified and the action taken to correct the identified unsafe conditions and work practices, are recorded on a hazard assessment and correction form; and
2. Documentation of safety and health training for each worker, including the worker's name or other identifier, training dates, type(s) of training, and training providers. are recorded on a worker training and instruction form.

Inspection records and training documentation will be maintained according to the following checked schedule:

__X__ For one year, except for training records of employees who have worked for less than one year which are provided to the employee upon termination of employment; or

_____ Since we have less than ten workers, including managers and supervisors, we only maintain inspection records until the hazard is corrected and only maintain a log of instructions to workers with respect to worker job assignments when they are first hired or assigned new duties.

HAZARD ASSESSMENT AND CORRECTION RECORD

Date of Inspection: **Person Conducting Inspection:**

Unsafe Condition or Work Practice:

Corrective Action Taken:

Date of Inspection: **Person Conducting Inspection:**

Unsafe Condition or Work Practice:

Corrective Action Taken:

Date of Inspection: **Person Conducting Inspection:**

Unsafe Condition or Work Practice:

Corrective Action Taken:

ACCIDENT/EXPOSURE INVESTIGATION REPORT

Date & Time of Accident:

Location:

Accident Description:

Workers Involved:

Preventive Action Recommendations:

Corrective Actions Taken:

Manager Responsible: **Date Completed:**

WORKER TRAINING AND INSTRUCTION RECORD			
Worker's Name	**Training Dates**	**Type of Training**	**Trainers**

Attachment “C”

Heat Illness Prevention Plan

Beta Engineering
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EAST COUNTY SUBSTATION PROJECT
SAN DIEGO GAS & ELECTRIC COMPANY

BETA PROJECT NO. B533 & B567

HEAT ILLNESS PREVENTION PLAN

BETA DOCUMENT NO. B533-HIPP
REVISED AUGUST 31, 2012

1. PURPOSE Prevent employee heat illnesses during outdoor work

2. POLICY AND SCOPE

2.1. The purpose of this policy is to protect employees from heat illnesses while performing outdoor work by providing heat illness training, specifying drinking water and shade requirements, and providing emergency procedures as needed.

2.2. The standard applies to all employees who work outdoors such as but not limited to field crews, meter readers, and customer service representatives.

3. PROGRAM

3.1. Heat Illness Training

3.1.1. All employees, who work outdoors, must attend an initial training class. All new employees must attend an initial training class prior to field assignments. The training must cover:

- Environmental factors and personal risk factors of heat illness;
- Different types of heat illness;
- Common signs and symptoms of heat illness and the importance immediately reporting symptoms or signs of heat illness in themselves, or in co-workers;
- The importance of acclimatization;
- The importance of frequent consumption of water;
- Control and emergency provisions;
- The requirements of this standard.

3.1.2. Each supervisor (including crew leads and working foremen) with outdoor employees must have the same initial heat illnesses training as well as emergency response training.

3.2. Drinking Water Requirement

3.2.1. One quart of drinking water per employee per hour for the entire shift must be provided unless water is plumbed or continuously supplied.

NOTE: Employees may begin the shift with smaller quantities of water if they can replenish their water supplies during the shift as needed to allow them to drink one quart or more per hour.

3.2.2. The frequent drinking of water shall be encouraged.

3.3. Shade Requirement

3.3.1. Shade area shall be provided that is either open to the air or provided with ventilation or cooling for a period of no less then five minutes to recover from

heat. Employee may be provided with vehicles capable of providing air conditioning or must have provisions for shade.

3.3.2. Access to shade shall be permitted at all times and especially for employees suffering from heat illness or require a break from the heat exposure.

3.4. Heat Illness Emergency Procedure

3.4.1. Heat illness is a potentially serious medical condition and must be responded to with the same procedures as other serious health and safety conditions using the respective departmental current emergency response procedures. It is important to be able to provide clear and precise directions to the work site.

4. RESPONSIBILITIES

4.1. Employees

4.1.1. Attend initial heat illness training.

4.1.2. Follow heat illness precautions when working outdoors.

4.1.3. Immediately reporting to their supervisor any symptoms or signs of heat illness in themselves, or in co-workers.

4.2. Supervisors (including crew leads and working foremen)

4.2.1. Ensure new or transferred employees receive initial employee heat illness training before working outdoors.

4.2.2. Attend initial employee and emergency response heat stress training.

4.2.3. Provide adequate water supplies, shade, other engineering controls and best management practices to reduce the potential for heat illness, i.e. mechanical ventilation, rotate crews and workers, air-conditioned vehicles, etc.

4.2.4. Ensure that heat illnesses precautions are used. This includes ensuring adequate water supply and shade is provided as well as encouraging frequent employee water drinking.

4.2.5. Be alert to any employee symptoms or signs of heat illness and take precautions as needed.

4.2.6. Prepare, maintain, and follow emergency response plans in the event of an employee heat illness.

4.3. Safety and Health Department

4.3.1. Develop heat illness training and provide program assistance as needed or requested.

5. DEFINITIONS

5.1. Environmental risk factors for heat illness- are those working conditions that create the possibility that heat illness could occur. This includes: air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the

ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

5.2. Heat Illness- means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

5.3. Personal risk factors for heat illness - are those individual factors that could place an employee at higher risk of heat illness such as an individual’s age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body’s water retention or other physiological responses to heat.

5.4. Shade- the blockage of direct sunlight to allow the body to cool. Canopies, umbrellas and other temporary structures or devices may be used to provide shade. Sitting in a vehicle without air conditioning is not adequate.

Attachment “D”

Helicopter Safety Plan

EAST COUNTY SUBSTATION PROJECT
SAN DIEGO GAS & ELECTRIC COMPANY

BETA PROJECT NO. B533 & B567

HELICOPTER SAFETY PLAN

BETA DOCUMENT NO. B533-HSP
REVISED AUGUST 31, 2012

1. Passenger Transport

The safe transport of personnel in helicopters is of the highest priority. Utilizing standard procedures for transport will ensure safe and efficient transportation of personnel. Only authorized passengers, essential to the accomplishment of the mission, will be allowed to board a Beta furnished helicopter. The pilot will perform load calculations prior to the first flight of the day.

2. External Load Operations

As a general rule, only the pilot(s) shall be aboard helicopters when conducting external load operations. The only exception is when another person:

2.1. Is a flight crewmember**;**

2.2. Is a flight crewmember trainee;

2.3. Performs an essential function in connection with the external-load operation; or

2.4. Is necessary to accomplish the work activity directly associated with that operation.

The pilot shall ensure that all persons are briefed before takeoff on all pertinent procedures to be followed (including normal, abnormal, and emergency procedures) and equipment to be used during the external-load operation. The pilot has the final authority regarding all aspects of external load operations.

3. Arrival of personnel at the fly yard

The person in charge of any group of people needing helicopter transportation shall report to the assigned pilot. The person in charge should give the pilot a list of the people with accurate weights, including all personal gear and cargo to be transported. Passengers should be appropriately clothed and ready for transportation.

4. Passenger Safety Briefings

Prior to boarding the helicopter for the first flight of the day, the pilot will give a safety briefing to every passenger. This briefing will cover all elements included in the Helicopter Safety Briefing (Exhibit A). The pilot must:

4.1. Ensure that instructions are clear and understood.

4.2. Ensure in-flight emergency procedures are covered.

4.3. Ensure all questions are answered to the satisfaction of the passengers.

5. Loading Procedures after Safety Briefing

After the safety briefing has been given, proceed with the following loading procedures:

5.1. Only qualified, designated loaders are authorized to load cargo onto the aircraft;

5.2. Explosives, flammables, firearms, or other dangerous materials are prohibited from carriage on all Beta contracted aircraft.

5.3. Personal items carried on board must be adequately secured;

5.4. Carry all materials to or from the helicopter in a horizontal position not above waist level;

5.5. Prior to approaching the helicopter, remove items which might impede proper fastening of seatbelts/shoulder harnesses; these items must be placed and secured in an appropriate area;

5.6. Stay in safe area prescribed by pilot or other authorized personnel until given the direction to load;

5.7. Do not smoke within 50 feet of the helicopter;

5.8. Do not wear hats or loose clothing that can blow away;

5.9. Do not carry any item in a vertical position;

5.10. Approach only from the front of the helicopter and, when able, remain in sight of the pilot—NEVER go behind or under the tail boom;

5.11. First person into the helicopter passenger compartment should move as far in as possible, or to the seat assigned by the Pilot;

5.12. Find seat belt and fasten; if unable, advise the helicopter pilot who will assist;

5.13. Ensure that personal protective equipment is properly worn (that is, sleeves rolled down and collars up, earplugs inserted).

5.14. Large gear such as fire tools should be handled by the pilot or designated personnel;

5.15. Ensure that all personnel understand the instructions given by the Pilot.

CAUTION: When opening hinged doors (not on sliding tracks) to embark/disembark passengers, keep one hand on the door at all times until the door is securely re-latched.

6. In-Flight Precautions.

6.1. No smoking at any time;

6.2. Keep clear of controls: DO NOT TOUCH controls, except in an emergency. If the pilot is incapacitated, a passenger may shut down the fuel and electrical supply;

6.3. Secure all items, especially when flying with the door(s) off;

6.4. Be aware of emergency exit procedures. If in doubt, ask the pilot.

7. Unloading Procedures.

7.1. Only qualified, designated loaders are authorized to unload cargo from the aircraft;

7.2. Off-loading during shutdown of helicopter should be avoided;

7.3. Wait for the pilot to give a clear signal for offloading;

7.4. Doors should be opened only at direction of the pilot;

7.5. Remove seat belts, refasten, and lay them on the seat when exiting.

7.6. Maintain tight control of all personal items. If an item is lost, **do not** go after it.

7.7. Exit the helicopter slowly and use the departure route indicated by the Pilot.

7.8. After leaving the helicopter, move to an area clear of the helicopter's departure flight path.

Exhibit A: Helicopter Safety Briefing Checklist

General Information

- **Pilot Certification:** Pilots are pre-qualified and have current certifications for aircraft type and mission.
- **Aircraft:** Only aircraft approved for the mission will be utilized.
- **Flight Plan/Resource Tracking:** A Flight plan will be filed with Sunrise Base; Resource Tracking procedures will be implemented.
- **Idle chatter:** During takeoffs and landings there should be no idle chatter that might distract the pilot.
- **Nature of Mission:** The pilot will be briefed on the nature and sequence of the mission(s).
- **Analysis of Known Hazards:** Known hazards discussed; high-level recon prior to descent to low-level.
- **Pilot-in-Command (PIC) Concept:** The pilot shall not be pressured into doing anything he/she feels is unsafe. The pilot has final say in all landing decisions.
- **Hazardous Materials:** Hazardous Materials are not allowed on any Sunrise Project flight.
- **Smoking:** Do not smoke within 50 feet of a helicopter, fuel storage, fuel tanker or fueling operation.
- **Helicopter Passenger Briefing:** Pilot must brief all passengers prior to flight; All passengers should be briefed in a group rather than individually.

Personal Protective Equipment:

- Appropriate Clothing (long-sleeved shirt and pants, or flight suit)
- Leather work boots
- Hearing Protection
- Eye Protection (preferably goggles)

Approach and departure paths:

- Board and depart only on instruction from the pilot.
- Keep in pilot's field of vision at all times where possible.
- Always approach and leave the helicopter in plain view of the pilot—never from the rear.
- Always approach and leave the helicopter from the down slope (lower) side, as directed by the pilot—never approach or leave from higher ground than that of the helicopter.
- Do not approach or leave a helicopter while its engines are running unless the pilot signals that it is safe to do so. Do not run.
- Stay well clear of landing area when helicopter is landing or departing
- Stay away from the main and tail rotors.
- Do not wear hats, caps, or loose fitting clothing. Do not reach up for, or chase any unsecured item.
- Never go around, under, or near the tail of a helicopter.
- When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and tail rotors.

Tools and Equipment:

- Secure hand tools and equipment awaiting transport.
- Keep landing and hovering areas clear of loose and lightweight materials.
- Make assignments for carrying tools/equipment to/from helicopter.
- Carry all tools/materials parallel to the ground and never above waist level—never on your shoulder.
- All tools and equipment shall be loaded/unloaded by qualified personnel.
- Portable Radios must be turned off.
- Helicopter Doors: Be aware of location and normal operation.

In-Flight Discipline:

- Follow the instructions of the pilot.
- Loose items are not permitted inside of aircraft. All items must be secured and manageable.
- All carry-on items must be secured in aircraft or cargo compartment.
- Never throw any object from the helicopter.
- Use seat belts during take-off, flight, and landing. Unbuckle only when directed to do so by pilot.
- Remain seated the entire time you are aboard.
- Do not talk unnecessarily to the pilot.
- Watch for other airborne aircraft and navigational hazards and call them to the attention of the pilot. Communicate location by clock-hand method based on 12 o'clock as the nose of the aircraft. i.e. Do you see aircraft at 3 o'clock? If no response ask again until confirmed.
- Keep clear of the flight controls at all times.
- Leave doors closed; wait for pilot's instruction to exit aircraft.
- Know location and operation of first aid kit, survival kit, fire extinguisher, ELT (Emergency Locator Transmitter), fuel and battery shutoff switches, and radio.

In-Flight Emergency Procedures

- Follow instructions of Pilot.
- Tighten seat belt and shoulder harness; secure gear.
- Emergency Seating Position WITH SHOULDER HARNESS (four point OR single diagonal strap): sit in full upright position with head and back pressed against seat and use arms to brace in position. If time permits and so equipped, lock the inertia reel.
- Emergency Seating Position WITH LAP BELT ONLY: bend over as far as possible and hold onto your legs.
- Emergency Exits: Location and emergency operation.
- Know the escape procedure at each operational site.
- If able, assist any injured person who cannot leave the aircraft on their own.
- Move clear of the aircraft only after rotor blades stop or when instructed to do so by the pilot.
- Assess situation, follow pilot's instructions, render first aid, remove first aid kit, survival kit, radio, ELT and fire extinguisher.

Always be alert and keep safety first!

Exhibit B: Helicopter Operations Code of Safe Practices

Code of Safe Practices
Contractor shall strictly adhere to the minimum Code of Safe Practices involving the use of a helicopter as stipulated in Article 35, Helicopter Operations, in subchapter 4, Construction Safety Orders, provided in CAL/OSHA Title 8, and included in Appendix L.

1. Do not approach or leave a helicopter while its engines are running unless in a crouched position and the pilot or pilot's designee signals that it is safe to do so.

2. Always approach and leave the helicopter in plain view of the pilot or as directed by the pilot's designee; never from the rear.

3. Approach and leave the helicopter on a level with the craft or a lower level, never from or to higher ground than that of the helicopter.

4. Wear goggles and head protection with chin strap under the chin when in the vicinity of an operating helicopter. Loose-fitting clothing likely to flap in the downwash and possibly be snagged on the hoist line shall not be worn.

5. Load all cargo and secure it to the satisfaction of the pilot or pilot's designee.

6. Do not put tag lines on sling loads without the pilot's or pilot's designee's permission and limit their numbers, their placement, and their lengths to the pilot's satisfaction.

7. Do not place explosives, flammables, or other dangerous materials on board any aircraft without the pilot's knowledge.

8. Carry all materials to or from the helicopter in a horizontal position not above waist level.

9. Do not smoke within 50 feet of a helicopter, fuel storage, or fueling operation.

10. Do not stand directly under a hovering helicopter longer than necessary to hook-up or unhook the load.

11. Always watch the helicopter, sling load, hook, or bottom end of the cable to avoid being hit.

12. Know the escape procedure at each operation site.

13. Keep landing and hovering areas clear of loose and lightweight materials.

14. Notify the person in charge of the project when erecting a suspended line, tower or

other navigational hazard.

15. Turn off radio transmitter when in vicinity of explosives or explosive loading operations.

16. Passengers transported by helicopter shall be instructed to:
(A) Board and depart only on instruction from the pilot.
(B) Use seat belts during take off, flight, and landing.
(C) Do not talk unnecessarily to the pilot.
(D) Remain seated during the time you are aboard.
(E) Watch for other airborne aircraft and navigational hazards and call them to the attention of the pilot.
(F) Do not smoke unless permitted by the pilot.

17. When performing as a crew member in external operations, listen to and be familiar with the normal sounds emitted by the helicopter in flight so that you will have the earliest notice of trouble and can avoid dangerous exposure.

(18) When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and stabilizing rotors.

Exhibit C:

Diversified Utility Services Inc.

Helicopter Operations Manual

Diversified Utility Services Inc.

Helicopter Operations Manual

Revised December 2011

Section 1

Section 1 describes the training involved for DUSI employees.

1.1. Helicopter Line Worker Training

All employees assigned to perform human load, long-line helicopter work procedures must be trained and qualified by attending the Helicopter Committee-approved helicopter work procedure training course. The training must include a review of the appropriate sections of the *Helicopter Operations Manual* related to the method(s) that employees are assigned to perform.

Employees will attend the helicopter work procedure training course prior to any helicopter related work. They will attend a refresher training course thereafter. All training will be documented in the training server.

Section 2

Section 2 describes DUSI's procedures for requesting an air ambulance and for ensuring the pilot finds the location and is able to land safely.

2.1. Contacting the Dispatcher

All requests for emergency helicopter transportation must be made through the General Foreman. A Company employee requesting a helicopter for emergency reasons must contact the project GF or the person in charge with the following information.

2.1.1. Providing Medical Information

A. State the emergency.

B. Give the name and department of the person requesting the helicopter.

C. Request an *aerial rescue* for injuries sustained high *above the ground—on* top of a tower or other tall structure. It is *important* to specify an aerial rescue helicopter because the crew often are specialized.

D. State the number of people in need of emergency transportation.

E. Give the time of the incident.

F. Describe the condition of the person(s) needing attention.

G. Supply any other information that the dispatcher requests.

2.1.2. Providing Physical Information

A. Give the location of the injured employee(s), both on the ground and above the ground (aerial rescue).

B. Provide information on possible landing areas, including:

1. Type of terrain.
   - Hazards or obstacles in the area.
   - How the area will be marked.
   - Approximate altitude.
2. Describe the visibility in the rescue area.
3. Give the temperature and weather conditions.
4. Describe the wind speed and direction.
5. Describe any special conditions or provide other instructions.
6. Provide a GPS coordinate, when available.

2.2. Air-to-Ground Communication

Programmable radio frequencies in the air ambulance permit air-to-ground communication.

2.2.1. Establish communication at the accident location or with the system dispatcher and/or switching center. At the base location, the system should have the capability of cross-patching radio, telephone, and air-to-ground communication.

2.2.2. As soon as a visual sighting of the helicopter is confirmed, provide the pilot with a pinpoint location of the accident site. This information is best communicated by one of the following methods.

- Radio
- 30-minute fuse (flare)
- Signal minor (20-mile range)
- Displaying red signal flags or waving bright clothing

Note: Be extremely careful if you are using flares in or near areas with forest or thick brush.

2.2.3. On approach, the pilot may fly over the scene and then veer off to evaluate the potential landing zone(s). When the pilot returns to the accident scene, he or she will request the wind direction. Position yourself at the forward or upwind approach of the landing zone. If you have not ignited a flare yet, do so now. You can safely hold the flare in your hand. The flare indicates the wind direction to the pilot. If a flare is not available, give the pilot a visual wind-direction signal by extending your arms and placing them together in a horizontal position in the direction of the wind.

2.2.4. During daylight hours, try to place a cone at each of the four corners of the landing site. At night, use flares to outline the landing site. If you use flares, be careful not to start a fire.

Section 3

Section 3 lists most common uses for helicopters in the field.

3.1. Typical Uses For a Helicopter

DUSI employees typically use helicopters to perform the following tasks.

- Serve as an air ambulance to move injured workers from inaccessible or remote areas quickly and safely.
- Transport employees to remote worksites.
- Patro, electric lines from the air.
- Wash insulators.
- String conductors.
- Install marker balls.
- Sling loads of materials and equipment.
- Perform skid transfer procedures.
- Perform skid work procedures.
- Perform longline transfer procedures.
- Perform longline work procedures.
- Perform platform work procedures
- Stringing sock lines prepatory to pulling conductors

Section 4 describes DUSI procedures to follow when working with helicopter contractors.

4.2. Relaying Information to the Helicopter Contractor

The DUSI employee responsible for scheduling a helicopter must provide the contractor with the following information.

- Date, location, and starting time for the work.
- Landing zones, Global Positioning System (GPS) coordinates, or other landmarks that provide the pilot with a reference point for locating the worksite.
- Purpose of the flight, scope of work, and any special circumstances.
- Estimated duration of the job.
- Length of time the helicopter will be needed.
- Size and type of helicopter suitable for known conditions (see Appendix C).
- Name and weight of each passenger.
- Weight of the sling load.
- Estimate of the highest ambient temperature.
- Elevation of the worksite.
- Contract Work Authorization (CWA) number.

Landing Zones

Selecting a Landing Zone

A Company employee initially shall *select* a landing zone; however, the pilot or pilot's representative retains the right to change or modify that selection when potentially unsafe conditions exsist. This may require the pilot to establish radio communications to resolve any unsafe conditions before landing.

4.2.1. A Company employee must consider the following information when selecting a proper helicopter landing zone.

A. Try to find an area that allows the pilot to land and take off horizontally. Pilots prefer not to land and take off vertically.

B. Generally speaking, helicopters require a landing zone that is 3 times the length of the rotor blades. A minimum of 60 feet is required for the smallest helicopter. When winds are high, a minimum of 100 feet is required.

C. Helicopter landing zones should be as safe and secure as possible. The landing zone should be relatively smooth with a slope of not more than 13 degrees. The landing zone should be free of:

- Trees
- Tall brush
- Fences
- Large rocks
- Towers
- Poles
- Overhead wires
- Dust and small pieces of debris
- Vehicles

4.2.2 Note the location and any other important information about the landing zone, such as:

- Nearby trees
- Nearby fences
- Equipment
- Power lines
- Wind direction
- Positions of site workers
- A 200-foot diameter area is cleared of loose

materials 4.2.3. Answer the following questions.

A. Does the selected landing zone permit takeoff and landing into prevailing winds?

B. Is the selected landing zone relatively level? Is it possible to use hilltops and ridges?

C. If using a built-up landing zone, is it capable of supporting the helicopter on the landing surface and will it provide a good footing?

D. If using a prepared landing zone on a hillside, is it large enough to ensure that the largest rotor clears the hillside by a distance equal to its radius measured horizontally from the tip of the rotor?

E. Have safe and effective means been implemented to control dust at the helicopter's selected landing zone, if necessary? It may be helpful to water the landing zone before the helicopter's arrival or departure.

F. Have arrangements been made with the helicopter contractor to provide effective mobile communications?

The Company shall provide cellular phone and/or radio communication for employees in the landing zone and between the landing zone and the work area. However, note that the Federal Communications Commission (FCC) does not allow cellular telephones to be used in aircraft.

G. Has the contracted pilot performed the following tasks? These details are the pilot's responsibility.

- Set up a windsock, or used other means to identify wind directions.
- Ensure that the flight path is not near restricted airspace.
- Check for areas with livestock in the flight path.
- Research the flight zone for other sensitive areas.

Section 4

Have objects that may be drawn into the main or tail rotor, or fly up during landing and takeoff, been removed from the landing zone and surrounding area for a minimum 200-foot diameter? Objects that could cause problems include the following:

- Tarps
- Ropes
- Lumber or nails
- Paper, cartons, or boxes
- Pieces of glass
- Cans
- Bits and pieces of wire
- Any trash or other debris

H. Is the landing zone near a school? Landing within 1,000 feet of a school (Grades K-12) is prohibited without advance approval from Cal-Trans authorities.

4.3. Selecting a Landing Zone

A Company employee initially must *select* a landing zone; however, the pilot or pilot's representative retains the right to change or modify that selection when potentially unsafe conditions exist. This may require the pilot to establish radio communications to resolve any unsafe conditions before landing.

4.3.1. A Company employee must consider the following information when selecting a proper helicopter landing zone.

A. Try to find an area that allows the pilot to land and take off horizontally. Pilots prefer not to land and take off vertically.

B. Generally speaking, helicopters require a landing zone that is 3 times the length of the rotor blades. A *minimum of 60 feet* is required for the smallest helicopter. When winds are high, a *minimum of 100 feet* is required.

C. Helicopter landing zones should be as safe and secure as possible. The landing zone should be relatively smooth with a slope of not more than 13 degrees. The landing zone should be free of the following potential hazards.

- Trees
- Tall brush
- Fences
- Large rocks
- Towers
- Poles
- Overhead wires
- Dust and small pieces of debris
- Vehicles

4.3.2. When selecting a landing zone, the Company employee must look for and note the locations of and any other important information about the landing zone, such as:

- Nearby trees
- Nearby fences
- Equipment
- Power lines
- Wind direction
- Positions of site workers

Ensure that a 200-foot diameter area around the landing zone is cleared of loose materials.

4.3.3. The Company employee who is selecting a landing zone must answer the following questions during the selection process.

A. Does the selected landing zone permit takeoff and landing into prevailing winds?

B. Is the selected landing zone relatively level? Is it possible to use hilltops and ridges?

C. If using a built-up landing zone, is it capable of supporting the helicopter on the landing surface and will it provide a good footing?

D. If using a prepared landing zone on a hillside, is it large enough to ensure that the largest rotor clears the hillside by a distance equal to its radius measured horizontally from the tip of the rotor?

E. Have safe and effective means been implemented to control dust at the helicopter's selected landing zone, if necessary? It may be helpful to water the landing zone before the helicopter's arrival or departure.

F. Have arrangements been made with the helicopter contractor to provide effective mobile communications?

The Company must provide cellular phone and/or radio communication for employees in the landing zone and between the landing zone and the appropriate DUSI switching center. However, note that the Federal Communications Commission (FCC) does *not* allow cellular telephones to be used in aircraft.

G. Has the contracted pilot performed the following tasks? These details are the pilot's responsibility.

- Set up a windsock, or use other means to identify wind directions.
- Ensure that the flight path is not near restricted airspace.
- Check for areas with livestock in the flight path.
- Research the flight zone for other sensitive areas.

H. Have objects that may be drawn into the main or tail rotor, or fly up during landing and takeoff, been removed from the landing zone and surrounding area for a minimum 200-foot diameter? Objects that could cause problems include the following items.

- Tarps
- Ropes
- Lumber or nails
- Paper, cartons, or boxes
- Pieces of glass
- Cans
- Bits and pieces of wire
- Any trash or other debris

I. Is the landing zone near a school? Landing within 1,000 feet of a school (Grades K-12) is prohibited without advance approval from California Depai talent of Transportation (Caltrans) authorities.

Note: See Appendix A for the "Landing Zone Safety Checklist."

Section 5

Section 5 describes methods for holding tailboard briefings before conducting helicopter operations.

5.1. Before the Tailboard Briefing

Ensure that each helicopter worksite has an person in charge (PIC), designated as the person responsible for all helicopter operations. (At times, a designee may act for the PIC. This is implied throughout this section, although it is not noted specifically.) The PIC must have a copy of the *Helicopter Operations Manual* at the worksite, along with the job emergency plan. The PIC supervising the landing zone must have radio communications with the pilot and line workers at all times. To ensure safe operations, the PIC must remain at the landing zone during all helicopter operations.

Projects requiring longline load operations must be designed to maintain radio communications at the landing zone between the pilot, the PIC, and line workers. To ensure safe operation, the PIC, in conjunction with the pilot or pilot's representative, must perform a thorough survey of the conditions and hazards at the worksite before starting work. The PIC also must review the emergency procedures to be followed in the event of helicopter failure. The PIC must discuss emergency procedures with the pilot and Company employees during the tailboard briefing.

5.2. During the Tailboard Briefing

5.2.1. Tailboard briefings associated with helicopter operations must be held at the immediate worksite. All crew personnel and helicopter company employees must attend the tailboard briefing. If the work starts before the helicopter arrives, the PIC must conduct an additional tailboard for crew personnel and helicopter company employees before the helicopter work can begin.

All crew members and the helicopter company employees must attend the tailboard to facilitate a common understanding of the work to be accomplished, the procedures to be used to accomplish the work, and the roles/responsibilities of everyone involved. During the tailboard, all equipment, including the helicopter, must be shut down so employees can clearly hear, understand, and question the details of the planned work assignments.

5.2.2. During the tailboard briefing, the PIC is responsible for informing the helicopter pilot whether the line being worked on is energized or de-energized. This will include any supplemental lines on structures (e.g., distribution under—built facilities on transmission structures). The PIC must tailboard the helicopter pilot on the proper work procedures to be used, ensuring the safety of the workers and of the pilots at all times.

5.2.3. Provide Company employees and helicopter crew members with a clear description of the job, highlighting the procedural steps and work methods to be used.

5.2.4. Ensure the tailboard briefing covers all hazards and warning signs pertaining to safe helicopter operation. Review the "Helicopter Safety Chart," with crew members. This chart is included in Appendix D.

5.2.5. Ensure that worksite personnel understand their individual assignments.

5.2.6. Determine who will signal the pilot from the ground. Only one designated person at each landing zone is authorized to give the pilot radio instructions or hand signals during the operation. Review Appendix E, "Helicopter Hand Signals" with the designated employee. Ensure that the designated employee wears an approved traffic safety vest or provide another method of identification so the pilot can recognize him or her immediately.

5.2.7. Ensure that the pilot reviews standard helicopter hand signals with the designated employee(s) during the tailboard briefing to help reduce the risk of confusing or misunderstood hand signals.

5.2.8. Ensure that affected worksite personnel check their radio units to make sure the units are on the correct frequency and operating properly.

5.2.9. Ensure that members of the ground crew receive personal protection equipment (PPE) and are clothed properly. The ground crew is required to wear the following equipment.

- Goggles
- Ear protection
- Snug-fitting clothing
- Hard hat with chin strap
- Dust protection (if necessary)

If a synthetic helicopter lift line is not available and personnel must use a stranded steel line, ensure that members of the ground crew either wear Class II rubber gloves or use a grounding device when working with a helicopter that is engaged in sling operations. This prevents static-electrical buildup and discharge.

Finally, it is important that all worksite personnel understand the requirements and instructions contained in this manual. They must keep a copy of this manual for ready reference during helicopter operations.

5.3. After the Tailboard Briefing: Pilot's Preflight Instructions

The responsible DUSI employee must ensure that the pilot reviews the preflight instructions with personnel who will be aboard the helicopter. Preflight instructions must address the following items on the *pilot's* safety checklist.

1. Operating the seat belts and doors.
2. The best seating arrangement for the flight (who should sit where).
3. Locating and using the fire extinguisher.
4. Locating and using life jackets, if any part of the flight will be over water.
5. Emergency escape procedures for hard landing on land and water.
6. Locating and using the communication system. The pilot should ensure that all necessary jacks, switches, volume controls, and headsets are in full operation at this time.
7. Locating and reading the fuel gauge.
8. The best areas for storing maps, note paper, and other personal materials during flight.
9. Location of the first aid kit.
10. Emergency Locating Transmitter (ELT) location: All models of aircraft have an ELT. As part of the pilot's briefing, this device must be clearly identified and the pilot must explain the device's manual activation procedure. The on-board personnel need to know how the activate the ELT should the pilot be unable to do so.

5.4. Responsibility and Authority

5.4.1. Pilot

It is important to understand a pilot's legal responsibilities for safety.

Pilots are licensed professionals and, as such, have command of the helicopter.

Federal Aviation Regulations (FARs) document the following rules.

FAR 91.3a: The pilot in command of an aircraft is directly responsible for, and is the final authority, as to the operation of that aircraft.

FAR 91.8: No person may assault, threaten, intimidate or interfere with a helicopter crew member in performance of the crewman's duties aboard an aircraft being operated.

FAR 91.1lb: Except in an emergency, no pilot of a civil aircraft may allow a person who appears to be intoxicated, or who demonstrates by manner or physical indications that the individual is under the influence of drugs (except a medical patient under proper care) to be carried in that aircraft.

5.4.2. Company Employees

Company employees must notify the helicopter contractor, the pilot, other crew members, and the job supervisor if they observe any work practices that are considered unsafe or in violation of safety rules and regulations.

5.5. Working With Helicopters Where Load Lines Are Used

Helicopters must maintain a minimum approach distance of 10 feet from conductors, wires, or structures. During longline operations, a helicopter pilot is responsible for ensuring a marker is affixed to the load line to indicate the 10-foot distance. The marker must be attached 12 feet from the cargo-hook end of the load line. This allows the pilot to see the marker and maintain the required, adequate, safe working distance between the helicopter landing gear and any wire/conductor or structures. To do this, place a 2-foot *red* covering over the load line. This covering serves as an adequate visual indicator for the pilot, line workers, and ground personnel.

The helicopter pilot must make a test flight to the area where the helicopter work will be performed. The helicopter pilot and PIC must calculate and verify that the length of the selected load line is adequate to maintain the required 10-feet safe working distance between the helicopter and nearest wire, conductor, or structure. This information will be documented in the tailboard briefing notes.

While performing external load helicopter procedures (i.e., human load and/or cargo load procedures), do *not* performe any other work that can create an unsafe environment for the pilot or helicopter. This includes moving wires or conductors, setting structures or structure members, pulling lines (i.e., sock line or conductors), delivering tools or equipment, etc.

5.6. Rules Governing Helicopters and Pilots

Pilots and helicopters assigned to perform work must comply with all of the rules pertaining to safe working distances for *energized* facilities. These rules are described in the specific sections of Cal OSHA Title 8, Chapter 5.

- California Safety manual accident prevention rules, NECA, Western Line Contractor's Charater Inc. & IBEW.

Pilots are responsible for knowing and understanding the grounding practices being applied. Before operating the helicopter, the pilot will verify that at least one set of grounds is installed on the line section being worked when required. Helicopter contractors are required to ensure that pilots meet the minimum qualifications for performing the requested work assignments.

5.7. Rules for Boarding and Exiting an Operating Helicopter

!H Think First - Be Alert - Be Safe !!!

The following rules apply to all employees who ride in, serve as ground crew for, or work around the helicopter.

5.7.1. The helicopter pilot is in charge of all operations involving the helicopter. Always follow the pilot's instructions.

5.7.2. All employees must remain outside of the landing zone when the helicopter is taking off or landing.

5.7.3. Employees must wait at the end of the designated landing zone and face the front of the helicopter. When the pilot lands in the center of the zone, everyone in the immediate area should be easily visible.

5.7.4. Employees cleared to board the helicopter must wait for the "safe-to-board" signal from the pilot before approaching.

5.7.5. Employees cleared to board the helicopter must approach it within the pilot's normal field of view unless otherwise directed by the pilot.

5.7.6. Employees must *not* approach the helicopter when the main rotor blades are still in motion unless signaled to do so by the pilot.

5.7.7. Employees approaching the helicopter in motorized vehicles and/or equipment *must never drive under the rotor blades.*

5.7.8. Employees must be alert when approaching the helicopter. Walk under the main rotor blades in a crouched position with your head held low. Use extreme caution.

5.7.9. Employees must *not* lift their arms or carry objects above waist level when approaching or working near a helicopter.

5.7.10. Employees must *never* approach or exit an operating helicopter from ground that is higher than the ground on which the helicopter is sitting. This is especially true when the helicopter lands on uneven terrain, in an "earthen saddle," or on sloping ground.

5.7.11. Employees must *never* approach the helicopter from the rear.

5.7.12. Employees seated in the front seat of the helicopter must *not* touch any helicopter controls.

5.7.13. Employees must not store any items under the helicopter's seats.

5.7.14. Employees must wear their seat belts and/or shoulder harnesses at all times when inside an operating helicopter.

5.7.15. Employees are required to wear Company-approved eye and hearing protection when they are near an operating helicopter.

5.7.16. Employees on board the helicopter must ensure the doors are securely latched before takeoff. *Never* slam the helicopter doors.

5.7.17. Employees must *not* assist the helicopter crew in any way unless they are specifically asked to do so.

Section 6
An Overview of Helicopter Development and Use in the Utility Industry

6.1. A History of Industry/Company Use and Service

Igor Sikorsky introduced the first, practical, single rotorcraft in 1939. This aircraft was the modern helicopter's prototype. It took nearly a decade to develop specialized uses for the helicopter.

In 1949, the start of using independent helicopter operators to perform aerial snow surveys. Within a year, the Company established a practice of using the helicopter's rotor wash to remove snow and ice from conductors. This showed potential and value in both establishing and restoring electric service to areas in high elevations.

In about 1953, the Company started using helicopters to identify the causes and locations of electric power outages during emergencies. By 1958, the Company was using helicopters regularly to perform both routine and emergency transmission-line inspections. Helicopter pilots themselves became valued resources during emergencies because they were able to identify access routes through often-rugged terrain and notify the ground crews of the safest, quickest routes.

6.2. Improvements in Performance

In the 1950s, improvements in helicopter design increased the machine's aerodynamic lift capability. These improvements allowed helicopters to sling even greater electric utility workloads. Initially, helicopters could lift maximum weights of 300 to 400 pounds. As helicopter design and capability improved, so did the helicopter's capacity to lift heavier loads. By 1959, 1,000-pound lifts were common.

Since the mid-1960s, the Company used helicopters to land employees on structures, to deliver insulators and travelers, and to string sockline for conductor installations across the San Francisco Bay. Helicopter operators were, and continue to be, in great demand on construction sites.

Modern helicopters now lift loads of up to 18,000 pounds; however, sling-load weights average about 2,500 to 3,500 pounds. Currently, the Company uses helicopters are used on construction sites to ferry employees to and from remote locations, as well as to transport tools, materials, and structures into project sites.

During the last 40 years, helicopters also have been used to perform an ever-growing list of important work functions. For example, since the late 1970s, helicopters have been instrumental in allowing employees to perform infrared inspections on equipment. Working from helicopters to re-insulated 500-kilovolt (kV) towers identified as having faulty insulators.

6.3. Conclusion

Helicopters have been used successfully to complete electric projects for decades. This success has led to the development of work procedures and, ultimately, to this manual. The work procedures provide helicopter line workers with methods to perform their jobs safely and efficiently. Nevertheless, helicopters should be used only if some or all of the following benefits can be achieved.

- Reduces employees' exposure to safety hazards.
- Improves line and line worker performance.
- Saves money by reducing setup time, coordination, and administration.
- Reduces strategic outage time.
- Reduces standby manpower when completing small tasks.
- Allows employees to perform tasks that cannot otherwise be performed effectively through conventional methods or other available options.

Specific helicopter line-work tasks have been identified over the years and procedures have been developed for them. As we enter this new area of work procedures for helicopter line workers, helicopter line work can be used for the following activities.

- Replacing spacers.
- Replacing dampers.
- Installing and removing aerial marker balls.
- Repairing conductors.
- Placing workers on transmission structures.
- Installing guards for wire stringing.
- Rescuing injured employees on a structure.
- Pulling in socklines

Although helicopter procedures can be used for the tasks listed above, they are best suited for projects that normally would require lengthy setup and coordination for relatively small tasks. Again, it is important to evaluate the work to be performed in order to ensure that using a helicopter will be the safest, fastest, most cost-effective method of construction or repair.

6.8. About This Manual

This is a living manual. New work procedures will be added as they are developed and approved. As the need for new helicopter work methods are identified and developed, they will be incorporated into the manual. Training in the methods described in this manual will be provided to all helicopter line workers performing this work.

Federal Aviation Administration (FAA) and California Occupational Safety and Health Administration (Cal/OSHA) regulations are being monitored closely. As future amendments are made and implemented to these documents, those amendments will be reflected immediately in this manual.

It is imperative that employees follow the procedures and use the equipment specified in this manual. Failure to do so can result in unsafe conditions for the employees and helicopter personnel involved.

Section 7

7.1. Scope

This section of the manual covers the general provisions and the special safety requirements for line workers when they work on the outside of helicopters. Specifically, it addresses the procedural requirements for safety and work issues affecting helicopter line workers. Employees must use the procedures contained in this manual when performing work that involves a helicopter.
work procedures are written to be in compliance with the Federal Aviation Administration (FAA) regulations contained in Federal Aviation Regulation (FAR) 133, Class B, external loads.

7.2. General Provisions

Company employees will never be forced or required to perform or undertake helicopter line worker activities. Helicopter line work must be performed by *volunteer* line workers only. No action will be taken against any employee who fails or refuses to volunteer for helicopter line work.

If the number of volunteers for helicopter line work exceeds the number of employees needed, the volunteers will be selected on the basis of seniority as defined in the International Brotherhood of Electrical Workers (IBEW) contract. The most senior volunteer will be selected first, the next most senior volunteer will be selected second, etc., until the number of helicopter line workers needed for the project has been filled.

Any employee who refuses to follow the procedures and safety requirements of this manual will be removed immediately from the project.

Before each flight, the person in charge (PIC), the pilot, and the helicopter line worker(s) must analyze and address any conditions specific to the work situation and agree on the safety measures required to address those conditions. When determining and selecting the best method to use, ensure that safe distances can be maintained between all parts of the helicopter and any energized conductors, de-energized conductors, coworkers, and/or the structure.

If, at any time either before performing the work or while performing the work, the helicopter line worker(s), the PIC, or the pilot, in his or her opinion, believes that dangerous or unsafe conditions exist that could jeopardize the safety of the operation or warrant the abortion of the operation, the helicopter line worker, PIC, or pilot has the right to postpone or stop the operation until those safety concerns have disappeared or have been corrected. These conditions include, but are not limited to, the following.

- Inclement weather conditions.
- Insufficient clearances.
- Exceeding helicopter load limitations.
- Structure or conductor damage that causes safety concerns.
- Any other condition that would adversely affect the safety of the operation.

7.3. Special Precautions and Equipment

A. Helicopter Helmets: It is critical that all helicopter line workers use an approved helicopter helmet. Using the helicopter helmet will prevent the possibility of a hard hat being blown off and contacting the helicopter rotor blades. All helicopter line workers are required to use an approved helicopter helmet while performing the work methods described in this manual.

Figure 7-1
Typical Helicopter Helmet

B. Hearing Protection: Helicopters produce a high level of sound or mechanical noise. Helicopter line workers always must use either approved hearing protection or an approved flight helmet or gear while working from a helicopter. All ground-support personnel must wear hearing protection while working near helicopters, as well.

C. Inspections: When helicopter line-work procedures involve either transferring a worker from a helicopter or performing work on conductors, the line workers assigned to perform the work must inspect the supporting structures and conductors before performing the work. This inspection will identify any condition that might jeopardize a line worker's personal safety or raise concern for the helicopter line worker, the PIC, or the pilot. If potentially unsafe conditions are discovered during the inspection process, the conditions must be corrected before performing the helicopter line-work procedures. If these conditions cannot be corrected, use an alternate work method.

D. Safeties: All lanyards and positioning straps used by helicopter line workers must be positioned to prevent possible hang-ups during while performing transferring procedures.

E. Tools: Helicopter line workers must not carry tools on their tool belts that could fall out during transport. Any tools that could fall off the belt must be secured by a lanyard. Also, helicopter line workers should not carry tools that could impede their movements or that could hang up on the helicopter or the structure.

7.4. Helicopters

The type of helicopter used when performing line work plays an important role in the type of work that can be performed and the safety measures that the line workers must take. Helicopter / safety committee will evaluate contractor helicopter make and models and projext requirements prior to contracting.

Besides identifying the type of helicopter work to be performed, you should know the answers to the following questions when determining which helicopter to use.

- How much load the helicopter will be lifting?
- At what altitude will the work be performed?
- What temperatures are forecast at and near the worksite?

These factors all play a role in the helicopter's performance. The helicopter must be able to maintain a 15% power reserve at all times while carrying a line worker. If the helicopter cannot maintain a 15% power reserve, do not use the helicopter. Use an alternate work method to perform the job.

7.5. Landing Zone Locations

Landing zone locations used for helicopter line-worker projects must be located as close as conditions will allow to the area where the work is to be performed. This will help limit the amount of time the helicopter line worker is standing on the helicopter skid or being supported from the helicopter on a longline

When selecting the landing zone, do not compromise on the suitability of the location in an effort to place the landing zone closer to the worksite. Follow all of the provisions in Subsection 4.3., "Selecting a Landing Zone."

7.6. Communication

Maintain good communication between the ground crew and the pilot, and between the pilot and the helicopter line worker. Communication may be in the form of hand signals, head signals, direct verbal communication, or, when practical, radio communication. For some of the helicopter line-work activities, special radio equipment is used to help communication. Whenever practical, use this radio equipment to ensure the best possible communication between the helicopter line worker and the pilot. For more information, see Section 14, "Specialized Equipment and Tools."

Figure 7-3
Communication Equipment

7.7. Training Requirements

All line workers who will be performing helicopter line-work activities, including the pilots, must be trained and in possession of a helicopter identification card *before* using these procedures.

7.7.1. Helicopter Line-Worker Training

Use the *Helicopter Operations Manual* to train helicopter line workers and pilots. The training must include all of the appropriate sections of this manual relating to the type of work method that the helicopter line worker and pilot will be expected to perform Line workers and pilots must complete this training *before* performing the work.

This training is classified as *initial* and refresher. Initial training will be managed and delivered by the appropriate employees or instructors that have been approved by safety Committee.

The training must be entered in the training server's database with the date, the location, and the type of training. Helicopter identification cards will be issued after the training is completed. The card will identify the work method in which the card holder is trained. The pilot and the PIC must review each line worker's helicopter identification card before that worker is allowed to perform the work. Additionally, the PIC must review the pilot(s) identification card to ensure that he or she has completed the training and is approved to perform the requested helicopter operation.

7.7.2. Pilot Training

Pilots who perform helicopter work for DUSI—using Company employees—must be trained before they are allowed to use the work methods described in this manual.

Pilots who have successfully completed the training and demonstrated proficiency in these work methods receive a pilot qualification card.

Note: Training will be conducted in conjunction with the helicopter line workers training program. Pilots will participate in the skill proficiency exercise. Only those pilots who satisfactorily demonstrate the skills needed to safely perform this work are qualified.

Section 8
Transferring Line Workers Between a Helicopter Skid and a Steel Structure

8.1. General Provisions

These DUSI procedures will minimize the risks involved when transferring line workers between a helicopter skid and a steel structure.

Before each flight, the person in charge (PIC), the pilot, and the helicopter line worker(s) must analyze and address any conditions specific to the job and agree on the safety measures required to address those conditions. (At times, a designee may act for the PIC. This is implied throughout this section, although it is not noted specifically.)

If a special condition exists, it may be necessary to adjust these procedures to ensure the safety of the personnel working on the job. Any changes to these procedures should be considered a only temporary measure for the specific job.

8.2. Special Precautions

During the transfer, line workers should *never* be attached to both the structure and the helicopter at the same time. The pilot must always have the option of leaving the structure at any time and for any reason. The pilot must be able to perform any emergency procedure necessary. These maneuvers would not be possible if a line worker was attached simultaneously to the helicopter and to the structure.

The line worker must follow the procedure described below during the transfer from the helicopter to the structure.

A. Disconnect the fall-arrest lanyard from the helicopter just before making the transfer.

B. Reattach the fall-arrest lanyard or positioning strap to the structure as soon as the transfer is complete.

8.3. Special Requirements and Equipment

Helicopters used for the work procedures described in this section must be equipped with the following installed features. Do *not* perform any work unless these features are available.

A. Handles: Used to aid the helicopter line worker during the transfer. See Section 14, "Specialized Equipment and Tools," for details.

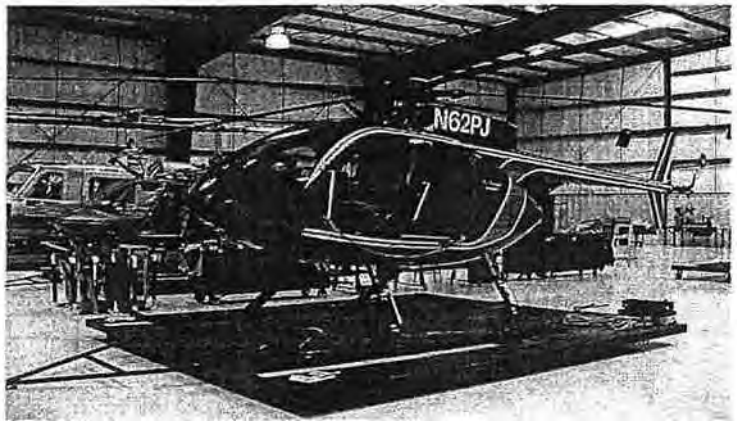


Figure 8-1
Hughes 500E

B. Collective Guard Used to prevent the helicopter line worker from accidentally grabbing the collective during a transfer. Also, the collective guard is used as a safety feature if the worker loses his or her balance. See Section 14 for details.

C. Safety Ring: Only attach lanyards or positioning straps to FAA-approved locations (i.e., skid transfer, working from skid, or platform work).

Figure 8-2
Red Collective Guard

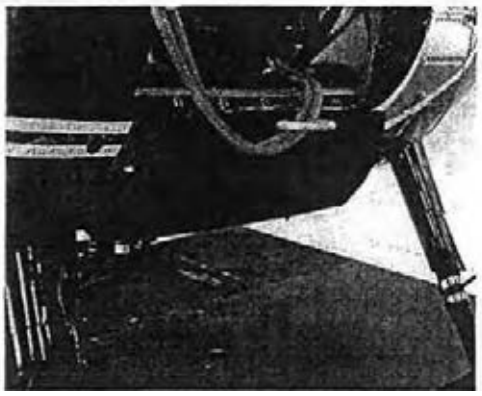


Figure 8-3
Closeup of the Safety Ring

Before a line worker is transferred from the helicopter to the structure (or from the structure to the helicopter), the pilot must place the helicopter skid in *direct contact* with the top of the steel structure. The pilot must maintain this contact during the transfer. This requirement serves two purposes

1. It will discharge any static or induced voltage and/or current that is present on the helicopter; therefore preventing the line worker from being shocked during the transfer.
2. It will provide the helicopter with additional stability during the transfer.

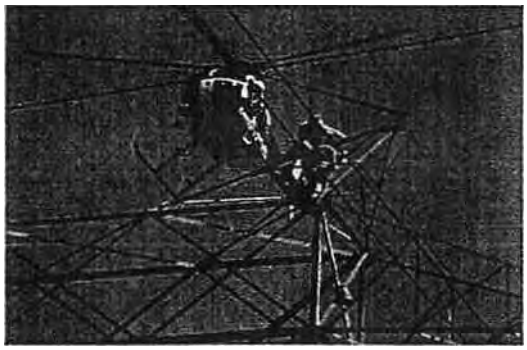


Figure 8-4
Skid Transfer Demonstration

Figure 8-5
Use of Hand Hold

8.4. Procedure

A Line worker or workers (there is a maximum of two per helicopter) responsibilities: Before takeoff; attach the lanyard with the shock absorber to an approved anchor point located on the helicopter. Then take a position on the helicopter skid. Once securely positioned on the skid, signal the pilot that it is safe for the helicopter to take off.

Note: Only use the fall-arrest system when attaching to the helicopter's anchor point. The fall-arrest system allows for a fast transfer and reduces the time that the helicopter must maintain its position against the structure.

B. Pilot responsibilities: Position one or both of the helicopter skids against the top of the structure and signal to the line worker(s) that it is safe to make the transfer.

C. Line worker(s) responsibilities: When two line workers are on the helicopter, the worker closest to the pilot exits first.

Note: If there is an overhead ground wire (OHGW) or optical ground wire (OPGW) located on the top of the structure, and the line worker cannot maintain the minimum safe approach distance of 2 feet, 1 inch during the transfer, or if the wires interfere with the safe operation of the helicopter, use another method of working on the structure (e.g., climb the structure). The helicopter line worker *must* maintain a 2-foot 1-inch working clearance for a 15 kilovolt (kV) circuit when an OHGW or an OPGW is on the structure.

After the pilot gives you approval, disconnect the fall-arrest lanyard from the helicopter's safety ring. Once the transfer is completed, use the helicopter's handholds to transfer to the structure, and reinstall the fall-arrest lanyard or positioning strap on the structure. When you are secured on the structure, signal the pilot that it is safe for the helicopter to leave. If the pilot sees that there are no hang-ups during the transfer and the helicopter line worker(s) is safely on the structure, the pilot can leave the structure at his or her discretion.

Note: During the transfer, the line worker can carry small hand tools if they are secured safely to his or her utility belt. Line workers must sling load all other tools to the structure using a basket or bucket designed for this purpose.

D. Pilot responsibilities: After the line worker signals that it is safe to depart and the pilot sees that the helicopter line worker is safely on the structure, the pilot then must ensure that there is nothing hanging from the line worker's belt that could catch on the helicopter's skid before moving the helicopter away from the structure. The pilot always must move the helicopter away from the structure in a slow and cautious manner. If something does catch accidentally, the helicopter can be maneuvered back to the structure easily and the line worker can free it from the skid.

Note: In case of an accidental hang-up when the helicopter departs the structure, the line worker must not contact the helicopter until its skid is placed against the structure. This prevents the worker from being shocked.

When the line worker(s) is ready to transfer back to the helicopter, maneuver and position the helicopter as described previously in Step 8.4.B. on Page 8-4.

E. Line worker(s) responsibilities: After the helicopter skid is in contact with the structure and the pilot gives the approval signal to transfer back to the helicopter, remove the fall-arrest lanyard or positioning strap and transfer to the helicopter. Immediately after transferring, attach the fall-arrest lanyard to the helicopter safety ring and then notify the pilot that it is clear and safe for the aircraft to depart.

F. Pilot responsibilities: As described in Step 8.4.D. above, once the line worker signals it is clear to take off, the pilot must ensure that nothing is hanging from the line worker's belt that could tangle on the structure as the helicopter moves away. The pilot always must move the helicopter away from the structure in a slow and cautious manner. If something does catch accidentally, the helicopter can be maneuvered back to the structure easily and the line worker can free it from the skid.

Note: In case of an accidental hang-up when the helicopter departs the structure, the line worker must not contact the helicopter until its skid is placed against the structure. This prevents the worker from being shocked.

Section 9
Transferring To a Pole or Structure Using the Suspended Helicopter Harness Method

9.1. General Provisions

These DUSI procedures will minimize the risks involved when transferring line workers between a helicopter and steel structures and wooden poles.

The harness method provides a fast, easy, and safe way for a helicopter to position a line worker on a pole or structure using common line-work tools. The information in this section describes the tools to use and other special requirements that must be followed when transferring a line worker to a pole or structure using a helicopter with a suspended load line.

This section specifically will address transferring a line worker from the ground to a pole or structure, as well as from a pole or structure to another location. Before each flight begins, the pilot, the person-in-charge (PIC) and the helicopter line worker must analyze and address specific work conditions and agree on the safety measures to take when addressing those conditions.

If a special condition exists, it may be necessary to adjust these procedures slightly to provide greater safety. Adjustments to these procedures should be considered only as a temporary exception for the duration of the special condition.

9.1.1. Water Safety

Employees working over water must wear a Coast Guard-approved life vest.

Figure 9-1
Approved Life Vest

9.1.2. Grounding Precautions

When employees cannot maintain the required safe working distances, they must install bracket grounds before making the transfer. Employees must follow *all* applicable protective grounding rules before performing any work.

9.2. Special Precautions and Equipment

The harness used for this procedure must be equipped with both a front D-ring (i.e., front sternum D-ring) and a rear D-ring. The D-ring located in back of the harness may be used only for fall arrest or for an emergency rescue. The harness also is equipped with side-positioning D-rings. These side-positioned D-rings are used while working on a structure. Employees must use only DUSI-approved harnesses. For more information on these approved harnesses, see Section 14.

Note: When a helicopter line worker is suspended from a helicopter, he or she must be suspended using only the harness's front sternum D-ring, as illustrated in Figure 9-2 below.

Figure 9-2
Line Worker Suspended Using the Front Sternum D-Ring

The Federal Aviation Administration (FAA) requires that helicopters designed to suspend line workers must attach the load line to the helicopter using two separate hooks. Each hook should have its own release mechanism that is controlled by the pilot. This system prevents accidental releases and provides the line workers with an additional level of safety. Also, this system provides the pilot with an opportunity to release the load line during an emergency while the line worker is attached to both the structure and the helicopter.

Because the pilot has the means to release the load line in an emergency, the line worker can attach either the positioning strap or the fall arrest lanyard to the pole or structure before disconnecting the helicopter load line. However, helicopter line workers should minimize the time that they are attached to both the helicopter and the structure.

Up to two workers may be transferred at the same time to a steel structure using this work method. The pilot and the helicopter line workers all must agree that it is safe to transfer both workers simultaneously. If either the pilot or the workers feel it is unsafe, the pilot will limit the transfer to one worker at a time.

When this work method is used to transfer line workers to a wood pole, only one worker may be transferred at a time. This will prevent the workers from accidentally being injured by coworkers' gaffs.

Each worker must have a lanyard system attached between the front D-ring of the harness and the helicopter load line. The lanyard, and the means for attaching it, must have a minimum breaking strength of 5,000 pounds and provide an easy disconnect for the line worker, as shown in Section 14.

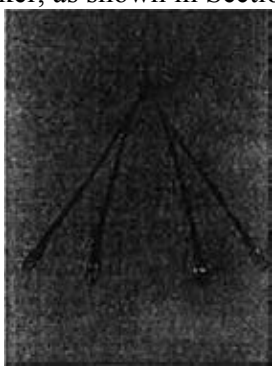


Figure 9-3
Approved Lanyard for Helicopter Line Workers

9.3. Procedure: Steel Structures

Note: Although reference is made to a single line worker, there could be two line workers performing the procedures in Subsection 9.3.

9.3.1. Transferring To a Structure While Suspended Below a Helicopter

A. Before using this work method, the pilot and helicopter line worker must ensure that the double release system mounted on the helicopter is working properly and that all rigging components are in good condition and are not defective.

B. The helicopter line worker will ensure that the pilot knows the exact structure number and the location on the structure where work is to be performed. Before beginning the transfer, the helicopter line worker and the pilot will:

- Discuss and address all the special conditions, safe working distances, and hazards associated with the structure.
- Agree on the methods to implement when dealing with the specific job conditions.

C. The pilot will position the helicopter above the line worker, allowing the line worker easy access to the helicopter load line.

D. The helicopter line worker will attach a lanyard between the harness's front D-ring and the helicopter load line. Once securely attached, the line worker will signal to the pilot that it is safe to lift off.

E. After the pilot receives the signal that it is safe to lift off, he or she will lift the line worker slowly, ensuring that nothing hangs up as the helicopter departs.

F. When the line worker is suspended from the helicopter load line and is clear of any obstructions, the pilot will proceed to the location where the line worker is to be positioned.

G. As the pilot moves the line worker into position for the transfer, the line worker will signal the pilot. This helps the pilot to place the line worker in the proper location for the transfer. When the line worker is on the structure, he or she must attach either the fall-arrest lanyard or the positioning strap to the structure immediately. After the line worker is attached to the structure, the next step is to remove the helicopter load line from the harness immediately. When the load line is detached, the line worker must signal the pilot that it is safe to depart.

H. After the line worker signals it is clear to take off, the pilot must ensure that nothing is hanging from the line worker's belt that could tangle on the structure as the helicopter moves away. The pilot always must move the helicopter away from the structure in a slow and cautious manner. If something does catch accidentally, the helicopter can be maneuvered back to the structure easily and the line worker can free it from the structure.

9.3.2. Transferring From a Structure Using a Helicopter and Load Line

A. When the helicopter line worker is ready to leave a structure, he or she will communicate the pick-up location to the pilot. The line worker then should assume a position on the structure that allows easy access for the helicopter load line and avoids hazards or conditions that would impair the transfer.

B. The pilot will approach the structure slowly and position the helicopter load line so the line worker can reach and attach the lanyard to the harness easily.

C. The line worker then connects the lanyard to the harness's front D-ring and immediately disconnects the positioning strap or fall-arrest lanyards from the structure. Once the line worker is disconnected from the structure, he or she will signal the pilot that it is safe to lift off.

D. After the line worker signals it is clear to take off, the pilot must ensure that nothing is hanging from the line worker's belt that could tangle on the structure as the helicopter moves away. The pilot always must move the helicopter away from the structure in a slow and cautious manner. If something does catch accidentally, the helicopter can be maneuvered back to the structure easily and the line worker can free it from the structure.

When the helicopter and suspended line worker is clear of the structure and related conductors, the pilot will return to the landing zone or proceed to the next location.

9.4. Procedure: Wood Poles

9.4.1. Transferring to a Wood Pole While Suspended Below a Helicopter

A. Before using this work method, the pilot and helicopter line worker must ensure that the double-release system mounted on the helicopter is working properly and that all rigging components are in good condition and are not defective.

B. The helicopter line worker will ensure that the pilot knows the exact pole number and the location on the pole where work is to be performed. Before beginning the transfer, the helicopter line worker and the pilot will:

- Discuss and address all the special conditions, safe working distances, and hazards associated with the pole.
- Agree on the methods to implement when dealing with the specific job conditions.

Note: Wood poles must be inspected and tested, before making the transfer. This is required to ensure that the pole will support the additional load of the worker.

C. The pilot will position the helicopter above the line worker, allowing him or her easy access to the helicopter load line.

D. The helicopter line worker will attach a lanyard between the harness's front D-ring and the helicopter load line. Once securely attached, the line worker will signal to the pilot that it is safe to lift off.

E. After the pilot receives the signal that it is safe to lift off, he or she will lift the line worker slowly, ensuring that nothing hangs up as the helicopter departs.

F. When the line worker is suspended from the helicopter load line and is clear of any obstructions, the pilot will proceed to the location where the line worker is to be positioned.

G. As the pilot moves the line worker into position for the transfer, the line worker will signal the pilot. This helps the pilot to place the line worker in the proper location for the transfer. When the line worker is on the pole, he or she must attach the the positioning strap to the pole immediately.

After the line worker is attached to the pole, the next step is to remove the helicopter load line from the harness immediately. When the load line is detached, the line worker must signal the pilot that it is safe to depart.

If the pole type requires the pilot to lower the line worker between the conductors, the pilot must ensure that the worker is at a safe distance from the pole before proceeding. The line worker must *not* contact the conductors and the pole at the same time. Because there is no personal ground installed, this places the line worker in series with the conductor and the pole.

After the line worker is at a safe distance below the conductors, the pilot can maneuver the line worker to the pole for the transfer. The pilot will position the line worker on the pole so that his or her positioning strap will *not* slip over the top of the pole.

H. After the line worker signals it is clear to take off, the pilot must ensure that nothing is hanging from the line worker's belt that could tangle on the pole as the helicopter moves away. The pilot always must move the helicopter away from the pole in a slow and cautious manner. If something does catch accidentally, the helicopter can be maneuvered back to the pole easily and the line worker can free it from the skid.

9.4.2. Transferring From a Wood Pole Using a Helicopter and Load Line

A. When the helicopter line worker is ready to leave a pole, he or she will communicate the pick-up location to the pilot. The line worker then should assume a position on the pole that allows easy access for the helicopter load line and avoids hazards or conditions that would impair the transfer.

B. The pilot will approach the pole slowly and position the helicopter load line so the line worker can reach and attach the lanyard to the harness easily.

C. The line worker then connects the lanyard to the harness's front D-ring and immediately disconnects the positioning strap from the pole. After the line worker is disconnected from the pole, he or she will signal the pilot that it is safe to lift off.

D. After the line worker signals it is clear to take oft the pilot must ensure that nothing is hanging from the line worker's belt that could tangle on the pole as the helicopter moves away. The pilot always must move the helicopter away from the pole in a slow and cautious manner. If something does catch accidentally, the helicopter can be maneuvered back to the pole easily and the line worker can free it from the skid.

When the helicopter and suspended line worker are clear of the pole and related conductors, the pilot will return to the landing zone or proceed to the next location.

Section 10
Working From a Helicopter Platform on Energized Transmission Voltages

10.1. General

Following the procedures described in this section will minimize the risks when DUSI employees work from a helicopter platform on energized transmission lines.

Before each flight, the person in charge (PIC), the pilot, and the helicopter line worker(s) must analyze and address any conditions specific to the job and agree on the safety measures required to address those conditions. (At times, a designee may act for the PIC. This is implied throughout this section, although it is not noted specifically.)

If a special condition exists, it may be necessary to adjust these procedures to ensure the safety of the personnel working on the job. Any changes to these procedures should be considered only a temporary measure for the specific job.

Note: Helicopter line workers weighing more than 250 pounds cannot perform line work from a helicopter platform.

10.2. Special Precautions

Before work begins, the pilot and crew must inspect the platform assembly to ensure that all of the joints and connections are fastened properly and/or pinned correctly. *Only crew members who have been trained can assist the pilot when the platform assembly is installed. All* of the safety equipment must be inspected before attaching components either to the worker or to the anchor points. Communication equipment must be tested fully functional before work begins and remain functional for the duration of the work. Tools and material must be stored correctly to ensure they remain secured during the flight. Both the pilot and the line worker must wear approved barehand clothing (i.e., coveralls or pants, a jacket, gloves, boots, and socks).

Note: The pilot must be able to perform emergency procedures whenever he or she deems them to be necessary; therefore, the pilot can leave the worksite at any time and for any reason.

The pilot and the helicopter line workers must discuss all aspects of the energized work to be performed, including the following topics.

- Emergency plan.
- Energized voltage to be worked.
- Phase separation.
- Presence of conductors near or within the worksite, and the required safe working distances.
- Type of construction—vertical or horizontal.
- Phase(s) to be worked on and the work location(s).
- Type of work to be performed.
- The proximity to a foreign ground (i.e., pole or structure).

These procedures are written specifically for work performed on energized transmission conductors and associated hardware or components.

When using a helicopter as a work platform or when performing external-load work procedures, a nontest is required before working on energized transmission conductors.

10.3. Special Requirements

Helicopters used for the work procedures described in this subsection must be equipped with the features described in Paragraph A., Paragraph B., and Paragraph C. on the following pages. If they do not have these features, do not perform the work using a helicopter.

A. Approved Platform: This platform is used in conjunction with the Hughes 500, Models D, E, or F. Ensure that the platform used during helicopter line worker projects is Federal Aviation Administration (FAA) approved. For more information, see Section 14, "Specialized Equipment and Tools."

Figure 10-1
An Approved Helicopter Platform

B. Helicopter Bonding Details: A bonding attachment must be connected from the air frame to the platform. This attachment ensures that both the platform and the helicopter air frame remain at the same potential. For more information on bonding attachments, see Section 14.

Figure 10-2
Approved Bonding Attachment

C. Safety Ring: Lanyards can be placed only at FAA-approved locations on the helicopter while performing work from a platform.

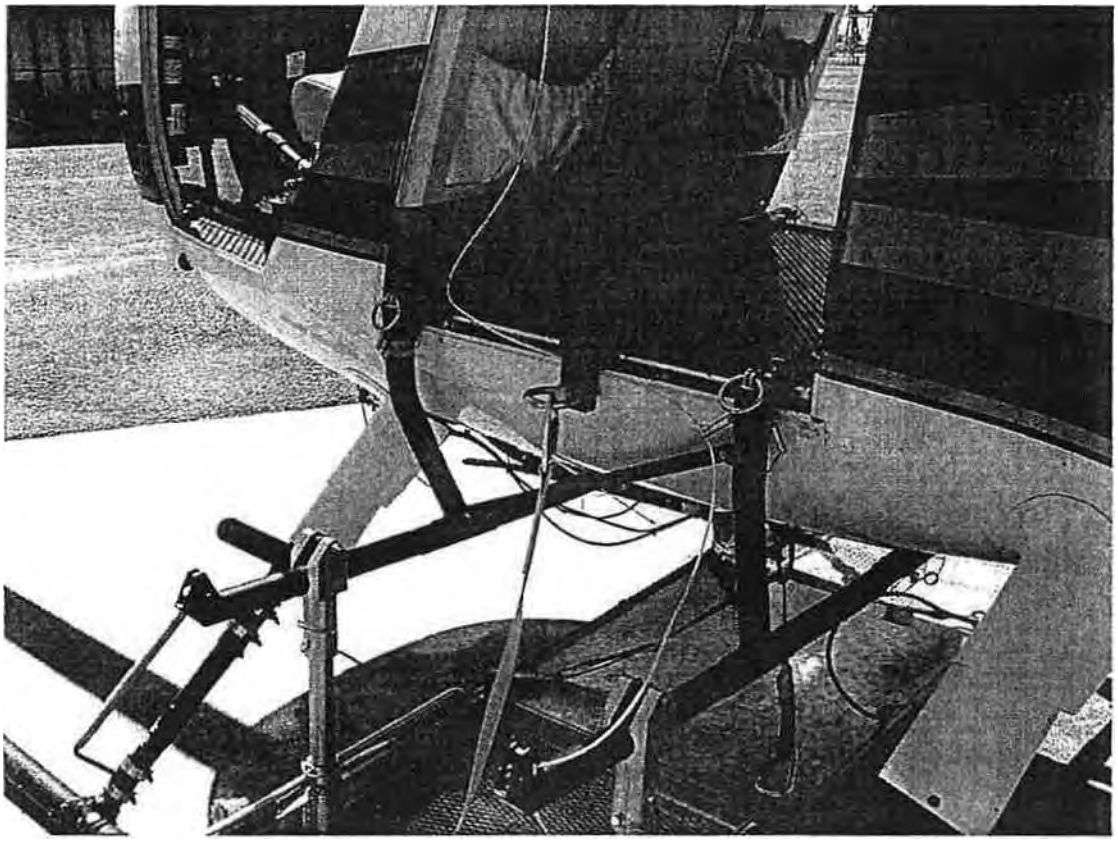


Figure 10-3
FAA-Approved Lanyard Locations

10.4. Procedures: Energized Platform Work

10.4.1. General

This work procedure allows for the helicopter and worker to come in direct contact with the energized conductor. For the purpose of this work procedure, no more than one qualified line worker must work from the platform on energized conductors. The helicopter pilot must be the only person within the helicopter.

Before the helicopter or line worker come in contact with an energized line, the line worker must apply a bonding wand; bringing the helicopter, the line worker, and the conductor to the same potential.

After applying the bonding wand and bringing the unit to the same potential, a clamp-on bond must be applied before continuing the work. This process also is known as ″Wand On—Bond On.″

When leaving the work area, apply the procedure in the reverse order: *"Wand On—Bond Off, Wand Off"*

See Section 14, "Specialized Equipment and Tools," for details.

Figure 10-4
Bond-On Wand

Before bonding on or off the conductor, ensure that clear communications are established between the qualified line worker and the pilot, ensuring that the pilot and the line worker are ready to begin the bonding/unbonding procedure.

CAUTION

Working safely from the platform requires balancing the line worker's weight with the counter-balance weight on the opposite side of the platform. The weight distribution is critical to the helicopter's safe performance.

During the helicopter's take off and landing, no part of the line worker's body must come in contact with the earth/ground before the helicopter sets down. This eliminates the possibility of static discharge through the line worker.

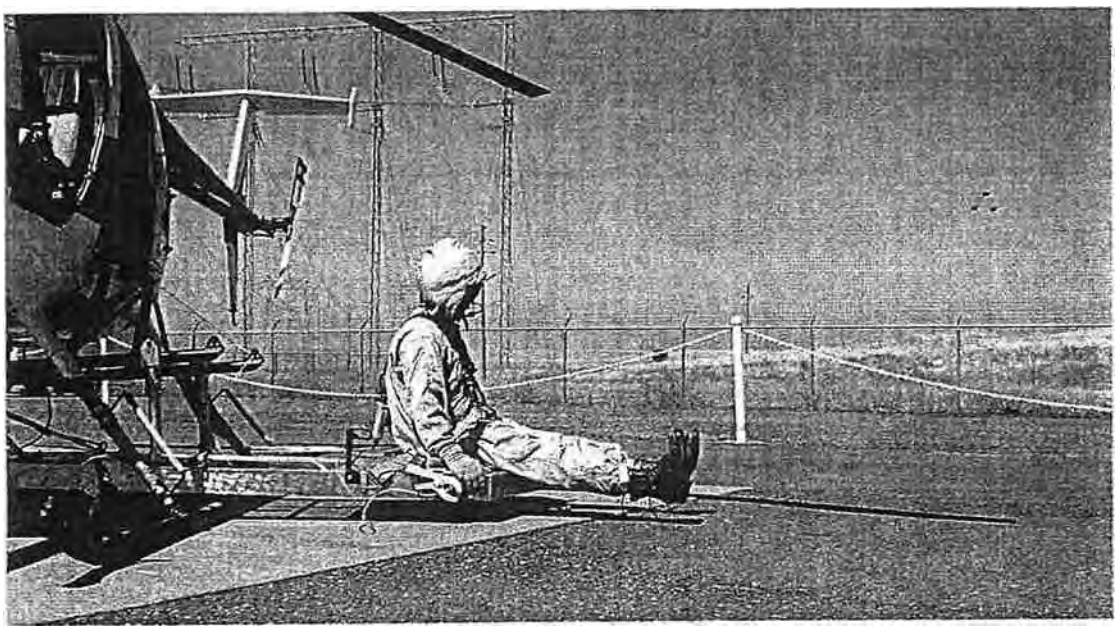


Figure 10-5
Raise Feet Before Landings and Takeoffs

10.4.2. Preflight Inspection

During the tailboard briefing/preflight inspection, the PIC must review the information contained in the remainder of this section and/or perform the actions described here to ensure that that the work is performed safely and that the work methods are in compliance with this work procedure.

A. Personal Protective Equipment (PPE)—All appropriate PPE must be used whenever work is performed from the helicopter platform. For the purpose of this work procedure, PPE must include, but is not limited to, the following:

- Barehand suit (including boots, gloves, and socks)
- FAA-approved flight helmet with eye/ear protection
- Safety harness with shock-absorbing lanyard

B. Safety Harness and Lanyard—Company employees must wear approved helicopter safety harnesses with approved, shock-absorbing lanyards during all helicopter platform work. Harnesses must be sized and fitted properly. The safety lanyard must be attached to the back of the line worker's helicopter safety harness as well as to the helicopter's safety ring anchor point.

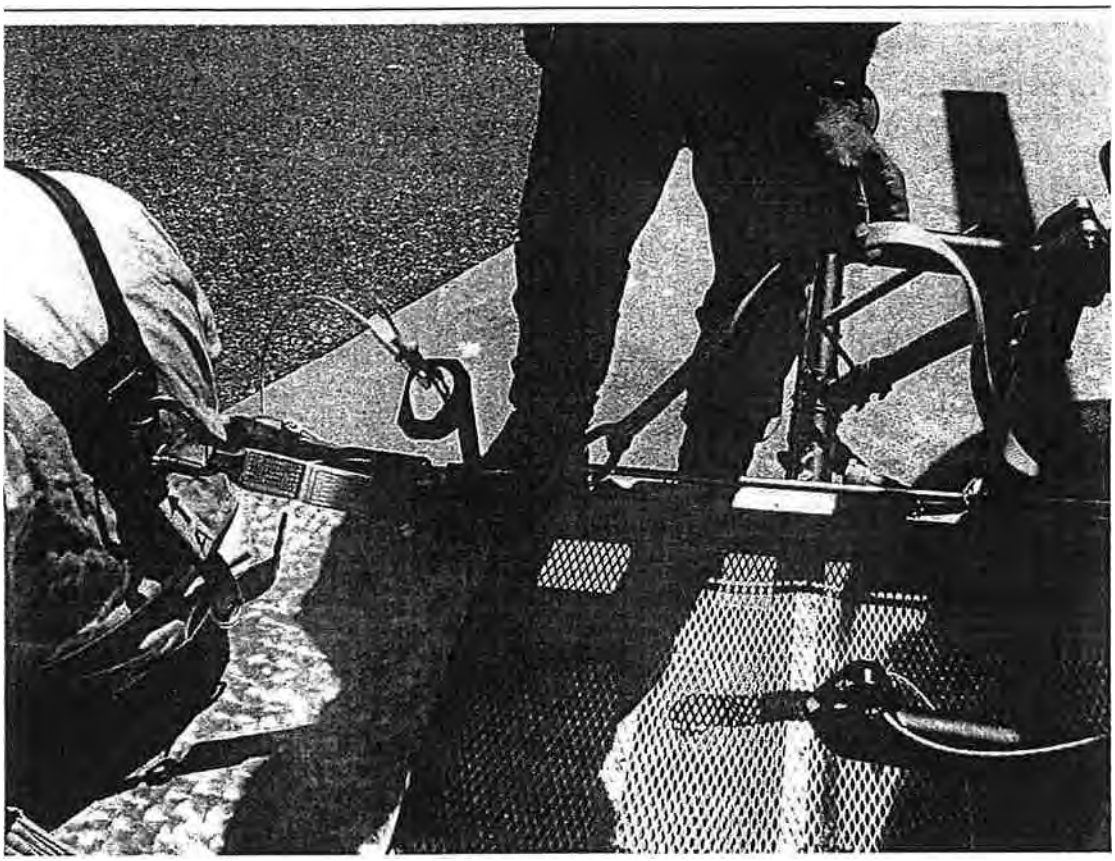


Figure 10-6
Properly Connected Safety Harness

C. Securing Tools and Materials—All tools and materials transported on the helicopter work platform must be secured to prevent objects from falling or creating a hazard for the helicopter. Hazards may include objects sliding and/or moving around, causing a weight shift, or being raised into the rotor blades.

D. Ensuring Clear Communications—For the purpose of this work procedure, communication must be maintained at all times between the pilot and the line worker via the pilot's internal helicopter communication device and the line worker's flight helmet communication system. These devices must be checked before they are used and verified as being in service throughout the work procedure. Do *not* begin to work if communications cannot be verified. Stop working immediately if communications are lost.

E. Bonding Wand and Clamp—Ensure that the bonding clamp is secured to the helicopter platform and that the bond-on clamp's conductor end is secured tightly to the cable. Check the set-screw for tautness. Follow the same procedures for the "Wand On—Bond On" process.

Figure 10-7
Bond-On Clamp

F. Platform Seat Belt—Line workers must wear their platform seat belts at all times while being transported to or working on energized lines. Seat belts must be secured to ensure that line workers cannot fall from the platform or slide through the seat belt. The seat belt must be included as part of the preflight inspection. Check for wear and tear on the belt material. Also, ensure that the bolts securing the belt to the platform are in place and secure, and that the buckle operates properly.

Figure 10-8
Adjust Seat Belt

10.4.3. Line Worker Awareness

The line worker assigned to work from the helicopter platform must be aware of his or her surroundings and of the mechanics of the helicopter at all times. During the preflight tailboard inspection, discuss the following issues with the helicopter pilot.

A. Body Positioning—The helicopter platform sits approximately 6 inches from the ground. Line workers must *not* extend any part of their bodies below the helicopter work platform during landings and take offs. This eliminates both the possibility of electrical discharge and of crushing the workers' hands, feet, etc., with the helicopter's weight.

B. Rotor Blades—The helicopter's rotor blades will be approximately 9 feet above the level of the work platform. Workers must *not* raise hot sticks or any other objects that could reach the rotor blade while sitting on the platform.

Line workers may leave or enter the work platform while the helicopter is on the ground and running only with the pilot's permission. Line workers must ensure that they are in full view of the pilot when they either walk away from or walk back towards the helicopter. This means that they must leave and return toward the front of the helicopter. Also, workers must be aware of ground's slope. *Never* walk uphill towards the rotor blades.

C. Platform Work Stability—The helicopter work platform is not always be stable. The helicopter will move up, down, or sideways depending on the wind or heat conditions. Also, a helicopter's position can be compromised when a line worker grabs the conductor. The force exerted by the worker can cause the helicopter to move in an unsafe direction. Workers must remain aware and be careful not to compromise the pilot's control over the helicopter.

If the pilot experiences difficulty stabilizing the helicopter, both the pilot and the line worker must agree that conditions are safe before leaving the work area.

10.4.4. Bonding On and Off Energized Conductors

A. Required Sequence for Bonding—Ensuring that the line worker, the helicopter, and the conductors are at the same potential is a critical part of the job. Line workers must use extreme caution to avoid contacting an energized conductor with any parts of their bodies or with conductive objects before bonding on. Workers must use the following procedure when bonding onto or off of energized conductors:

- **Bonding On:** Apply the bonding wand. Then, apply the bonding clamp; i.e., "Wand On—Bond On."
- **Bonding Off:** Apply the bonding wand. Then, remove the bonding clamp. Lastly, remove the bonding wand; i.e., "Wand On—Bond Off—Wand Off."

B. Correct Position for Wanding On or Off—The pilot must use extreme caution when positioning the helicopter for the bonding work. Both the pilot and the line worker must agree that they are in position before the bonding work begins.

Before bonding on, the line worker should have the bonding wand in one hand and the bonding clamp in the other hand. Distances from the conductors will vary depending on the sizes of the line workers; however, workers should hold the bonding wands with their arms completely extended to ensure that their bodies are as far away from the conductors as possible before they make contact.

After contacting the conductors with their bonding wands, the workers must move in closer to the conductors to install the bonding clamps (i.e., "Wand On—Bond On").

Workers must follow the reverse sequence after their projects are finished and they are ready to bond off. They must apply their wands to the conductors when they are close and remove their bonding clamps. As the helicopter moves away from the conductor, line workers should keep their arms extended completely and allow the helicopter to break contact between the wands and the energized lines (i.e., "Wand On—Bond Off—Wand Off").

10.4.5. Potential Hazards

The pilot and line worker must ensure that all potential worksite hazards are identified during the preflight tailboard briefing. Potential hazards include the following:

- Adjacent conductors
- Vertical conductors
- Static/shield wire
- Tower members
- Trees

After the hazards are identified, the essential members of the crew, including the pilot, the helicopter's crew members, and the line workers assigned to the project, must discuss ways to mitigate the hazardous situations before starting to work.

10.4.6. Potential Projects

As long as the work procedures described in this section are followed, there are a variety of tasks that can be performed using an energized work platform. As always, the worksite conditions are a determining factor as to the feasibility of performing an aerial work procedure. Also, as previously discussed, the essential crew members of the proposed project must come to a consensus on any safety issues before the project can begin. Examples of tasks that may be performed using this work procedure include, but are not limited to, the following bulleted items.

- Installing, removing, and repairing conductor spacers
- Installing sock lines
- Repairing damaged conductors
- Installing conductor shunt splices and armor rods
- Installing, removing, and repairing conductor weights
- Installing, removing, and repairing aerial markers
- Installing and removing bird diverters
- Installing, removing, and recovering dampers
- Removing foreign objects from energized lines
- Installing and removing fault indicators
- Inspecting conductors

Section 11
Working From a Helicopter Skid or Platform on De-Energized Circuits

11.1. General

Following the procedures described in this section will minimize the risks when line workers are positioned on a helicopter's skid.

Before each flight, the person in charge (PIC), the pilot, and the helicopter line worker(s) must analyze and address any conditions specific to the job and agree on the safety measures required to address those conditions. (At times, a designee may act for the PIC. This is implied throughout this section, although it is not noted specifically.)

If a special condition exists, it may be necessary to adjust these procedures to ensure the safety of the personnel working on the job. Any changes to these procedures should be considered only a temporary measure for the specific job.

Figure 11-1
Approved Hughes 500 Helicopter

11.2. Specialized Equipment

While working from the helicopter skid, the line worker must be connected to the helicopter using either a fall-arrest lanyard or a positioning strap. Because of this requirement, it is necessary for the helicopter line worker to wear a fall-arrest harness that is equipped with a rear D-ring.

Figure 11-2
Work Position

This work method is not intended for use on energized conductors, and only may be used on de-energized conductors that have been short circuited and grounded. Grounds must be installed according to the requirements specified in the *Protective Grounding Manual.* An exception to standard grounding requirements is allowed when working on overhead conductors from the helicopter skid where there is *no possibility* of contacting a foreign ground potential. In this situation, a personal ground is not required.

A bonding cable must be installed between the helicopter and the conductor before the helicopter line worker contacts the conductor. This requirement does not apply to insulated fiberoptic cable or to insulated cable. The bonding clamps used for this purpose must be designed to release during an emergency so the helicopter pilot can exit the work location quickly. See Section 14, "Specialized Equipment and Tools," for bonding cable specifications.

Figure 11-3
Bonding Clamps

11.3. Procedure for Working From a Skid or Platform

11.3.1. Before Takeoff

A maximum of two line workers can perform this procedure. (For the remainder of this section, the procedure will be written as if one line worker were performing the work, although it is implied that there can sometimes be two workers.) Each line worker must attach his or her fall-arrest lanyard *with shock absorber* and a short positioning lanyard to an approved anchor on the helicopter. Also, the helicopter line worker must ensure that the bonding strap is attached securely to the helicopter.

Note: The bonding clamp must be attached to a point on the helicopter that provides both good electrical contact and easy access.

11.3.2. Performing the Work

A. The pilot must maneuver the helicopter to the work location and hold a position that allows the line worker on the skid to attach the bond from the helicopter to the conductor. Once the bond is installed, the pilot will assume a position where the helicopter line worker can easily access the work area.

Note: The pilot must maintain as much distance from the tail rotor to the conductor as conditions will allow. It may be necessary for the pilot to place the helicopter at a slight angle to the conductor to maintain the maximum distance.

B. The line worker must be able to communicate any required position changes to the pilot. Also, the line worker must let the pilot know when the project is complete and he or she is ready to remove the bond from the conductor.

C. After receiving notification that the work is completed, the pilot will reposition the helicopter to allow the line worker to remove the bond from the conductor.

D. The line worker will remove the bond clamp from the conductor and notify the pilot that it safe to depart.

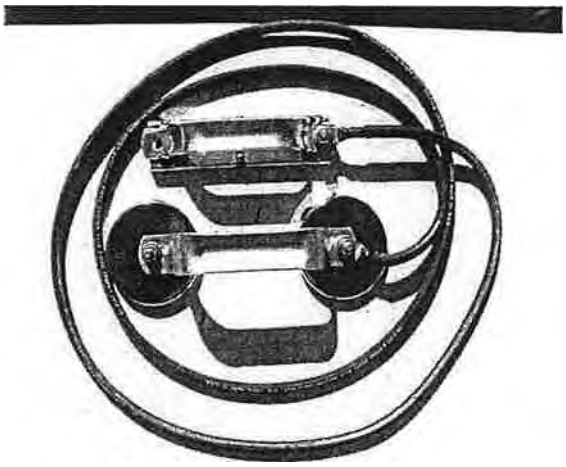
E. After the line worker signals that it is safe to depart, the helicopter pilot will leave the work location and fly back either to the landing zone or to the next work location, as appropriate.

11.3.3. Required Equipment

Section 14 contains the specifications for bonding devices and short positioning straps.

Approved bonding clamps are used as described in the two bulleted items below.

- A bonding clamp is attached to the conductor that will be worked on.
- A magnetic bond is attached to the structure.



Section 12
Working From a Suspended Sky Chair

12.1. General

Following the procedures described in this section will minimize the risks when a helicopter line worker is working from a sky chair suspended below the helicopter.

Before each flight, the person in charge (PIC), the pilot, and the helicopter line worker(s) must analyze and address any conditions specific to the job and agree on the safety measures required to address those conditions. (At times, a designee may act for the PIC. This is implied throughout this section, although it is not noted specifically.)

If a special condition exists, it may be necessary to adjust these procedures to ensure the safety of the personnel working on the job. Any changes to these procedures should be considered only a temporary measure for the specific job.

12.2. Rescue Equipment

When a helicopter line worker is suspended from a helicopter, the Federal Aviation Administration (FAA) requires that the load line be attached to the helicopter using two separate attachment hooks, each having a separate release button that is controlled by the pilot. This system prevents an accidental release and provides an additional level of safety for the helicopter line worker.

Figure 12-1
Closeup of Three-Ring Release System

Figure 12-2
Manual Release Location

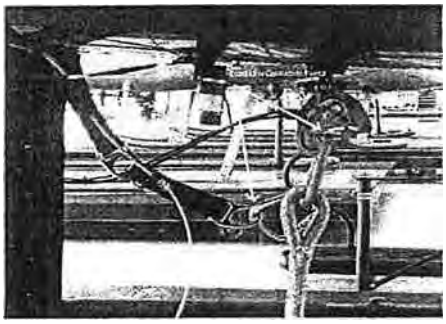


Figure 12-3
Three-Ring Secondary Release System

Note: In the remainder of this section, the term "sky chair" will be used in the singular, although some projects will allow for two sky chairs.

The person in charge (PIC) must ensure that a rescue long-line equipped with a helicopter grouper hook is located at the landing zone to allow for a rescue, if needed. The top D-ring on the sky chair must be attached to the helicopter load line. A fall-arrest lanyard with a grouper hook must be attached to the top D-ring of the sky chair. The grouper hook will be positioned within reach of the helicopter line worker.

In an emergency, the helicopter line worker will place the grouper hook on the wire, allowing the pilot to release the load line and fly back to the landing zone to make repairs. The fall-arrest lanyard with the attached grouper hook can be placed on the wire at any time if both the pilot and the helicopter line worker agree.

12.3. Self-Rescue Procedure

The helicopter line worker will attach a 4-foot nylon sling to the top D-ring of the sky chair and secure it to one of the D-rings located on each side of the sky chair. Line workers can use the secured sky chair during self-rescue procedures, which are described on the following pages.

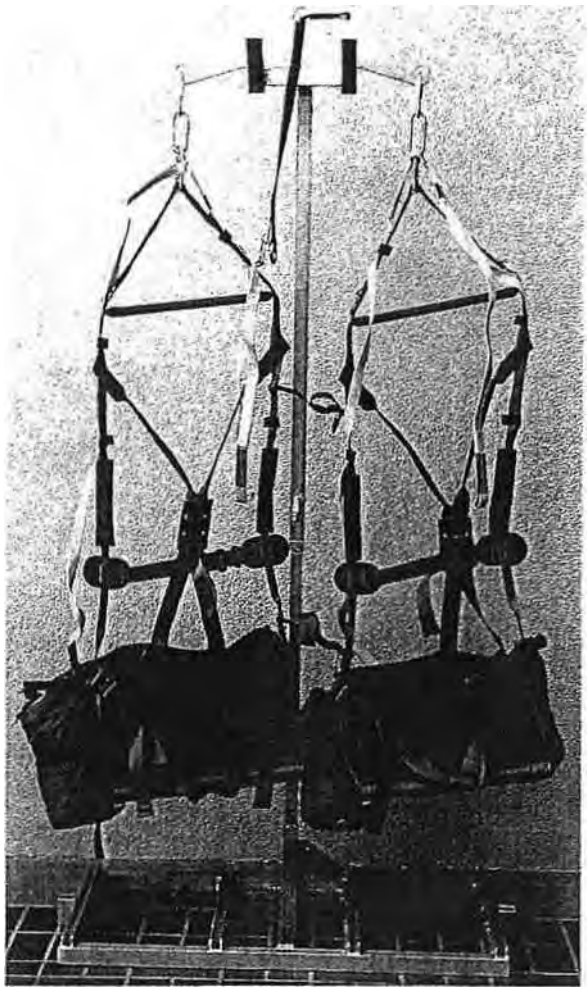


Figure 12-4
Sky Chairs

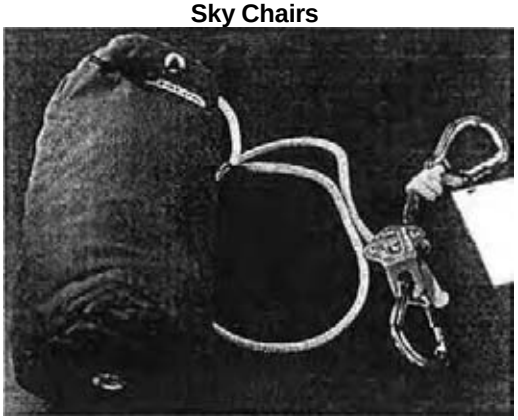


Figure 12-5
Self-Rescue System

12.4. Communications

Good communications are essential for all helicopter work. To maintain communication, helicopter line workers must wear approved FAA flight helmets equipped with radio communication devices, as shown in Section 14. The radios allow helicopter line workers to give clear and concise positioning instructions to the pilot during work activities.

12.5. Preplanning Work Using Sky Chairs

The PIC, the pilot, and the helicopter line worker(s) must discuss all aspects of the work to be performed, including the following topics.

- The emergency plan.
- The positions of any energized conductors near the work location, and the safe working distances that must be maintained.
- The type of construction (i.e., vertical or horizontal).
- The phase(s) to be worked on and the specific work location(s).
- The length of load line required to maintain a safe work position for the helicopter, if overhead ground wire(s) or optical ground wires are present.
- The type of work to be performed.
- The proximity to a foreign ground (i.e., pole or structure).

WARNING

While performing external load operations (i.e., human load and/or external load/cargo), do *not* perform other types of work that could create an unsafe environment for the pilot or helicopter. This includes, but is not limited to, moving the wires/conductors, setting structures/structure members, pulling lines (i.e., sock line/conductors), or delivering tools and/or equipment.

Install all grounds according to the requirements specified in the *Protective Grounding Manual.* The only exception to accepted grounding requirements is when line workers are working on overhead conductors from a helicopter and there is *no* possibility of contacting a foreign ground potential. In this instance, personal grounds are *not* required.

12.6. Procedure

A. Before taking off, the pilot and the helicopter line worker must ensure that:

- The double-release system mounted on the helicopter is functioning properly.
- Radio communications are working properly.
- All special equipment is in use and correctly attached.
- All rigging components are in good condition and there are no defects.

Once the checks have been completed and all systems are ready, the helicopter line worker will signal the pilot that it is safe to take off.

B. The pilot will maneuver the helicopter directly above the helicopter line worker and slowly lift the worker, ensuring that nothing gets caught during the move. The pilot then will proceed to the worksite and hold a position that allows the line worker to access the worksite easily and safely. The helicopter line worker will help the pilot to position the helicopter at the worksite by providing detailed instructions to the pilot over the radio.

C. The helicopter line worker will communicate any required position changes to the pilot by radio. The line worker will contact the pilot after the project is completed and inform him or her that it is now safe to depart.

Note: The helicopter line worker must remove the safety lanyard from the conductor, if one was installed, before signaling to the pilot that it is safe to depart.

D. After the pilot is informed that the work is complete and that it is safe to depart, the pilot will leave the worksite slowly, ensuring that nothing gets caught, and then proceed to the next worksite or landing zone, as appropriate.

Section 13
Performing Energized Work From a Sky Chair Suspended by a Helicopter

13.1. General

Following the procedures described in this section will minimize the risks when a helicopter line worker is performing barehand work on energized transmission conductors from a sky chair suspended below a helicopter.

Before each flight, the person in charge (PIC), the pilot, and the helicopter line worker(s) must analyze and address any conditions specific to the job and agree on the safety measures required to address those conditions. (At times, a designee may act for the PIC. This is implied throughout this section, although it is not noted specifically.)

If a special condition exists, it may be necessary to adjust these procedures to ensure the safety of the personnel working on the job. Any changes to these procedures should be considered only a temporary measure for the specific job.

13.2. Special Precautions

When a helicopter line worker is suspended from a helicopter, the Federal Aviation Administration (FAA) requires that the load line be attached to the helicopter using two separate attachment hooks, each having a separate release button that is controlled by the pilot. This system prevents an accidental release and provides an additional level of safety for the helicopter line worker.

Note: In the remainder of this section, the term "sky chair" will be used in the singular, although some projects will allow for two sky chairs.

A line worker performing energized barehand work procedures from a sky chair must wear approved barehand clothing, including coveralls or pants, a jacket, gloves, boots, and socks.

The person in charge (PIC) must ensure that a rescue long-line (i.e., approved hot rope) is located at the landing zone to help rescue a stranded line worker, if required. Section 14, "Specialized Equipment and Tools," provides the ordering information for this equipment.

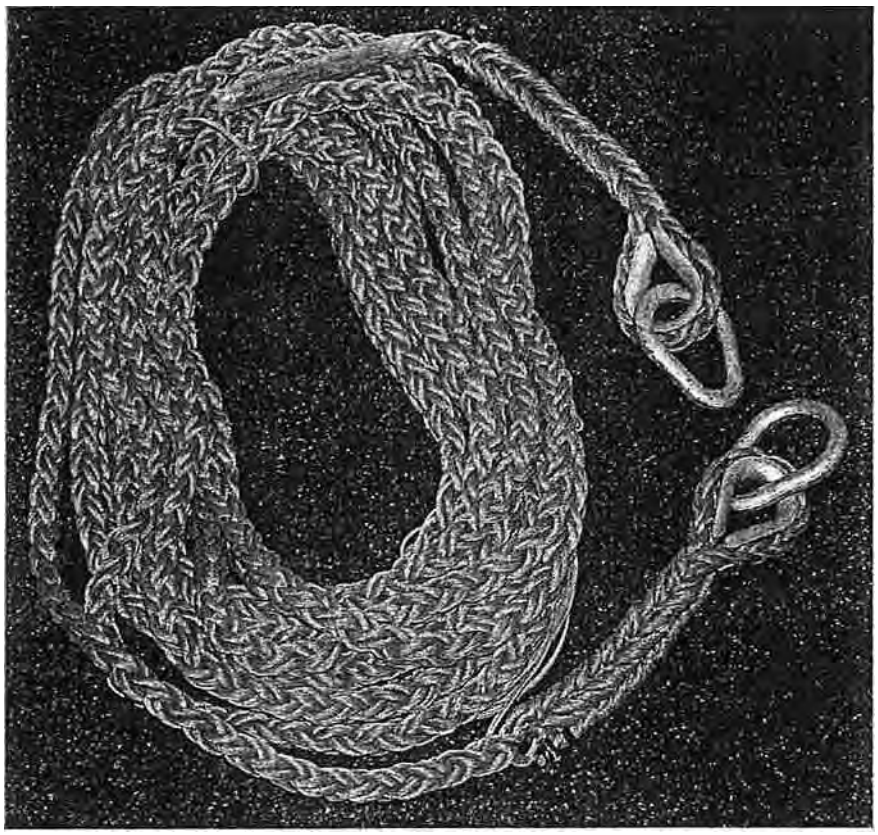


Figure 13-1
60-Foot Hot Rope

The spreader bracket attached to the two-person sky chair must be attached to the helicopter by a nonconductive load line. A fall-arrest lanyard with a grouper hook or large carabineer must be attached to the sky chair's top D-ring. The grouper hook or large carabineer must be positioned within reach of the helicopter line workers.

In an emergency, the helicopter line worker will place the grouper or large carabineer hook on the wire, allowing the pilot to release the load line and fly back to the landing zone to make repairs. The fall-arrest lanyard with the attached grouper hook or large carabineer hook may be placed on the wire at any time if both the pilot and the helicopter line worker agree.

13.3. Self-Rescue Procedure

The helicopter line worker will attach a 4-foot nylon sling to the top D-ring of the sky chair and secure it to one of the D-rings located on each side of the sky chair. Line workers can use the secured sky chairs during self-rescue procedures, which are described on the following pages.

If helicopter line workers are stranded on an energized conductor and the helicopter cannot be repaired in a timely manner, they can follow the procedure for self-rescue. Line workers must use an approved, energized rescue device, with a minimum of 200 feet of rescue line. The line workers must attach the line to the sky chair. For information on approved rescue lines, see Section 14.

An alternative method is for helicopter line workers can attach the rescue device to a nylon sling, which is attached to the chair, and lower themselves to the ground.

After the helicopter line workers have attached the rescue devices, they must remove all leg, waist, and chest straps from their sky chairs before starting the self-rescue.

This self-rescue method is limited to work locations 175 feet or less above the ground. For work locations higher than 175 feet, a second helicopter must perform the rescue if the first helicopter cannot be repaired in a timely manner.

Figure 13-2
Self-Rescue System

13.4. Communications

Good communications are essential for all energized work activity. To maintain communication, helicopter line workers must wear approved FAA flight helmets equipped with radio communication devices, as shown in Section 14. The radios allow helicopter line workers to give clear and concise positioning instructions to the pilot during energized work activities.

13.5. Preplanning Energized Work Activities

The PIC, the pilot, and the helicopter line worker(s) must discuss all aspects of the work to be performed, including the following topics.

- The emergency plan.
- The energized voltage to be worked.
- The phase separation.
- The presence of conductors near or within the worksite, and the required safe working distances.
- The type of construction (i.e., vertical or horizontal).
- The phase(s) to be worked on and the specific work location(s).
- Length of the load line required to maintain a safe work position for the helicopter, if overhead ground wire(s) or optical ground wires are present. (Refer to Subsection 13.2., "Special Precautions.")
- The type of energized work to be performed.
- The proximity to a foreign ground (i.e., pole or structure).

13.6. Work Procedures

The following work procedures are intended for use on energized transmission conductors and associated hardware or components.

A nontest is required either when working on energized transmission conductors using a helicopter as a work platform, or when working on external load, energized work procedures.

A. Preflight Check

Before the helicopter takes off, the pilot and the helicopter line workers must ensure that all of the required equipment and clothing listed below are available and prepared for the work.

- The double-release system is mounted on the helicopter and functioning properly.
- The radio communication devices are working properly.
- All special equipment is available and attached correctly.
- All rigging components are in good condition and without defects.
- The line workers' barehand suits are bonded together.
- The external load hot rope is clean and in good repair.

After these checks have been completed and all systems are ready, the helicopter line workers must notify the pilot that it is safe to take off.

B. Bonding Requirements

Unlike performing other energized barehand procedures, helicopter line workers suspended from sky chairs are *not* required to bond on to the energized lines.

When performing barehand work procedures from a helicopter platform, Condor, or ladder, bonding on *is* required because it brings the helicopter's or Condor's metal mass to the same line potential as the conductor. Or, during ladder work, the bond on process is required because of the difference in potential of the metals, as described in the previous sentence, as well as the ground potential.

When working from sky chairs, only the line workers' suits and chairs are brought to the same line potential. Neither a bonding wand nor cable with a clamp is required or used for such work. Bonding occurs each time contact is made with energized conductors.

A line worker performing energized work while suspended from a sky chair may feel some sensation when making contact with an energized conductor; he or she should instruct the pilot to move away from the energized conductors immediately and return to the landing zone when experiencing discomfort. To ensure safety, the connections in the barehand suit bonds must be verified.

C. Transporting to the Worksite and Performing the Energized Work

The pilot will maneuver the helicopter directly above the helicopter line **worker and slowly lift the worker, ensuring that nothing gets caught during** the move. The pilot then will proceed to the worksite and hold a position that allows the line worker to access the worksite easily and safely. The helicopter line worker will help the pilot to position the helicopter at the worksite by providing detailed instructions to the pilot over the radio.

The helicopter line worker will communicate any required position changes to the pilot by radio. The line worker will contact the pilot after the project is completed and inform him or her that it is now safe to depart.

Note: If the helicopter line worker chooses to install a safety lanyard to the energized conductor while performing the work, it must be removed *before* telling the pilot that it is safe to depart.

After the pilot is informed that the work is complete and that it is safe to depart, the pilot will leave the worksite slowly, ensuring that nothing gets caught, and then proceed to the next worksite or landing zone, as appropriate.

The success of your job depends on your ability to follow these work procedures; however, as noted at the beginning of this subsection, modifications may be required because of changes in field conditions that are not identified or communicated at time of your tailboard briefing.

Appendix A

Note: Photocopy this form and take it with you to help select a landing-zone.

The Dusi employee *selects* the landing zone.
The pilot or pilot's representative *approves* the landing zone.

Look around the prospective landing zone and note the following items. Check off each item as you note it.

- ❑ Trees
- ❑ Fences
- ❑ Equipment
- ❑ Power lines
- ❑ Wind direction
- ❑ Position of site workers
- ❑ 200-foot diameter landing area is clear of any loose objects that could fly up or into the helicopter rotor blades during takeoff or landing.

Answer the following questions. Check off each question. as you answer it.

- ❑ Does the selected landing zone permit takeoff and landing into prevailing winds?
- ❑ Is the selected landing zone relatively level? Is it possible to use hilltops and ridges?
- ❑ If using a built-up landing zone, is it capable of supporting the helicopter on the landing surface and providing good footing?
- ❑ If using a prepared landing zone on a hillside, will the largest rotor clear the hillside by a distance equal to the rotor's horizontal radius?
- ❑ Have safe and effective means been implemented to control dust at the helicopter's selected landing zone, if necessary?
- ❑ Have arrangements been made with the helicopter contractor to provide effective mobile communications using DUSI-assigned frequencies?
- ❑ Do the Company landing zone personnel have cellular phones and/or radios to communicate with the appropriate DUSI personnel.
- ❑ Has the pilot performed the following tasks? (These are the pilot's responsibility.)
  - ❑ Identified the wind direction.
  - ❑ Ensured there is no restricted airspace near the flight path.
  - ❑ Checked for areas with livestock in the flight path.
  - ❑ Flown the work area and either verified that the flight zone is free of sensitive areas or identified any sensitive areas requiring corrective action.
  - ❑ Determined if the landing zone within 1,000 feet of a school (K-12).

Appendix A

DUSI employee *selects* the landing zone.
The pilot or pilot's representative approves the landing zone.

Landing Zone Safety Checklist

Look around the prospective landing zone and note the following items (check when done):

V Trees V Fences

V Equipment V Power lines

V Wind direction V Position of site workers

V 200-foot diameter landing area is clear of any loose objects that could fly up or into the helicopter rotor blades during takeoff or landing.

Answer the following questions (check off each question as you answer it):

V Does the selected landing zone permit takeoff and landing into prevailing winds?

V Is the selected landing zone relatively level? Is it possible to use hilltops and ridges?

V If using a built-up landing zone, is it capable of supporting the helicopter on the landing surface and providing good footing?

V If using a prepared landing zone on a hillside, will the largest rotor clear the hillside by
a distance equal to the rotor's horizontal radius ?

V Have safe and effective means been implemented to control dust at the helicopter's selected landing zone, if necessary?

V Have arrangements been made with the helicopter contractor to provide effective mobile communications by means of DUSI assigned frequencies ?

V Has the pilot performed the following tasks? These are the pilot's responsibility.

V Identified direction of wind.

V Ensured there is no restricted airspace near the flight path.

V Checked for areas with livestock in the flight path.

V Has the pilot flown the work area and verified the flight zone is free of sensitive areas, or identified sensitive areas requiring corrective action. Is the landing zone within 1,000 feet of a school (K - 12)?

Communications: General Requirements

Maintain good communications between the ground crew and the pilot, and between the pilot and the helicopter line worker. Communication may be in the form of hand signals, head signals, direct verbal communication, or, when practical, radio communication. For some of the helicopter line work activities, special radio equipment is used to help communication. Whenever practical, use this radio equipment to ensure the best possible communication between the helicopter line worker and the pilot (see Section 9, "Specialized Equipment and Tools"). Projects requiring long-line load operations shall be designed to maintain radio communications at the landing zone between the pilot, the person-in-charge/designee, and line workers.

Ensure that affected site personnel check their radio units to make sure the units are on the correct frequency and operating properly.

Communications: Before the Tailboard Briefing

Ensure that each helicopter jobsite has a person in charge, designated as the person responsible for all helicopter operations. The person in charge shall have a copy of the *Helicopter Operations* Manual onsite, along with the job emergency plan. The person in charge and/or designee in charge of the landing zone shall have radio communications with the pilot and line workers at all times. In order to ensure safe operations, the person in charge shall remain at the landing zone during all helicopter operations.

Appendix B

The Company maintains a list of approved helicopter contractors and pilots.

For additional information regarding helicopter contractors, contact Operations Dept. or Safety Dept. for details

Appendix C
Selecting a Helicopter Based on Load Capacity Guidelines

Type	Interior Load Capacity (Pounds or Passengers)	Exterior Load Capacity (Pounds)
Hughes		
500D	600	900
Bell		
204-UH1B	Not Allowed	3,100
205	5 Passengers	3,100
214	9 Passengers	6,000
212	3,000	3,000
206B-3 Jet Ranger	4 Passengers	700
206-L3 Long Ranger	6 Passengers	1,100
206-L4 Long Ranger	6 Passengers	1,600
407-Bell	6 Passengers	1.400
Aerospatiale		
SA-315B Lama	800	2,200
SA 315 Lama	3 Passengers	2,400
AS350B (A Star)	1,300	1,600
AS350B (A Star)	5 Passengers	1,700
SA-316B Alouette III	900	1,230
Siskorski		
S-58T	9 Passengers	4,700
S-58T	4,000	5,000
S-61V	5,000	10,000
S-61N	5,000	8,000
S-61R	5,000	7,000
S-64E	None	20,000

Note: Interior and exterior load capacities are given as guidelines for selecting the appropriate aircraft for the job.

Appendix E

Move Right

Left arm extended horizontally; right arm sweeps upward to position over head

Hold Over

The signal "Hold" is executed by placing arms over head with clenched fists

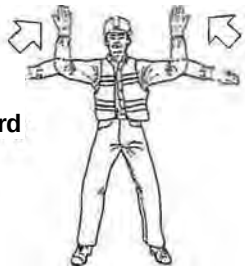
Move Left

Right arm extended horizontally; left arm sweeps upward to position over head

TAKEOFF

Right hand behind back; left hand pointing up

Move Forward



Combination of arm and hand movement in a collecting motion pulling toward body

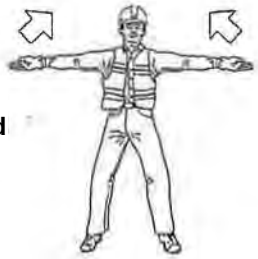
LAND

Arms crossed in front of body and pointing downward

Move Rearward

Hands above arms, palms out using a noticeable shoving motion

Move Upward

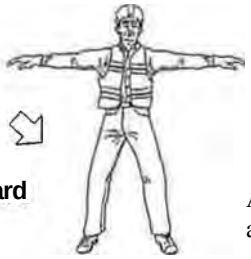


Arms extended, palms up; arms sweeping up

Release Swing Load

Left arm held down away from body; right arm cuts across left arm in a slashing movement from above

Move Downward



Arms extended, palms down; arms pressing down

Appendix F

Rope Specification No. 3-I
Single-Braided Polyester Helicopter Load Lines

This specification shall serve as a standard for polyester ropes used as helicopter load lines.

Specification for 12-Strand, Single-Braid Polyester Synthetic Rope for Lightweight Helicopter Load Line

This line shall consist of a 12-strand, single-braided rope with an eye splice on each end. *This line shall be constructed only by authorized and approved suppliers.* This load line shall *not* be used as a choking sling. Rather, the choking slings and/or loading slings shall be shackled to this line.

1. **Size:** 5/8 inch diameter or larger.

2: **Color:** Load-line colors may vary between helicopter operators.

3. **Braided Rope:**

Diameter (in inches)	Working Load Limit (in pounds)	Available Length •(in feet)	Code
5/8	3,000	30	201354
		40	201355
		50	201400
		Specify	201401

Appendix F

Specification No. 3-11
Specification for Double-braided Polyester Synthetic Rope for Heavyweight Helicopter Load Line

Definition of a Double-Braided Synthetic Rope

Double-braided synthetic rope consists of a braided cover over a braided core. The cover is hollow and the core may be either hollow or solid. The cover and core are of approximately equal strength for the types covered by this specification.

The line shall consist of a 50-foot, double-braided rope with a 2-foot internal wire rope core (IWRC), wire rope held captive at each end of the double-braided rope. *This load line shall be constructed only by authorized and approved suppliers*. This load line shall *not* be used as a choking sling. Rather, the choking slings and/or loading slings shall be shackled to this line.

1. **Size:** 1-1/8 inch diameter.
2. **Color:** The rope surface shall be coated with a high-visibility yellow polyurethane coating.
3. **Braided Rope:**

Diameter (in inches)	Working Load Limit (in pounds)	Code
1-1/8	7,600	030895

Rope Specification No. 3-I
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This line shall consist of a 12-strand, single-braided rope with an eye splice on each end. This line shall be constructed only by authorized and approved suppliers. This load line shall not be used as a choking sling. Rather, the choking slings and/or loading slings shall be shackled to this line.

1. **Size:** 5/8 inch diameter or larger.
2. **Color:** Load-line colors may vary between helicopter operators.
3. **Braided Rope:**

Diameter (in inches)	Working Load Limit (in pounds)	Available Length (in feet)	Code
5/8	3,000	30	201354
		40	201355
		50	201400
		Specify	201401

Specification No. 3-11
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for Heavyweight Helicopter Load Line

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The line shall consist of a 50-foot, double-braided rope with a 2-foot internal wire rope core (IWRC), wire rope held captive at each end of the double-braided rope. *This load line shall be constructed only by authorized and approved suppliers.* This load line shall *not* be used as a choking sling. Rather, the choking slings and/or loading slings shall be shackled to this line.

1. Size: 1-1/8 inch diameter.
2. Color: The rope surface shall be coated with a high-visibility yellow polyurethane coating.
3. Braided Rope:

Diameter (in inches)	Working Load Limit (in pounds)	Code
1-1/8	. 7,600	030895

Special helicopter tools and devices for slinging loads, stringing conductors, and transporting tools and material are available for use with different types of helicopters.

The following is a list of available special tools and devices.

Boxing Glove

A device attached to the end of the lifting line for lifting conductors without damaging them.

Concrete Bucket

Devices used to supply concrete either to the concrete bin or directly to a worksite, depending on the size and location of job.

Concrete Pumping Bin

Large bins used to receive concrete from the helicopter. The concrete can then be pumped from the bin through hoses to the location where it is needed.

The bin is lightweight and designed to be moved by a helicopter when it is empty.

Gin Pole

Appendix G

Portable booms that are transported and placed in the tower using a helicopter. Gin poles are used in building or modifying the tower at locations with difficult access by ground-support equipment.

Hairpin
Devices that allow insulators, tools, and material to be placed on or picked up from the arm of a tower without assistance from climbing personnel.

Needle/Rail

Needles, also known as rails, are devices that allow the helicopter to thread sockline under a bridge of the tower. They are excellent for "V" string construction.

Tool Basket
Devices that allow the helicopter to fly in tools to the worksite and drop them off or pick them up without assistance from ground personnel.

Wire Rack

Devices that handle reels of wire. Racks can handle various wire sizes depending on the weight of wire and the size of reels. (Racks come with two methods of braking.)

External Load "Human" Equipment
The load line, secondary emergency release system, lanyards, and weight bag shall be provided by the helicopter contractor.

Helicopter
Operations Refresher

Presenter's Instructions

Audience

- All Company employees who have been trained in Helicopter external human load work procedures.

Purpose

- To comply with section 1.1 of the helicopter operations manual, which requires helicopter refresher training annually.

Estimated Training Time

30 minutes should be allocated for presentation of this training, including discussion.

Instructor Qualifications

This training must be delivered to eligible workers by their trained supervisor or by their Safety Program Coordinator or their designee.

Before the Training

- Become familiar with the Helicopter Operations Manual.
- Obtain highlighters and pencils for employee use during the discussion.
- Highlight sections of the Handout that you wish to emphasize to aid in presentation of the training.

During the Training

- Provide copies of the attached Helicopter refresher Handout.
- Distribute pencils and highlighters.
- Inform the employees that there will be a test at the end of the discussion. Tell them that they will be able to use their copy of the Helicopter Operations Manual Handout as a reference during the test.
- Cover all of the points in the Handout thoroughly.
- Make sure all of the employees' questions are answered. Follow up with employees if you can't answer their question immediately.

After the Training

- Distribute copies of the attached test. Inform participants that they are expected to achieve at least a 70% score. Remind employees that they can use the Handout as a reference during the test.
- Collect and grade completed tests. Those who do not achieve a 70% score must be retrained, either one-on-one or in a group, and must

- Enter employee training record in Training Server. Maintain tests and other training records in local IIPP file until training is repeated.

Helicopter Operations Refresher

Audience: Any Company employee who performs Helicopter external human load work and their supervisors.

Purpose: This course will provide refresher training for line workers to transfer from a helicopter long line, suspended from under the aircraft to a structure (pole/tower) and ground to ground. The refresher covers safety requirements, tailboards, landing zones, communications, and PIC (Person in Charge), and PPE (personal protective equipment).

Introduction

This training is to fulfill the mandatory annual refresher training requirement, as documented in the Helicopter Operations Manual.

Safety Requirements

Any employee who refuses to follow the procedures and safety requirements of this manual shall be removed immediately from the project.

The decision of the pilot, the person-in-charge (PIC), and the helicopter line worker/s performing the work shall be final in determining and using the safest method for a particular job situation or task. When determining and selecting the best method to use, ensure that safe distances can be maintained between all parts of the helicopter and any energized conductors, de—energized conductors, coworkers, and/or the structure.

If, at any time before or during the performance of the work, the helicopter line worker/s, the PIC, or the pilot, in his or her opinion, believes that dangerous or unsafe conditions exist that could jeopardize the safety of the operation or warrant the abortion of the operation, the helicopter line worker, PIC, or pilot has the right to postpone or stop the operation until those safety concerns have disappeared or have been corrected. These conditions include, but are not limited to, the following:

- Inclement weather conditions.
- Insufficient clearances.
- Exceeding helicopter load limitations.
- Structure or conductor damage that causes safety concerns.
- Any other condition that would adversely affect the safety of the operation.

Safety Requirment: Rules Governing Helicopters and Pilots

Pilots and helicopters assigned to perform work shall comply with all rules pertaining to safe working distances for energized facilities as described in CSP section 1, rule 36

(D) for non qualified electrical workers. Section 4, rule 405 (A) for qualified electrical workers.

Pilots are responsible for knowing and understanding what grounding practices are being applied. Before commencing work, the pilot will verify at least one set of grounds installed in the line section being worked. Helicopter contractors are required to ensure pilots meet the minimum pilot qualifications for performing requested work assignments.

Safety Requirement: Working with Helicopters where Load Lines are Utilized

Helicopters shall maintain a minimum approach distance of 10 feet from conductors, wires or structures. During long line operations, helicopter pilots are responsible for ensuring a marker shall be affixed to the load line to indicate the 10 foot distance. The marker shall be affixed twelve feet from the cargo hook end of the load line to allow the pilot visibility in maintaining adequate safe working distance between the helicopter landing gear and any wire/conductor or structures.

The helicopter pilot shall make a test flight to the area where the helicopter work is to be performed. The helicopter pilot and person in charge shall calculate and verify that the length of load-line selected is adequate to maintain ten foot safe working distance between the helicopter and nearest wire, conductor or structure. This information will be documented in the tailboard briefing notes.

While performing external load (human load and/or cargo load) helicopter procedures, no other work will be performed that has the ability to create an un-safe environment for the pilot or helicopter, i.e. movement of wires/conductors, setting of structures/structure members, pulling lines (sock line/conductors) delivery of tools/equipment etc.

Note: If a synthetic helicopter lift line is not available and a stranded steel line must be used. Class II rubber gloves or a grounding device shall be used when working with a helicopter engaged in sling operations to prevent static electrical build up and discharge.

Section 8.0
Procedures for Helicopter Work
Reprint of
2009 California Safety Manual
Accident Prevention Rules
"NECA Redbook"

Section 8.0
Procedures For Helicopter Work

8.01 Safety

While the Employer and Union recognize that the Employer has sole responsibility for the health and safety of all the workmen on the job, and that helicopter work can be more hazardous than the conventional methods, the following rules and guidelines shall be followed:

(a) Prior to any work being done, a safety meeting will be held by those who will perform the work. Each activity to be performed shall be discussed and clearly understood by everyone. Attendance of each crew member and pilot is mandatory. Proper procedures for entering and exiting the helicopter shall be explained to all employees by the pilot. For the safety and conduct of all personnel, the pilot shall have ultimate responsibility in or around the aircraft

(b) The pilot shall receive signals from only one signal person who is distinguished from the rest of the crew.

(c) When the job includes men working from the skid, a briefing shall be conducted prior to starting work to set forth the plan of operation for that job. This briefing shall include planning to minimize possible hazards of the operation and all personnel exposed shall be informed and directed as to safeguards and escape procedures. Emphasis shall be given to:

(i) Emergency procedures including mechanical failures resulting in autorotation.

(ii) Hazards associated with loose items interfering with main rotor and tail rotor blades.

(iii) Hazards arising from rigging components in external load operations.

(iv) Hot line crossings and clearances to power lines.

(v) Head and hand signals as a means of communication between the pilot and the ground crew during external load operations.

(d) Location of ground personnel on the project and other aircraft in the area will be brought to the attention of the pilot. Communications procedures will be explained and discussed in detail. Input will be requested from all, so as to identify and prevent hazards and operational problems.

(e) The pilot and the lineman have the ultimate decision latitude in determining the safest method to use, given all the circumstances of a particular job situation.

(f) Employees refusing to follow safety procedures shall be immediately removed from the project. Work to be performed with helicopters shall be on a voluntary basis. Employees shall not be discriminated against by the Employer for not volunteering to work with helicopters. If the employees and/or Employer determine the work is being done in an unsafe or unprofessional manner, the work will be discontinued until the unsafe conditions are corrected.

8.02 Equipment and Tools

(a) All equipment and tooling shall be free from defects, and/or excessive wear. Each day, rigging shall be visually inspected by the pilot and men performing the work. If deficiencies are found, the item shall be discarded unless repairs can be made to return its condition to like new quality. Economy shall not govern safety or quality of tools and equipment.

(b) Helicopters shall be FAA certified for the work to be performed. Pilots shall be qualified FAR Part 133, A.B. and C., and Part 135 and demonstrate experience prior to performing such work. Pilot logbooks shall be maintained daily. Helicopter maintenance shall be done in accordance with manufacturer's recommendations and the FAA. Fuel shall be stored in proper fuel tanks and dispensed from same by use of filtering devices. Filter systems shall be of the Go-No-Go Type. The system shall be maintained according to manufacturer's recommended specifications. Passengers shall not remain in helicopters during fueling operations. Fueling shall be done with care so as not to allow contaminants to enter the fueling process. Drips, spills and excess fuel shall be removed from the aircraft immediately. A pre-flight inspection of the helicopter shall take place each day prior to any work being done. A pilot's checklist shall be completed daily. A copy of the checklist shall be kept in the aircraft at all times. Long lines used to carry loads shall be inspected daily and replaced immediately should any damage occur. Cargo release hooks operated by the pilot shall have a manual release device. An audible emergency alert device shall be installed and be operable at all times that the helicopter is in use. The warning sound shall be of sufficient decibels to be heard 100 yards from the aircraft in all directions with the helicopter engine at peak power limits. Communication shall be operable at all times from helicopter to helicopter, helicopter to workmen working below and pilot to passenger. If communications are interrupted, operations shall cease until they are restored.

8.03 Receiving Loads While Working Aloft

(a) Workmen receiving loads while aloft shall be safely tied off to the structure by the use of approved Lineman's safety strap. A suitable hand line shall be carried up the tower by the first workman. They shall have stable footing before receiving any loads from the helicopter. No loose fitting clothes shall be worn that could become entangled in sling load operations.

(b) Loads shall not be hovered directly above the workmen at any time; except that qualified employees may function under such aircraft for that limited period of time necessary to guide, secure, hook or unhook the loads.

When installing large loads such as tower tops and bridges, the use of a positive guide system shall be utilized to limit the employees' exposure to the suspended load.

(d) At NO TIME will there be less than two (2) workmen on the tower.

8.04 Installing Insulators

(The following are some examples of installing insulators. They do not preclude the utilization of another suitable method.)

(a) "V" Strings.

(1) "V" string insulator assemblies shall be installed by the use of a spreader bar of sufficient length to pin each string to the tower attachment point.

(2) The helicopter shall bring the assembly into the tower so that the assembly is horizontally equal to or below the men in the tower.

(3) The men shall not attempt to pin both sides at the same time. The outside end of the arm shall be pinned first. One string shall be permanently pinned before attempting to pin the other string.

(4) One designated signalman shall signal the pilot to lower the spreader bar to place the weight of the assemblies in their permanent position. When the Journeyman has determined the assemblies are secure, they shall disconnect the slings and signal the pilot to depart from the tower.

(b) Dead End Strings.

(1) The designated signalman shall signal the pilot to position the ladder to one side of the permanent dead end attachment point on the tower. The designated signalman shall signal the pilot to release the load when the ladder is secure. The Lineman then attaches safety chains and ground wire, and then descends the ladder and safeties off.

(2) The designated signalman then guides the pilot to attach the insulator string to the permanent attachment point. Once the permanent pin is securely fastened, the designated signalman shall signal the pilot to depart form the tower.

8.05 Installing Conductor Travelers

(The following examples are one method of installing travelers. They do not preclude the utilization of another suitable method.)

(a) Landing Ladder: The helicopter shall come in with ladder as the Lineman guides hooks to the bridge rail and the pilot releases the load when instructed by the designated signalman.

(b) The Lineman then attaches safety chains and ground wire; then they descend the ladder and safety off.

(c) The helicopter then comes with the traveler. At approximately 200 feet away. Designated signalman starts to signal pilot as to how load is in relation to position on ladder. A ground will be attached to the load when it is within reach to drain off static electricity.

(d) The designated signalman then signals to position traveler for attachment to insulators.

(e) When Linemen have successfully completed their task, the

designated signalman will signal to the pilot to slack off slowly on the load and the Linemen then release the rigging.

(f) The Lineman unbelts, goes up the ladder, back onto the arm and belts off to the tower. The helicopter comes back and the Lineman hooks the ladder to the long line, the helicopter then moves the ladder to the next position and the process is then repeated.

8.06 Cargo Loading and Handling.

(a) All cargo shall be loaded and secured under the direction of the pilot or pilot's designee.

(b) No passenger shall be transported in the helicopter with a sling load and no person shall be transported as an external or sling load, except in an emergency.
EXCEPTION: Unless authorized by the F.A.A.

(c) Explosives and other "dangerous materials" shall not be transported except as authorized by F.A.A.

(d) All sling loads, including line-stringing devices, shall be attached only to quick-release devices. Steel or metallic sling ends shall be of the pressed sleeve or swedged eye-type, or equivalent. Tag lines shall be of a length or secured in such a manner that will not allow their being drawn up into the rotors.

(e) Automatic release devices are prohibited in all construction operations where ground crews are used. The devices shall be activated only for actual placement of loads. Electrical release devices shall have meehanical back-up, be checked each day of operation, and be designed to prevent inadvertent operation.

(f) When stringing conductive lines or conductors, there shall be radio communication between the helicopter and the ground crew.

(g) When stringing lines or conductors close to or parallel to energized lines, conductive lines or reels, payout machines, and conductors shall be grounded as required by the High Voltage Electrical Safety Orders. Hoist wires or other gear shall not be attached to any fixed ground structure.
EXCEPTION: When pulling lines or conductors that are allowed to "pay-out" from a container or roll off a reel.

(h) External sling load operations shall not be performed if electrical storms in the immediate vicinity make the work unsafe.

(i) Load landing operations shall not be performed when the pilot or ground crew deems the wind conditions too unsafe.

8.07 Helicopter Entrance and Egress Procedures

(a) After the lineman are belted on to the helicopter via the attach points with the shock lanyard, positioning belt and the proper tools and hardware for the job loaded onboard, the pilot will maneuver the helicopter up next to the structure so that the lineman can place his tools and hardware on the structure and then transfer himself to the structure.

(b) All structures shall be bonded by cable to the helicopter prior to the lineman transferring between the helicopter and the structure. Such bonding will be done utilizing approved cables with spring loaded quick release clamps.

(c) It is extremely important that, whatever the helicopter is bonded to, it must be the same object that the lineman transfers onto. In the case of an isolated static system, grounds from the structure to the wire shall be used if the Lineman cannot safely transfer without coming in contact with the static. If this is the case then the helicopter should be bonded to the wire and then the wire grounded to the structure, in that order.

(d) Once the helicopter is properly bonded and if necessary,

the structure's static grounded, the lineman is ready to start transferring equipment and material to the structure. Every piece of equipment shall be placed onto the structure in a way so as to prevent any contact with the lower phases. Handlines, hoists, grounds, splices, cables all have the potential to come into contact with the phases and must be tied up in a manner to prevent inadvertent release. Everything should also be placed in a manner that does not interfere with the hand and footholds that will be used for the lineman transfer.

(e) The lineman transfer is accomplished by removing his regular belt harness from one D-ring, then refastening the snap onto the other D-ring so that both snaps of the belt are into one D-ring. The lineman shall not leave the harness hanging without refastening it; this will prevent the harness from catching on the aircraft. Once released and with the helicopter in position, the lineman shall unsnap the large carabiner (attached to the shock lanyard) from the helicopter and attach it to the structure, then proceed onto the structure with both hands and feet free. The lineman will then wait in that position until the helicopter has cleared the tower.

(f) Once the lineman has transferred, the pilot will insure that there is nothing hanging frrom the lineman's belt that could possibly get caught on hung up as the helicopter leaves the structure. It is extremely important that the pilot always move away from the structure in a slow and cautious manner so that in the advent of something hanging up, he can maneuver back to the structure and have the lineman free him.

(g) When the lineman is ready to transfer back to the helicopter, the helicopter shall be positioned in the same manner as before. The lineman shall bond the helicopter to the same source and then begin transferring equipment onto the helicopter. It may be necessary at times for the lineman to board the helicopter and, once satisfied, help position equipment into the helicopter. In any case, once equipment is on board the lineman shall transfer to the

helicopter, then safety off. Once this has been completed and the bond cable removed, the pilot will depart the structure in a slow and cautious manner so in the case of a hang-up, he can proceed back to the structure so the lineman can release him. It should also be noted that in the case of a hang-up departing the structure, the helicopter must be re-bonded to prevent accidental static discharge.

(h) It must be noted that during the transfer, the lineman shall never be safetied off to the structure and the helicopter at the same time. The pilot should always have the option of departing the structure at any time for whatever reason. The practice of un-belting his primary safety and then removing his shock lanyard from the helicopter and attaching it to the structure will, in the event of an emergency, prevent the lineman from falling. This also allows the pilot the option of performing an emergency procedure without worrying about the lineman being attached to the helicopter and the tower at the same time.

(i) If followed, these guidelines will minimize the risks involved in these procedures. Again, before the flight begins is the time to analyze a particular situation. If a special condition exists, you may have to deviate slightly to gain more safety, but it should be an exception.

8.08 Working From The Helicopter Skid

(a) Linemen must use a Federal OSHA approved safety harness.

(b) The rear left door shall be removed and the lineman will attach a D-ring to the middle seat belt attach point allowing him to run his belt through the D-ring.

(c) Aircraft CG limits must be observed.

(d) Aircraft performance and controllability must not be in question

prior to the task to be performed. In the case of adverse wind angles, the helicopter will be positioned in the approximate position desired and checked for controllability.

(e) STATIC DISCHARGE: If the purpose of the lift is to place the lineman onto the tower, then the potential static charge will be dissipated by touching the skid to the tower. If the purpose of the lift is to work on an ungrounded item, such as conductor wire or static wire, then the lineman will evaluate the situation and use either hot gloves or jumper cables to bond the helicopter. Jumper cables, once attached, shall be able to be removed with minimal force so as to allow the helicopter to maneuver away if needed.

Attachment “E”

Blasting Plan

“Currently Under review by the CPUC”

Attachment “F”

SDG&E Safety Plan

EAST COUNTY SUBSTATION PROJECT

SAFETY PLAN – ECO 10-100, REV 5

EFFECTIVE November 8, 2012

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APPENDICES

APPENDIX A- INJURY AND ILLNESS PREVENTION PLAN

RULE 1100

INJURY AND ILLNESS PREVENTION PROGRAM

1100. PURPOSE AND SCOPE

This purpose of this program is to outline the seven essential elements of SDG&E's Injury and Illness Prevention Program (IIPP).

NOTE: The requirements of this program apply to SDG&E employees, and are effective on the date of issue.

1101. ELEMENT #1: AUTHORITY AND RESPONSIBILITY FOR THE PROGRAM

A. **Chief Executive Officer**: Has overall authority and responsibility for implementation of the IIPP.

B. **Safety and Environmental Officer**: Provides policy guidance, compliance oversight, and executive safety leadership.

C. **Officers**: Have overall authority and responsibility for program implementation and performance in their areas.

D. **Directors**: Have direct authority and responsibility for program implementation and performance in their areas.

E. **Department Heads/Managers and Supervisors**: Have responsibility for implementing and maintaining the injury and illness program in their work areas and for answering questions about the injury and illness prevention program.

F. **All Employees**: Perform only work they are qualified to do in a safe and efficient manner.

G. **Executive Safety Council**: Review, and/or support company wide initiatives for safety and health as well as remove barriers that inhibit a strong safety program.

H. **Safety and Health Department**: Specifies employee protection, interprets all applicable safety related regulations, creates safety policies and programs, identifies and evaluates workplace hazards, periodically, conducts safety and health assessments, and manages health and safety functions.

1102. ELEMENT #2: PROMOTING COMPLIANCE WITH SAFE AND HEALTHY WORK PRACTICES

A. All employees are responsible for using safe work practices, for following all directives, policies, and procedures, and for assisting in

maintaining a safe work environment. Employees who fail to follow safety procedures and rules are subject to disciplinary action.

B. Management is responsible for ensuring all safety and health policies and procedures are clearly communicated and understood by all employees. Management is expected to enforce the rules fairly and consistently.

C. Personal recognition, as well as award and recognition programs, is used to recognize employees, organizations, and employee safety committees for safety leadership and safe performance. Refer to the Safety Recognition Policy for more details.

D. Our systems of ensuring all levels of employees comply with the rules and maintain a safe work environment include job observations, inspections, audits, incident evaluations, performance appraisals, and safety training as well as those mentioned in the above paragraphs.

E. Compliance deficiencies may indicate the need for additional employee training and/or retraining, revision of policies and procedures, review of equipment and tools, etc.

1103. **ELEMENT #3: COMMUNICATING WITH EMPLOYEES IN A READILY UNDERSTANDABLE FORM**

A. Open, two-way communication between management and employees on safety and health issues is essential to an injury-free, productive workplace. The following system of communication is used to ensure a continuous flow of information is shared:

- Supervisors communicate safety and health information with all employees to whom they provide work direction including office employees.
- Employees report hazards, injuries, and incidents without fear of reprisal of any kind.
- Various committees are as follows with their associated responsibilities:

  a. Executive Safety Council: Communicates to employees at regularly scheduled meetings to gain a deeper understanding of safety at the frontline.

  b. Safety Action Team: Communicate between union and management on health and safety issues.

  c. Local Safety Committees; Create and maintain active interest in their department's safety issues and initiatives.

     i. Safety committees will be established for each department involved in construction, operations, maintenance or other manual work.

ii. Size and representation will be determined by the department. One member of supervision shall be a regular committee member.

iii. Safety committees will meet regularly and documentation of committee meetings, activities, and recommendations will be made in writing and provided to the department head.

- The incident phone tree is used to communicate injuries and incidents.
- Other means of communicating safety and health issues are:

a. Safety and health training, including formal training instructions such as the safety lesson plans and classroom training.

b. Employee newsletter, safety bulletins, posters, Cal-OSHA Log and Summary of Occupational Injuries and Illnesses, Safety Standards, surveys, incident evaluation reports, Safety and Health Department intranet website and MS Outlook public folders.

c. Safety Committee Congress.

d. Safety meetings, department staff meetings and tailgates.

i. Office employees shall receive safety information through department staff meetings, safety meetings and email alerts. The goal is to ensure office employees are provided safety information and opportunities to discuss safety issues

ii. Safety meetings are as follows:

1. Every 10 days for employees engaged in field construction or construction associated activities.

2. Monthly for employees involved in operations, maintenance or other manual work (employee who spend at least 50% of their time in the field).

iii. Tailboard conferences or job briefings will be conducted by crew leaders to enhance understanding of the job plan prior to starting any job or day's work and whenever the job plan changes during the work.

iv. Safety meetings must be recorded on a 5300 form (or the Safety Meeting Record form) and filed locally. Records must be maintained for three years at a designated location within each department.

1104. ELEMENT #4: IDENTIFYING AND EVALUATING WORK HAZARDS

A. Safety inspections are conducted to identify and evaluate hazards and results of inspections will be documented in the Safety Information Management System (SIMS) and communicated to affected employees.

B. Periodic inspections are performed depending on the hazards involved and are conducted at a frequency to ensure workplace safety. At a minimum, inspections should be conducted:

- Daily or weekly depending on project for construction areas and jobs.
- Semiannually for operating bases and office areas.
- Daily for Class A and B vehicles and forklifts

C. When new substances, process, procedures, or equipment which present potential hazards are introduced into our workplace.

D. When workplace conditions warrant an inspection, i.e., new unidentified hazard is recognized, injury or illness occurs, etc.

E. Supervisors routinely observe their area(s) of responsibility and correct at-risk work practices and conditions.

F. Employees shall report immediately any hazardous conditions, defective tools or equipment, or at-risk procedures to their supervisor.

G. In addition, work place hazards and at-risk work practices can be identified through safety committee meetings, safety meetings, job observations, incident statistics and incident evaluation reports, near misses, audits, safety assessments and manufacturer warnings and information.

H. All inspection records are retained in SIMS.

1105. ELEMENT #5: INVESTIGATING OCCUPATIONAL INJURIES AND ILLNESSES

A. Employees report all work-related incidents promptly to their supervisors.

B. Department heads/supervisors will investigate work-related injuries, illnesses, incidents, and near misses to determine underlying/contributing factors and actions necessary to prevent recurrences.

C. Incident evaluation procedures include:

- Proper notification is made.
- Visit the incident scene as soon as possible.
- Interview injured employees and witnesses.
- Examine all factors associated with the incident
- Determine the contributing factors of the incident
- Develop and implement corrective actions to prevent reoccurrence.
- Document the findings and corrective actions using incident evaluation form.

D. Incident evaluation process will conform to Incident Notification, Investigation, and Reporting standard. In addition, for more information, refer to the

Safety and Health department website, the injury and illness reporting section.

1106. **ELEMENT #6: CORRECTING UNSAFE OF UNHEALTHY CONDITIONS, WORK PRACTICES AND PROCEDURES IN A TIMELY MANNER**

A. Unsafe and unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on severity of hazard.

B. Supervisors correct and control identified hazards as soon as practical. When hazards are beyond supervisor's authority, supervisors communicate hazardous conditions with recommended corrective action to management and/or Safety and Health will be contacted for assistance.

C. When a hazard is identified, the following steps are taken:

- Eliminate the hazard source immediately if practical.
- Take immediate temporary action until permanent controls are in place.
- Permanent controls are done in this order:

  i. If practical, build engineering controls into the process and eliminate the hazard. Examples are: use barriers or mechanical guards; provide ventilation; substitute less hazardous substances; change the design; etc.

  ii. Apply administrative controls to reduce or limit employees' exposure to hazards. They include training, personal hygiene, and reduction of employee exposure time.

  iii. Provide personal protective equipment to the employee. It must be correct for the hazard. This includes eye and face protection, protective coveralls, respirators, gloves, foot protection, head protection, etc.

D. When an imminent hazard exists and cannot be abated immediately, all exposed persons must leave the area. Only properly trained and equipped employees are allowed to correct imminent hazards.

E. A serious concealed danger is one which, (1) results from normal company operations, (2) poses a substantial probability of death or great bodily harm, and (3) is not readily apparent to the individual who is likely to be exposed. For these conditions that cannot be corrected immediately, take the following steps:

- Notify and remove the employee(s) and call the Field Safety Advisor.
- Outside normal working hours, contact the SCG message center or SDG&E Trouble Desk and ask for the on-call Field Safety Advisor.
- If corrections cannot be made within 15 days, Safety and Health must report the condition to Cal-OSHA.

F. Records of hazard control actions must be retained by each department for a minimum of three years.

1107. ELEMENT #7: TRAINING AND INSTRUCTIONS

A. All employees, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices as well as on specific hazards associated with employee's job tasks. When employees know how to do their job properly, know the hazards of the job, and understand their supervisor's expectations, they work safely. The required training is provided:

- To all new employees which include training on the IIPP, rules for safe work, notation of all hazardous materials and conditions etc.;
- To all employees given new job assignments for which training has not previously been received;
- Whenever new substances, processes, procedures or equipment are introduced into the workplace and represent a new hazard;
- For supervisors to familiarize them with the safety and health hazards to which employees under their immediate direction and control may be exposed and how to communicate information about those hazards effectively.

B. Training and instruction is provided depending on employees job tasks and may include the following:

- How and when to use personal protective equipment.
- Employee Safety Handbook
- Smith System® defensive driving
- Potential hazards, protective measures and safety practices associated with new job assignments before exposure
- Information on chemical hazards to which employees could be exposed and other hazard communication program information
- Emergency action and fire prevention plans

C. For a listing of all Safety and Health training required and Safety and Health training requirements, go to the Safety Training section of the Safety and Health Department website.

D. Training records must be documented and maintained as required in the Employee Safety Training Standard (G8301).

1108. RECORDKEEPING

A. All inspections are recorded on the SIMS safety inspection checklists. Copies of the SIMS safety inspection checklists can be found at the Safety and Health Department website.

B. Safety and Health training is documented and maintained as required in the Employee Safety Training standard (G8301).

C. Inspection records are maintained for at least three years and in accordance with the company retention policy.

1109. DOCUMENTS

A. The IIPP is the foundation of SDG&E's safety and health program. In addition to the IIPP, other safety and health documents and program are established and must be adhered to, those include but are not limited to:

- Safety Standards
- Safety Lesson Plans,
- SDG&E Employee Safety Handbook,
- SDG&E Safety and Security Policies and Programs Manual,

B. These documents are equivalent in providing required training and information to employees, as outlined in federal, state, and local regulations as well as company policy.

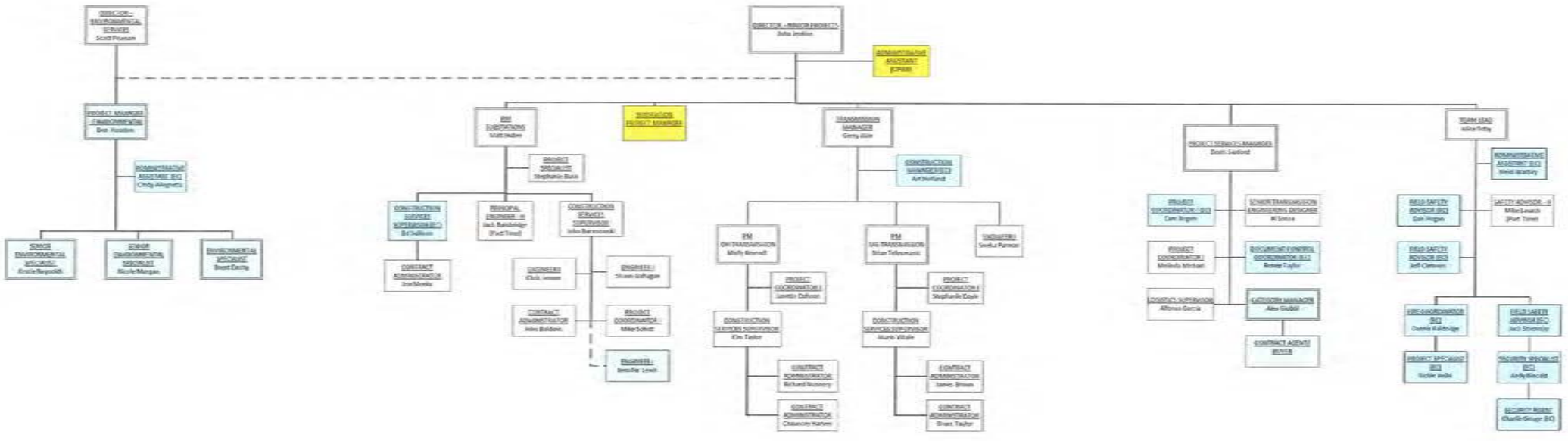
1110. DEFINITIONS

A. **Incident:** Any work related injury, illness, damage, or near miss.

1111. REFERENCES

A. California Code of Regulations, Title 8, Section 3203, Injury and Illness Prevention Program

Major Projects Group



PROJECTS INCLUDED:
ECO & BLVD
SOUTH BAY
SOUTH ORANGE COUNTY RELIABILITY PROJECT
WOOD TO STEEL (ENF)
OTHER SMALLER PROJECTS

SDG&E REGULAR MAJOR PROJ EMPLOYEES:	27
OPEN POSITIONS:	2
SDG&E CONTRACT EMPLOYEES:	12
SDG&E MATRIX EMPLOYEES:	7
TOTAL:	48

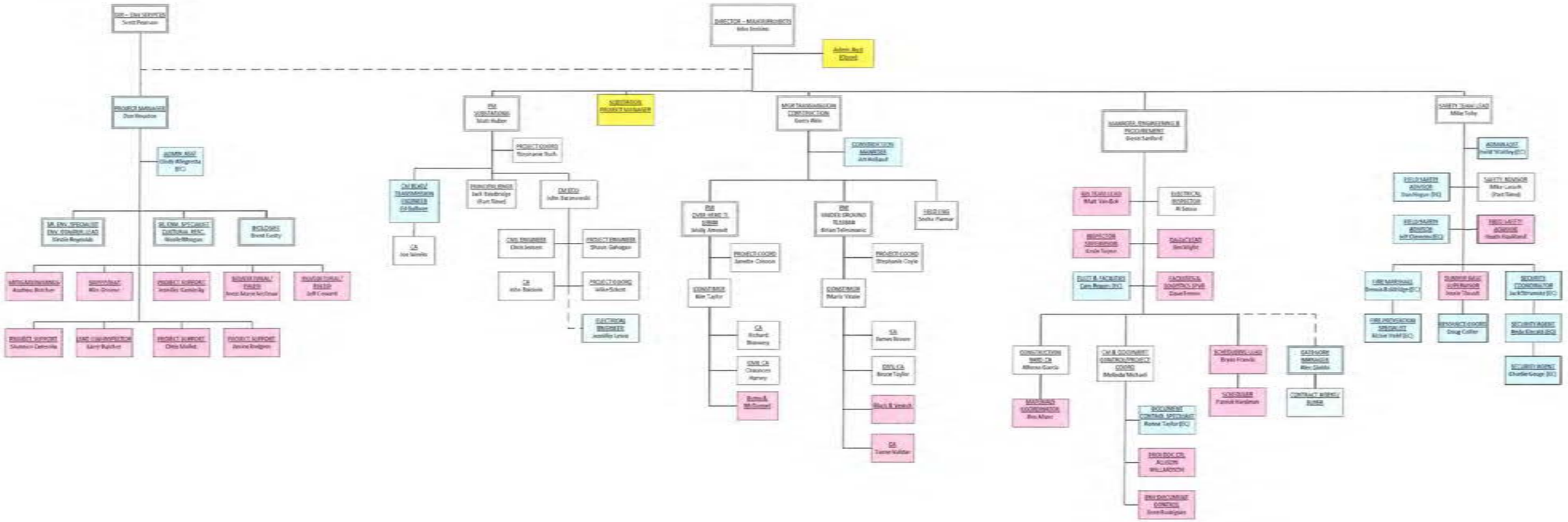
Legend

Open Position

SDG&E Matrix

Employee Contract

Major Projects Group



PROJECTS INCLUDED
ECO & BEYD
SOUTH BAY
SOUTH ORANGE COUNTY RELIABILITY PROJECT
WOOD TO STEEL (DNF)
OTHER SMALLER PROJECTS

SDG&E REGULAR MAJOR PROJ EMPLOYEES:	27
OPEN POSITIONS:	1
SDG&E CONTRACT EMPLOYEES:	13
SDG&E MATRIX EMPLOYEES:	7
CONSULTANTS:	23
TOTAL:	71

Legend

Open Position

SDG&E Position

Employee Contract

Consultant

Open Consultant/ Contractor Position

Major Projects Base Operations Outline for ECO Substation

Major Project Base (Base) is a physical location equipped, staffed and trained to adequately monitor construction field activities (both air & ground) and when needed will provide and/or coordinate emergency response, provide notifications and formally document events.

BASE team members are trained in CPR and emergency response, but will not provide lifesaving medical instructions to any field personnel.

Authority:
Base has been granted authority to implement field communications protocols by SDG&E project leadership, Safety and Corporate Security.

All field personnel are required to comply with check-in, reporting, emergency directions (if given) and follow-up procedures.

Physical Location:
Alpine Headquarters, 1010 Tavern Road, Alpine, CA 90901.

Base Contacts:
Primary Phone……619-717-8118

Jesse Thrush, Base Supervisor…… 619-888-4900

Resources:
BASE continues to collect information and train to assist field and Base personnel so that they are prepared to react quickly in response to any type of incident/event. The Base is equipped with a dedicated phone, printer/fax, computer stations, 800 & 900MHtz radio's, a project version of Google Earth – referred to as "One Touch", GPS flight following technology for project helicopters and GPS ground personnel tracking units.

Additional resources Base has at its disposal:

- Direct line into the Sherriff's communication center otherwise known as 911
- Direct lines to Sherriff's substations along the ROW
- Direct lines to Border Patrol substations
- Direct line to air rescue (ASTREA/Mercy Air Rescue)
- Direct line to SDG&E's emergency dispatch center Sta. Y
- Direct communication with SDGE Field Security Agents patrolling the ROW daily, who provide updates on activity in the field
- Direct communication with security posts at Alpine HQ and Rough Acres Material yards
- Lat/long's of all the tower sites
- Lat /long's of the walk-out rally points
- Direct access to meteorologist
- Variety of weather resources for both aviation and ground
- List of hospitals

- List of clinics
- List of San Diego County Airports
- List of towing companies
- List of 24/7 lock smiths
- Gas station locations along the ROW
- Access to project phone lists and/or leadership personnel

Capabilities:

- Immediately determine worksite locations by long/lat and/or closet road or monument
- Ability to plot a long/lat location quickly
- Ability to convert long/lat to structure #
- Ability to directly contact emergency response agencies quickly
- Ability to direct emergency response agencies by translating long/lats/ into driving directions or helicopter extraction points
- Authorization to request aerial rescue resources
- Through scenario and procedural training the ability to calmly and methodically work through any type of incident/event.
- Ability to broadcast to all field personnel
- Ability to notify specific locations to transmit alerts or notify

Staffing:

Base personnel are trained and equipped to provide a timely response when an incident/event arises. Each member of the team is coached and prepared to deliver quick, calm and effective support in all situations.

The incident and events Base personnel are trained for are fires, severe weather, medical emergencies, criminal activities and aircraft emergencies.

Hours of Operations:

Hours of operation begin at 0600 and continue until the final person is determined to be off of the Right of Way. Phone coverage is maintained 24 hours per day to be available for night crews. Coverage is provided Monday through Saturday and Sundays as needed.

Operating Charter:

BASE will monitor field personnel via radio, phone and GPS systems.

SDG&E, project related, helicopter operations will coordinate with Base on a daily basis and be in constant contact via radio communications.

Project Personnel Safety -

Radio check-in requirements are outlined in the ECO Project Field Communication Policy, and will be strictly enforced. Failure to follow check-in procedures will initiate Emergency action in accordance with Base emergency procedures. These emergency procedures include immediate contact and coordination with emergency responders such as but not limited to S.D County Sherriff's, Air Rescue (Sheriff ASTREA and/or Air ambulance services).

BASE Response to Report of an Incident –

When an incident is reported Base will quickly gather information and determine the response actions necessary. Base will trigger emergency services call immediately when appropriate. Base procedures include but are not limited to:

- Assign/dispatch field security agents and field safety advisors to the scene of an incident/event.

- Start an incident/event timeline as the event unfolds, documenting on or about the time when actions or events happen and;

- Launch a wide variety of notifications to project and SDGE leadership. These notifications are made to different distribution lists Based on level and type of incident/events Notifications made within minutes of an event and contain information on who, what, when, where, action taken and status of the incident/event and;

- Stay in communications with field personnel reporting any incident/event and the emergency response agency until responders reach the target destination. This ensures expeditious response and accurate information.

Timely Emergency Response -

The geography and remoteness of the worksites can pose challenges that result in delays for emergency agencies not familiar with the project right-of-way. For that reason Base is interested in your whereabouts - the more precise and timely information we can relay to emergencies response agencies the faster the response.

Below is a list of incidents and events that Base is trained to assist field personnel with:

- **Vehicles**
  - Mechanical problems
  - Towing Services
  - Locksmith services
  - Motor vehicle accidents (with and/or without injuries)
  - When you are a witness to a motor vehicle accident

- **Criminal**
  - Confrontations with land owner/residents
  - Assault
  - Observation of a crime
  - Recreational Gun Fire
  - Trespassing
  - Vandalism
  - Theft

- **Medical Services**
    - Ground response of medical treatment & transport
    - Evacuation via helicopter
    - Direction of emergency response
    - Assistance with location of local medical facilities
    - Notifications to employer

- **Aircraft**
    - Complaints of a pilot operating unsafely
    - Complaints of a passenger not complying with safety procedures
    - Suspected aircraft safety issues, e.g., equipment issue, rigging
    - Mechanical aircraft problems
    - Aircraft accidents
    - Weather interruptions with aircraft schedules

- **Fire**
    - Reporting of and/or observed smoke
    - Reporting of fire and/or observed proximal to crews
    - Reporting of and/or observed fire – not project related
    - Notification of personnel on ROW
    - Notification of SR Fire Managers
    - Reporting to emergencies response agencies

ECO PROJECT BASE EMERGENCY EVACUATION SCENARIO'S

This document contains risk scenario's ranked moderate to high. ECO BASE personnel are required to exercise against these scenario's at least monthly to ensure proper execution proficiency

Evacuation Scenario's include:

1. Evacuation of a helicopter only remote work site where non-life threatening injuries have occurred to one or more of the personnel.

2. Evacuation of a helicopter only remote work site where life threatening injuries have occurred to one or more of the personnel.

3. Evacuation of a helicopter only remote work site where weather is approaching that may prevent later transport of one or more personnel.

4. Evacuation of a helicopter only remote work site where fire has ether broken out at the work site or fire is nearby and may pose a threat to personnel at the work site.

5. Evacuation assistance is requested by an agency for an event close in proximity but not necessarily connected to Major Project Base.

*note similar scenario's can be exercised for evacuation of site other than helicopter only.

ECO Project Base Procedural Outline

1. Confirm the evacuation request with field supervision and escalate to "priority action"
2. Collect required facts from the requestor
3. Determine and notify appropriate air resource(s) (project aircraft vs. Air Rescue)
4. Provide pilots and/or agencies with required response information and coordination if requested
5. Start an event timeline and further collect facts from the requester
6. Within minutes of the call begin internal notifications including phone and email
7. Provide coordination support if necessary to pilots
8. Continue the plotting timeline of events
9. Provide additional factual and informational updates as required
10. Close out the event
11. Send a final notification
12. Critique the bases response for process improvement

APPENDIX D – CODE OF SAFE PRACTICES

PLATE A-3 CODE OF SAFE PRACTICES

(This is a suggested code. It is general in nature and intended as a basis for preparation by the contractor of a code that fits his/her operations more exactly.)

GENERAL

1. All persons shall follow these safe practices rules, render every possible aid to safe operations, and report all unsafe conditions or practices to the foreman or superintendent.

2. Foremen shall insist on employees observing and obeying every rule, regulation, and order as is necessary to the safe conduct of the work, and shall take such action as is necessary to obtain observance.

3. All employees shall be given frequent accident prevention instructions. Instructions shall be given at least every 10 working days. When applicable, the accident prevention instructions shall also include specific instruction on the safe use, care and maintenance of fall protection equipment (i.e. fall arrest systems, positioning device systems, safety nets, etc.) used at the jobsite.

4. Anyone known to be under the influence of drugs or intoxicating substances which impair the employee's ability to safely perform the assigned duties shall not be allowed on the job while in that condition.

5. Horseplay, scuffling, and other acts which tend to have an adverse influence on the safety or well-being of the employees shall be prohibited.

6. Work shall be well planned and supervised to prevent injuries in the handling of materials and in working together with equipment.

7. No one shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness, or other causes that it might unnecessarily expose the employee or others to injury.

8. Employees shall not enter manholes, underground vaults, chambers, tanks, silos, or other similar places that receive little ventilation, unless it has been determined that it is safe to enter.

9. Employees shall be instructed to ensure that all guards and other protective devices are in proper places and adjusted, and shall report deficiencies promptly to the foreman or superintendent.

10. Crowding or pushing when boarding or leaving any vehicle or other conveyance shall be prohibited.

11. Workers shall not handle or tamper with any electrical equipment, machinery, or air or water lines in a manner not within the scope of their duties, unless they have received instructions from their foreman.

12. All injuries shall be reported promptly to the foreman or superintendent so that arrangements can be made for medical or first aid treatment.

13. When lifting heavy objects, the large muscles of the leg instead of the smaller muscles of the back shall be used.

14. Inappropriate footwear or shoes with thin or badly worn soles shall not be worn.

15. Materials, tools, or other objects shall not be thrown from buildings or structures until proper precautions are taken to protect others from the falling objects.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

History:

1. Amendment filed 4-3-85; effective thirtieth day thereafter (Register 85, No. 14).

2. Amendment of first paragraph and provision number 3. filed 7-30-97; operative 8-29-97 (Register 97, No. 31).

PLATE A-3-a

16. Employees shall cleanse thoroughly after handling hazardous substances, and follow special instructions from authorized sources.

17. Hod carriers should avoid the use of extension ladders when carrying loads. Such ladders may provide adequate strength, but the rung position and rope arrangement make such climbing difficult and hazardous for this trade.

18. Work shall be so arranged that employees are able to face ladder and use both hands while climbing.

19. Gasoline shall not be used for cleaning purposes.

20. No burning, welding, or other source of ignition shall be applied to any enclosed tank or vessel, even if there are some openings, until it has first been determined that no possibility of explosion exists, and authority for the work is obtained from the foreman or superintendent.

21. Any damage to scaffolds, false work, or other supporting structures shall be immediately reported to the foreman and repaired before use.

USE OF TOOLS AND EQUIPMENT

22. All tools and equipment shall be maintained in good condition.

23. Damaged tools or equipment shall be removed from service and tagged "DEFECTIVE."

24. Pipe or Stillson wrenches shall not be used as a substitute for other wrenches.

25. Only appropriate tools shall be used for the job.

26. Wrenches shall not be altered by the addition of handle-extensions or "cheaters."

27. Files shall be equipped with handles and not used to punch or pry.

28. A screwdriver shall not be used as a chisel.

29. Wheelbarrows shall not be pushed with handles in an upright position.

30. Portable electric tools shall not be lifted or lowered by means of the power cord. Ropes shall be used.

31. Electric cords shall not be exposed to damage from vehicles.

32. In locations where the use of a portable power tool is difficult, the tool shall be supported by means of a rope or similar support of adequate strength.

MACHINERY AND VEHICLES

33. Only authorized persons shall operate machinery or equipment.

34. Loose or frayed clothing, or long hair, dangling ties, finger rings, etc., shall not be worn around moving machinery or other sources of entanglement.

35. Machinery shall not be serviced, repaired or adjusted while in operation, nor shall oiling of moving parts be attempted, except on equipment that is designed or fitted with safeguards to protect the person performing the work.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

History:

1. Amendment filed 4-3-85; effective thirtieth day thereafter (Register 85, No. 14).

PLATE A-3-b

36. Where appropriate, lock-out procedures shall be used.

37. Employees shall not work under vehicles supported by jacks or chain hoists, without protective blocking that will prevent injury if jacks or hoists should fail.

38. Air hoses shall not be disconnected at compressors until hose line has been bled.

39. All excavations shall be visually inspected before backfilling, to ensure that it is safe to backfill.

40. Excavating equipment shall not be operated near tops of cuts, banks, and cliffs if employees are working below.

41. Tractors, bulldozers, scrapers and carryalls shall not operate where there is possibility of overturning in dangerous areas like edges of deep fills, cut banks, and steep slopes.

42. When loading where there is a probability of dangerous slides or movement of material, the wheels or treads of loading equipment, other than that riding on rails, should be turned in the direction which will facilitate escape in

case of danger, except in a situation where this position of the wheels or treads would cause a greater operational hazard.

BLASTING OPERATIONS

1. Cases that have contained explosives shall be destroyed by burning out-of-doors. Do not burn in a stove or furnace.

2. Shoes with nails or metal plates shall not be worn in magazines or near explosives.

3. Blasting caps shall only be carried in approved containers.

4. The least amount of proper strength explosive that will do the job effectively shall be used.

5. Detonators and primers shall be separated from the explosives until it is necessary to bring them together in preparing for the blast.

6. Holes loaded during a shift should be fired during that shift.

7. The operations of loading and firing should be carried out with as few workers as possible.

8. Drill holes shall be blown out and made ready before explosives are brought to the site.

9. In tamping explosives, steady, even pressure should be used.

10. For electric blasting, the following shall apply:

(a) Tight electrical connections.

(b) No short circuits or breaks in the wires.

(c) Enough current to fire all shots.

(d) A strong, properly-applied force when using a blasting machine operated by physical effort.

(e) Care not to damage the insulation of wires when tamping charges.

11. If misfires occur, the licensed blaster shall be contacted.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section142.3, Labor Code.

History:

1. Amendment filed 4-3-85; effective thirtieth day thereafter (Register 85, No. 14).

2. Amendment filed 8-29-86; effective thirtieth day thereafter (Register 86, No. 39).

East County Substation (ECO) Project
Field Communications Guidance –Construction Phase
Revision 1a – Effective August 24, 2012

Ensuring the safety for all employees is critical for the ECO Project. Creating guidance around routine and emergency communication, identifying who needs training and the devices that will be used are all important elements for employee safety. This communications plan is a key element to ensuring employee safety while working in the field.

Purpose: The purpose of this document is to explain how communications will be used during the construction phase of the ECO Project (ECO). This guidance document is to ensure that all ECO employees have an effective means of communication and understand their roles and responsibilities as they pertain to communication on the ECO Project.

Definitions:

Project Personnel – refers to all persons engaged in project activities on the ECO Project, including employees of SDG&E, Burns & McDonnell, Beta Engineering, and all associated subcontractors.

ECO or Project: The East County Substation Project that includes the ECO Substation, Boulevard Substation, the transmission line between ECO Substation and Boulevard Substation and the transmission loop-in of the existing Southwest Powerlink (SWPL) into the ECO Substation.

Base – A project communications organization established at Alpine Headquarters to monitor construction field activities (both air & ground). When needed, Base will provide and/or coordinate emergency response, provide notifications and formally document events.

POC – Point of Contact. Employee designated at each work site that will interact with BASE during the shift. These individuals shall ensure they have a functioning communications device capable of being in contact with Base at all times. The preferable communications device is a 900 MHz radio.

Field **–** Project sites along the right of way, including construction yards, access roads, substations, material yards and fly yards.

Device – 900 MHz, Tracplus personal GPS, satellite phone or an employee's assigned or personal cellular phone.

Requirement

Employees working in a crew or group shall identify their POC for the day. Employees who are working in the field, acting as a POC for project personnel, must have a communication device capable of service at all points on the ROW with them at all times. A 900 MHz radio is the preferred device. The 900 MHz system and handhelds have been tested and is considered the primary and most reliable means of communications from the field to Base. It is the responsibility of the field employees to ensure there is a POC for their work site and that they have an effective means of communications from their work site to Base. This generally is accomplished by way of the morning safety tailgate and including a start- of-the-day radio check. **If a 900MHz radio is lost or stolen, Base must be immediately notified and requested to contact Project Security for follow-up.**

ECO Project Radio System:

Base has several radio systems in service for construction support.

- 900 MHz - Primary communication method
- 450 MHz – Sometimes referred to as "wire-stringing" radios are typically line-of-site or point-to-point radios and should be used for work task coordination.
- More information is available for Tracplus GPS, Satellite phones and other devices listed in the document.

900 MHz System:

The 900 MHz system has been set up for wide-area coverage from Alpine to the Imperial Valley.

RADIO DISPLAY NAME	PURPOSE
SPL MSTR	Wide area communications
SPL 1	Project Area coverage

BASE can currently monitor and work **only** on the master talk group. POC's and/or project employees with overall work site responsibilities shall monitor and maintain two-way communications with BASE on the master talk group. **BASE cannot monitor radio traffic on SPL-1**.

900 MHz HAND-HELD EMERGENCY/RED BUTTON – the button located on the top of each hand-held radio should NOT be used to hail help for ECO emergencies (See emergency section below). The button if activated may actually delay emergency resources and requires the reset from the SDG&E Trouble department (aka Station Y). Should this button be activated for any reason, you **must** contact BASE immediately to advise them of the situation. **Do not turn off your radio.**

All employees must adhere to the Safe Use of Portable Electronic Devices Policy For your safety, DO NOT DRIVE while distracted by any means. It is against the law to text or talk on a cell phone (without hands free) while driving.

Communication Devices & Training

All employees whose job requires them to work in the field must be trained and familiar with the operational capabilities of the communication devices that apply to their specific job tasks and the specific areas.

Safety and/or BASE in collaboration with SDG&E Telecom will make training available to employees. Training requires face-to-face training time with someone from Safety, BASE or Telecom. Generally one business day notice is required to arrange training.

Devices:

- Hand-held 900 MHz radios (Primary means of communication)

- Cell phones (including camera and text messaging) (Secondary means of communication)

Alternate devices:

- Satellite phones (Alternate means of communication)
- Truck mounted 900 MHz radios (Alternate means of communication)
- Person to person radios (stringing radios) (Alternate means of communication)
- Mobile Data Terminals (MDT) (Alternate means of communication)
- Tracplus field personnel GPS Device

For more information on 900 MHz radios see the Use of Company Radio (900 MHz), Electric Standard Practice No. 108.

Equipment Check-out/Check-in:

BASE requires one business day notice to reserve equipment.

- Each employee must reserve a device from BASE. Each individual checking out a device(s) must have a brief operational review and sign for the equipment.
- It is the responsibility of the ECO employees to verify that the communication devices are working properly prior to and once at the work site.
- Each employee will sign for and be responsible for the equipment and accessories. No notice is required for checking back in equipment.
- Each individual and his organization will be responsible for lost equipment and/or obviously abused equipment.

Daily Communications Requirements by Construction Work Groups:

Overhead Work Sites on the Right of Way

Where crews or groups of people will be working at one general location, a single point of contact (POC) will be designated at the beginning of the shift (after the tailgate meeting). The POC will communicate with BASE during the work shift. The POC shall be someone who will be physically located at the work site at all times and is responsible for monitoring the radio and maintaining a communications link with BASE. If the POC needs to leave the worksite while employees are still present, a new POC will be designated. Prior to the pass down the new/replacement POC will contact BASE with a brief informational update that includes; name, radio unit number, cell phone number.

Boulevard and ECO Substations and Under Ground Work Sites

The designated person in charge will check in with Base at beginning and end of shift. The designated person in charge will insure all personnel are accounted for before checking out at end of shift.

Employees Working Individually or in a Group of two

Employees working solo are required to check in when entering the ROW in an unpopulated area. This group shall also check-out with Base once back in a populated work area or leaving the project ROW.

Non-project Employees and/or Visitors to the Project

Non-project employees and visitors shall be escorted by a project employee equipped with a functional communication device.

Base Daily Communications (POC)

- Just prior to entering any project site, contact the Base to provide notification that you are entering the Project. **Radio is the preferred method for reporting your presence and location**. Use a secondary device only if the radio is not working, cell phone where coverage is available. Provide your name, your intended work location(s), number of people in your crew/group, contact information, and your vehicle number if applicable. During the work day crews or groups larger than two working at a fixed location for the entire day shall, at a minimum, check in at the beginning of the shift and check out at the end of the shift.
- All *POC's* for Crews and/or smaller groups leaving the project area during the work day MUST notify Base prior to, or while in the process of leaving the ROW/Work site.
- POC's must monitor the radio to hear emergency traffic and other important communications.

Contact information for the Base is as follows:

- By Radio: 900MHz Base - Talk group: SPL-MSTR
- By Phone: (619) 717-8118

For non-emergencies - If the Base cannot be reached for any reason, please contact

- Jesse Thrush 619-888-4900
- Mike Toby 619-209-9076

Base Responsibilities

Base has the responsibility to monitor field employee status at work sites along the ROW for the purpose of notifying emergency agencies and coordinating an emergency response when needed. BASE is prepared with emergency contact information, emergency response and internal notification procedures during an incident. Base will work with the reporting party in the field to manage the appropriate response. Base will assume incident command unless otherwise assigned by project leadership.

Field Emergencies

It is the responsibility of all field employees to report and work with BASE to resolve field emergencies. Primarily it is the responsibility of the field work site POC to notify and work collaboratively with BASE to resolve field emergencies. Field events include but are not limited to: construction accidents, employee illness/injury while in the field, other observed public incidents like wild land fire, vehicle incident, acts of violence, security threats/breaches, theft and sabotage.

Note: Potential Safety Zones and Emergency Walk-out Routes have been identified for remote project locations and are available to download into a GPS unit via OneTouch or through ECO Safety. Depending on the nature of the emergency these safety zones and walk-out routes may be the most expeditious way to leave the site or shelter in place.

When a Field Emergency Occurs - Reporting

For privacy reasons the reporting of an emergency to Base should be done via phone if at all possible. If it is not possible the 900 MHz radio is acceptable, however NO NAMES OR IDENTIFIYING INFORMATION ABOUT THE INJURED MAY BE GIVEN OVER THE RADIO! The Base contact number is 619 717- 8118.

When reporting an emergency by Phone

1. Call Base at 619-717-8118 and state that you are reporting an emergency
2. Stay as calm as possible and provide a brief report about the emergency
3. Prepare to stay on the phone with Base team member until help arrives or unless directed by Base to end the call.

When reporting an emergency by Radio

1. Hail Base and state that you are reporting an emergency
2. Wait for Base to acknowledge your transmission.
3. Stay as calm as possible and provide a brief report about the emergency
4. Prepare to stay on the Radio with Base team member until help arrives or unless directed to end the transmission by Base.
5. NO NAMES OR IDENTIFYING INFORMATION OF THE INJURED MAY BE GIVEN OVER THE RADIO!

During a field emergency Base is prepared to provide help from a variety of resources. Base coordinators will work with the reporting party to gather information and initiate the appropriate response. Resources include internal field safety personnel, internal field security agents, City & County Fire resources, San Diego County Sheriff, San Diego County Sheriff's Search & Rescue (Astrea), Mercy Air Trauma Patient transport and internal helicopter services.

Upon confirmation of an emergency BASE will initiate event notifications to a variety of internal sources.

If an emergency occurs after you have notified Base that you have left the jobsite and Base has shut down for the day (i.e. when traveling home), you may reach a team member of Base after hours by calling the Base contact number 619-717-8118.

Emergency Reporting Directory:

1) Base (First Call Priority):

- **By Phone: (619) 717-8118**
- **By Radio: 900mhz Major Projects Base – Talk group: S SPL MSTR**

2) SDG&E Trouble department (aka "Station Y") this is the backup if Base can't be reached.

By Radio: 900mhz Station Y Talk group 1G – DSP S
By Phone: (619) 725-5199

3) Dial "911" (as a last resort in case of emergency only)

Below are listed important facilities, agencies, and departments for easy reference. Always report work related injuries/illnesses to Base and your supervisor prior to securing care at any health facility.

1) Area Hospitals and Urgent Care Facilities

- Sharp Grossmont Hospital
  5555 Grossmont Center Drive
  La Mesa, CA 91942
  619-740-6000 General
  - Heliport

- Urgent Care of East San Diego County
  Monday – Friday 8:15 – 17:30 Saturday – Sunday 9:00 – 15:45
  1625 East Main Street
  El Cajon, CA 92021-5240
  619-442-9896

- Southern Indian Health Council
  Monday – Friday 8:00 – 12:00; 13:00 – 16:00
  4058 Willows Road
  Alpine, CA 92901
  800-400-1189

- Southern Indian Health Council
  Monday – Friday 8:00 – 12:00; 13:00 – 16:00
  36350 Church Road
  Campo, CA 91906
  619-445-1188

2. Law Enforcement

Sheriff (SD County)

- Alpine station (619) 659-2600
- Boulevard/Jacumba substation (619) 766-4585
- Campo substation (619) 478-5378
- Pine Valley (619) 473-8774

Sheriff (Imperial County)

- El Centro (760) 339-6301

California Highway Patrol (CHP)

- El Cajon (619) 401-2000

US Border Patrol (619) 652-9966 Ext: 100

3. Fire Agencies

- Cal Fire (Monte Vista) (619) 590-3100

4. Other Governmental Agencies

- US Forest Service (619) 445-6235
- BLM (El Centro) (760) 337-4400
- Cal Trans (619) 688-6699
- DigAlert (800) 227-2600

In addition, employees should have the following SDG&E Emergency Contact phone numbers available at all times:

- ECO Safety 858-637-7930
- SDG&E Safety 858-654-1895
- Sempra Security 619-725-8611
- Sempra Claims 858-650-4100
- Media Relations 877-866-2066
- Community Relations 877-775-6818
- SDG&E Labor Relations 858-637-7924/619-890-1020

- Emergency Operations Center (EOC) Primary Site 858-636-6920
- Emergency Operations Center (EOC) Alternate Site 858-574-7076
- Employee Identification Badges/Access Control 619-696-2013
- Fleet (for breakdowns-Cam Rogers) 858-503-5014
- Gas Control 323-266-5800

Emergency Contact Card

All SDG&E employees must ensure their emergency contact data in MyInfo is accurate. Contract employees working under SDG&E supervision must fill out and keep current at all times, an Emergency Contact Card which will be kept on file at Base. All Contractors and Consultants must ensure they have current emergency contact information for all their employees.

Employee Incident & Injury Reporting (SDG&E EMPLOYEES)

All SDG&E ECO Project employees are responsible for reporting any office, field and/or vehicle incident, minor injury or close call to their Supervisor immediately after said occurrence. If incident occurs in the field, employee will follow emergency reporting protocol above; i.e. immediately notify the BASE, Following initial notification, the reporting of incidents and/or injuries will be done in accordance with Rule 1800 Incident and Injury Reporting. Supervisors will ensure timely communication up through their chain of command and with Disability Management and Project Safety & Compliance. Project leadership will share information on serious incidents and injuries through an established phone tree. Incidents will be recorded per Safety Rule 1800 in the Safety Incident Management System (SIMS).

Contractor Incident Reporting and Investigation

Contractors and Consultants will immediately notify the SDG&E Project Manager or other primary contact, by the most effective means, of all safety incidents including near misses, vehicle incidents, first-aids, OSHA recordables, hospitalization, property damage in excess of $25,000, any serious incident resulting in death, and any project related theft or vandalism. A written summary of the incident will be also be submitted within 24 hours and a complete incident investigation report will be submitted within 20 calendar days of the incident. Contractor/Consultant shall cooperate with SDG&E and responsible Governmental Authorities with respect to their independent investigations of the incident.

Appendix F-1
ECO Substation Project
Safe Worker and Environmental Awareness Program (SWEAP)

Visitor Form

(Under Development)

ENTERPRISE – TRAINING FORM 5300

INSTRUCTIONS

Last Updated: 09/10/08

For Facilitator Only: Upon completion of training, make a copy of this form. File the original at the facility where the training was conducted. Send the copy to [illegible] Enterprise Training Administrator for Enterprise entry. [illegible] Refer to the detailed instructions on pages 5 and 6 for more information, including documenting make-up sessions [illegible] **Date Routed to Training Admin:** ______ **Initials:** ______	**For Training Administrator Only:** Input to Enterprise within [illegible] days of training date [illegible] [illegible] Refer to the detailed instructions on pages 5 and 6 for more information including proper [illegible] make-up sessions in Enterprise [illegible] **Date Input to Enterprise:** ______ **Initials:** ______

TRAINING DATE & LOCATION INFORMATION

Date(s): ____________ **Facility/Room:** ____________ **Vendor/Company Name:** ____________ (if applicable)

COURSE INFORMATION

Course Code	Course Title	Course Time	Facilitator	Delivery Method*	Session ID # Entered by Training Admin Only
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		
		Begin: End:	Name: Emp ID #:		

* **Delivery Method Key:** B = Bypass C = Computer Based (CD-ROM) E = External F = Facilitator Led-Internal O = On-the-Job S = Self-Study V = Video W = Web Based (e-Learning).

SEE NEXT PAGE FOR PARTICIPANT INFORMATION

ENTERPRISE – TRAINING FORM 5300

PARTICIPANT INFORMATION Facility/Room:_____ Vendor/Company: _____

	Employee ID #	Name (Printed)	Signature	Work Facility (e.g., Kearny, Pico, etc.)	Supervisor	Today's Date	Course Grade*
1							
2							
3							
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* Course Grade Column for Facilitator Only: P = Pass F = Fail I = Incomplete NS = No Show

Appendix G - Hazard Communications Program

HAZARD COMMUNICATION PROGRAM (HAZ-COM)

Purpose

The Haz-com program provides employees with information and training on hazardous substances in the workplace. This Hazard Communication Program does not apply to employees who use consumer products except when consumer products are used in a duration and frequency of exposure greater than normal consumers' experience.

Program

- Hazardous Substance Evaluation
- Approval of new materials/substances
- Product Approval Request Form
- Periodic evaluations

Material Safety Data Sheets and Hazardous Substance Inventories

- Current and complete MSDSs
- Master inventory of hazardous substances
- MSDS availability for employees

Labeling

- Containers
- Transferring to secondary container

Hazardous Substances Information and Training

- Training prior to exposure and use
- Training when new hazardous substances are introduced

Contractors

- Contractors informed
- SDG&E approval of Contractors' hazardous substances

Proposition 65 Warnings

Proposition 65 prohibits the exposure of any individual to a chemical known to the State of California to cause cancer, birth defects or reproductive harm, without first providing a "clear and reasonable warning." Visible warning signs shall be present at any location of the project where there is exposure or possible exposure to a prop 65 chemical.

Responsibilities

Supervisors

- Plan, review and document control measures and emergency response procedures
- Ensure new hazardous substances are approved (see 1.1 above)
- Ensure Contractors receive Hazmat info(2.3.1), and Contractors info is provided to SDG&E(1.15 and 1.16)
- Ensure labeling of containers
- Ensure employees know location of Hazcom program and MSDS
- Provide employees with Hazmat info and training
- Provide employees assigned to new or non-routine task Hazmat info and training
- Provide employees, working on or near areas where there may be UXO, identification, potential hazards, safety precautions that will be taken.

Employees

- Attend Hazcom training
- Use only approved substances
- Review label, sign, fact sheet, and MSDS info
- Follow safety procedures
- Use and maintain PPE
- Use approved container labels
- Responsibility for own chemical safety
- Inform supervisor of injury/illness

Contract Administrators/Project Managers

- Ensure Contractors are provided with info regarding hazardous substances
- Obtain info of substances brought in by Contractors

Environmental Coordinator/Stores Function

- Provides proper management of hazardous materials and wastes
- Advises dept. heads and Field Environmental Specialist of Hazmat and waste matters requiring corrective action
- Ensures product approval process is followed
- Verifies containers have proper labeling prior to release

Field Environmental Monitor or designated site representative

- Provides assistance and guidance regarding proper management of Hazmat and waste
- Conducts and maintains records of required Hazcom training
- Ensures training records are entered into record keeping system

- Participates in annual chemical inventories for designated facilities

Environmental Services

- Reviews MSDS and Product Approval Request forms for proposed materials and/or their containers, approves or prohibits materials, establishes protective measures for the environment and returns MSDS and Product Approval Request form to Safety

Material ordering departments

- Requests MSDS on all orders placed with the supplier

Safety Department

- Coordinates the product approval process for proposed materials
- Ensures approved products are entered into 3E Company database
- Monitors compliance and provides assistance with this program

APPENDIX H – East County Substation Project
CONSTRUCTION FIRE PREVENTION PLAN

EAST COUNTY SUBSTATION PROJECT
CONSTRUCTION FIRE PREVENTION PLAN

ESP – 113.1 (Revised)

Electric Standard Practice – 113.1
'Wildland Fire Prevention & Fire Safety'

Electric Distribution Engineering is publishing this standard after being revised by the SDG&E Fire Coordinator.

- Various changes and revisions throughout this standard

If you have any questions regarding this Standard Practice, please contact:

- Hal Mortier at (858) 654-8683 or **HMortier@semprautilities.com**
- Gaspare Ciaravino §Vino at (858) 654-8250 or **GCiaravino@semprautilities.com**

PROJECT CHECKLIST

Use 'Tab Key' to navigate form

Date: July 5, 2012

Originator: Hal Mortier

Project Title:
WILDLAND FIRE PREVENTION & FIRE SAFETY

The attached document pertains to: (Select one of the following from the drop-down menu)

Standard Practice Number: 113.1

Synopsis of change (for distribution cover sheet)

☒ See attached '**NEW / REVISED**' cover sheet.

Sponsoring Department:

Other (Select one of the following from the drop-down menu)

If Other, Describe: SDG&E Fire Coordinator

Individuals Involved in Development and/or Revision:

Hal Mortier

Training Requirements: (Describe how the training will be conducted)

All Districts, please review this revised Electric Standard Practice with all district field personnel at your next Safety Meeting. To be completed within 30 days of Effective Date.

Reviewed By: _____ **Approved By:** _____

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION
GENERAL PRACTICES

SUBJECT TITLE
WILDLAND FIRE PREVENTION & FIRE SAFETY

REVISION HISTORY

This Electric Standard Practice has been revised by the SDG&E Fire Program Manager.

1.0 PURPOSE

1.1 Southern California presents one of the most dangerous natural wildland fuel scenarios and explosive fire weather potential in the world. The period for active fire conditions can exist all year long depending on rainfall totals and other dynamic weather factors. The fall months and at times extending into early winter historically host the region's largest fires. Extended dry periods can bring us into or back into critical fire conditions essentially any time of the year. SDG&E facilities, equipment, and activities can present a potential wildland fire ignition risk which must be minimized to the extent reasonably possible. In the event a fire occurs, we must also be equipped to suppress small fires, thus potentially preventing a major fire. Most importantly, we must provide the resources and training necessary to keep our employees safe while working in the wildland areas. This plan is for all system Operations & Maintenance work and can be used for low complexity Construction projects when additional mitigation is not required (see 4.7 SDG&E PROJECT SPECIFIC FIRE PLANS). The intent of this document is to formalize procedures and routine practices that will:

1.1.1 Assist SDG&E employees in their understanding of fire prevention and to improve their ability to prevent the start of any fire. The emphasis will be on wildland fires, especially during the critical times of the year when the fire risk is high.

1.1.2 Set standards for certain tools and equipment to be present in our vehicles and on our work sites, when performing identified high risk work activities. This will assist with rapid response to small fires in the event one should occur.

1.1.3 Incorporate State, Federal, and local requirements into our standard way of doing business to provide compliance with rules and regulations on a daily basis no matter where our work is taking place. This would include, but not be limited to: pertinent laws, Forest Standard Practice Regulations, and "Special Use Permit" or "Right of Way" fire related requirements.

1.1.4 Define or reference restrictions mandated by "Red Flag Warnings", "Project Activity Levels", or other unique fire danger scenarios. Provide the means for determining when these restrictions are in effect, what activities they prohibit, the precise locations to which they apply; and identify the notification procedures for all affected employees and contractors. (See TMC 1320)

1.1.5 Establish communication requirements when working in the wildland areas.

1.1.6 Discuss procedure to identify when a Construction project specific "Fire Plan" is required and the process for developing the document. (See 4.7)

1.1.7 Share some common sense practices, with regards to fire safety, that should be used in all activities to reduce the risk of fires and to prevent injury to employees as a result of fire.

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION
GENERAL PRACTICES

SUBJECT TITLE
WILDLAND FIRE PREVENTION & FIRE SAFETY

2.0 APPLICABILITY

2.1 This applies to SDG&E field personnel who will work in the wildland areas of the service territory during the periods described that are conducive to wildland fire occurrence. This also includes Distribution and Transmission operating personnel who will be involved with field personnel in regards to safety, system reliability and/or restoration. Contractors performing work for SDG&E will be expected to comply with this Standard Practice as it relates to their activities as well.

3.0 DEFINITIONS

Wildland Areas: This term refers to any area within the SDG&E service territory that has wildland fuels available for ignition.

3.1 **Fire Threat Zone (FTZ):** This is a CALFIRE developed rating of wildland threat based on a combination of potential fire behavior (fuel rank) and expected fire frequency. SDG&E has established practices within the FTZ on how SDG&E constructs facilities and also determines certain construction practices to be used within the FTZ. See attachment 1.

3.2 **SDG&E High Risk Fire Areas (HRFA):** This area will be an assortment of GIS polygons that represent the zones of greatest concern within the SDG&E service territory, blending fuels, topography, wind, and system information. (The areas can change annually and the map will be labeled with the appropriate year, “SDG&E 20XX Highest Risk Fire Area” and is always a subset of the Fire Threat Zone). The HRFA helps to determine how SDG&E operates the electric system, as a function of weather conditions. See attachment 2.

3.3 **Fire Season:** Fire season is no longer officially designated by the wildland fire agencies. California is considered to be in fire season on a year long basis. CAL FIRE adjusts their staffing patterns as fire conditions moderate or escalate and this can be used as an indicator of potential fire activity.

3.4 **Elevated Fire Condition:** The SDG&E Fire Preparedness Plan uses a combination of live fuel moisture content information, other fuel condition data and input from Fire Coordination and SDG&E Meteorology to enter into what is termed “Elevated Fire Condition”. This condition is usually achieved during the month of August or September and is curtailed later the same year, or early the next year, with the arrival of substantial rain.

3.5 **Elevated Wind Condition**: This condition occurs when the combination of high wind and lower Relative Humidity’s necessitate an increase staffing or staging, but not to the level of a Red Flag Warning.

Red Flag Warning Condition (RFW): The National Weather Service will declare a RFW for;

- Wind- if the relative humidity is 15% or less with sustained winds equal to or greater than 25 mph, or frequent gusts equal to or greater than 35 mph for a period of 6 hours or more.
- Dry Lightning- for a lightning event that is not accompanied by enough precipitation to significantly wet fuels that have been identified as critically dry. This is common within the inland and mountain zones.

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

Project Activity Levels: This is a federal program designed to reduce the risk of fire starts during forest related work on high fire danger days and only applies to work on the Cleveland National Forest. (See 4.8)

3.6 **Pulaski:** The Pulaski is an axe-like fire hand tool used primarily for cutting or grubbing forest fuels. See Section 4.3.1.

3.7 **McLeod:** The McLeod is a fire hand tool used for raking and scraping forest fuels. See Section

3.8 **Backpack Pump:** A backpack pump is a portable 5 gallon water pack with hose and nozzle used for extinguishing Class A fire and particularly wildland fires. They can be rubber collapsible packs or stainless steel canisters.

3.9 **Major Operations Work Area:** It will be considered a Major Operations Work Area when work activities or staging of resources will be concentrated in and out of a staging facility or site, conducted over multiple days and generally involves multiple crews and resources.

3.10 **SDG&E Incident Commander (IC):** The SDG&E IC will be the positively identified single point of contact for all SDG&E resources (people and equipment) on an emergency incident. The appropriate line authority will identify who the IC will be on moderate or complex incidents. "First-in" supervisor will generally be the IC on low complexity incidents. The IC will be responsible for integrating SDG&E resources into the larger incident structure by serving as the single point of contact for SDG&E to the overall incident.

3.11 **SDG&E EOC:** The Emergency Operations Center (EOC) is activated to varying degrees, depending on the complexity of the incident. It is intended to be a support to the emergency management personnel and houses the Officer in Charge (OIC) in major incidents.

3.12 **Operations & Maintenance (O&M):** O&M refers to post construction care and maintenance of SDG&E facilities.

3.13 **Low Complexity:** This refers to projects that are routine in nature, involve few resources, and have no extraordinary fire risk present.

3.14 **Fire Box:** A fire box can be placed in a staging area or worksite to supplement available fire suppression equipment when necessary due to excessive work activity. It generally contains additional handtools and/or backpack pumps as deemed appropriate.

3.15 **Fire Patrol:** Also referred to as Fire Watch or Guard; is a designated person assigned specifically to assess and mitigate fire risk, observe for immediate detection of fire starts, have fire equipment readily available, and insure rapid extinguishment of fires. No special qualifications required.

3.16 **SDG&E Fire Coordinator (FC):** The SDG&E Fire Coordinator serves as a conduit or liaison to the emergency service agencies, including fire and law enforcement, for the utilities on emergency incidents. The FC will help the emergency service agencies obtain their needs related to the utility and represent the utility needs to the emergency service agencies.

3.17 **Grass Cured:** This is grass that is dry (generally yellow or light brown in color) and is at its highest danger for fire ignition and spread.

3.18 **Hazardous Areas:** Any "wildland" or unincorporated area within SDG&E service territory identified by the State Division of Forestry as being particularly susceptible to the danger of fire during certain seasons of the year.

4.0 PROCEDURE

4.1 EQUIPMENT & FACILITY RISK:

4.1.1 The nature of utility equipment operations and facilities can pose a fire risk. As a result there are laws and regulations governing utilities in this regard. The following Public Resource Code (PRC) sections exist to reduce utility specific risks involved with wildland fire. SDG&E is proactive, insuring compliance with each of these on a continual basis.

- PRC Section 4290 - Regulations Implementing Minimum Fire Safety Standards Related to Defensible Space Applicable to State Responsibility Lands.
- PRC Section 4291 – Reduction of Fire Hazards Around Buildings.
- PRC Section 4292 – Power Line Hazard Reduction, 10' ground clearance around power poles with non-exempt hardware.
- PRC Section 4293 – Power Line Radial Clearance Required, between vegetation and conductors, 4' for 2,400-71,999 volts, 6' for 72,000-109,999 volts, and 10' for 110,000 and above.

4.1.2 Some departments are assigned the responsibility for compliance with these regulations. The SDG&E Vegetation Management Program, in the Construction Services Department, has an extensive tree pruning and removal program to provide adequate line clearance. They also treat all non-exempt power poles in the specified area to maintain the 10' clearance required by PRC 4292. Personnel from Land Services, Facilities, and Fire Coordination work together to meet defensible space requirements, as well as other fuel hazard reduction measures where applicable. **However, it is the responsibility of all SDG&E employees and contractors to support the company's efforts to comply with these regulations.**

4.2 ACTIVITIES THAT POSE A FIRE RISK:

4.2.1 The Control Centers, Dispatch Center, and Fire Coordinator will provide general information to SDG&E employees regarding general fire condition status. When working in the SDG&E FTZ on any warm and dry day and in particular during the "Elevated Operating Condition", the following SDG&E related activities present a risk of fire ignition. Although not prohibited, extra caution is critical during the performance of any of these activities.

4.2.1.1 Working on energized electrical equipment or facilities located within the SDG&E Wildland Fire Area.

4.2.1.2 Any off-pavement vehicle use.

4.2.1.3 On-highway work activities that are located adjacent to particularly hazardous wildland fuel conditions.

4.2.1.4 Chain saw use of any kind.

4.2.1.5 Operation of generators, pumps, augers, compressors, two-cycle motors, or other equipment capable of producing sparks or ample exhaust heat to cause ignition.

4.2.1.6 Other tree removal equipment including but not limited to grinders, chippers, skidders, excavators, etc.

4.2.1.7 Grinding and welding

4.2.1.8 Blasting or other explosive work

4.2.1.9 Smoking

4.3 TOOLS AND EQUIPMENT:

4.3.1 When working in the FTZ identified on the attachment 1; the following tools and equipment will be carried on the vehicles described, when engaged in any of the work activities discussed above. If other fire risks are identified specific to your work project in these same areas, these standards should be applied as well. This does not apply to transient traffic driving on primary road beds through the wildland areas. These items will meet the California Forest Practice Rules; Public Resource Code Division 4, Chapter 6. Making this equipment available at your work sites will also meet the majority of the requirements mandated by the wildland fire agencies within the company service territory. Some additional project specific or weather specific requirements may be necessary and will be discussed later in this plan. Please note that if work project is over 50' from the vehicle location, the mandated equipment should be removed from the vehicle and staged at the work site.

Shovel

Pulaski

MCleod

Indian Pump

Stainless Steel Pump

4.3.2 Passenger Vehicles (performing work in the wildland areas);

- 1 round point shovel with overall length of at least 46”
- 1 serviceable fire extinguisher, minimum U.L. rated “2 BC”; rating found on fire extinguisher label (a “2” rated extinguisher will put out apprx. 2 sq. ft. of combustible material and BC indicates it will work on flammable liquids and is non-conductive for electrical fires)

4.3.3 Trucks & 4 Wheel Drive Vehicles;

- 1 round point shovel with overall length of at least 46”
- 1 axe or “Pulaski” (see picture above)
- 1 (5) gallon backpack pump (see pictures above) or a “2 BC” rated extinguisher; rating found on fire extinguisher label (a “2” rated extinguisher will put out apprx. 2 sq. ft. of combustible material and “BC” indicates it will work on flammable liquids and is non- conductive for electrical fires)

4.3.4 Heavy Machinery or Equipment (including tub grinders, whole tree chippers, drilling rigs, tractors, etc.);

- 1 round point shovel with overall length of at least 46”
- 1 axe or “Pulaski” (see picture above)
- 1 (5) gallon backpack pump (see picture above) or fully charged U.L. rated “4 BC” or larger fire extinguisher; rating found on fire extinguisher label (a “4” rated extinguisher will put out apprx. 4 sq. ft. of combustible material and “BC” indicates it will work on flammable liquids and is non-conductive for electrical fires)

4.3.5 Chain Saw Use;

- 1 shovel within 25 feet of the chainsaw operation with unrestricted access to the tool.
- or 1 serviceable UL rated 2BC fire extinguisher in their immediate possession.

4.3.6 Major Operations Work Area (fire toolbox should be located on site, accessible to all, sealed, labeled, and in addition to vehicle equipment requirements);

- 1 (5) gallon backpack pump (see picture above)
- 2 axes or “Pulaskis” (see picture above)
- 2 “McLeod “ fire tools (see picture above)
- Round point shovels 46” for each employee assigned to work site

4.3.7 Optional Considerations for particularly Hazardous Areas where additional measures are warranted (discuss with Fire Coordinator if applicable);

- Water Supply, recommended 1500 gal. minimum (Tank, truck, or hydrant)
- Fire Hose (and associated fire accessories)
- Dozer or Tractor (capable of producing fire line in an emergency situation if safe to do so.)
- Small Fire Engine or Patrol with 1 or 2 personnel equipped with pump, accessories and a Minimum of 150 gallons of water

4.3.8 Helicopter Operations; Primary helicopter staging areas will be treated similar to other staging areas as far as fire equipment. When working with Temporary Staging Access Pads (TSAP) adequate firefighting equipment shall be carried on the helicopter and made available to personnel working on the ground at those sites.

4.4 FIRE PREVENTION & FIRE SAFETY CONSIDERATIONS:

NOTE: The following Safety considerations will help to reduce the risk of fire start (Fire Prevention), as well as provide for the safety of company employees while working in the wildland areas (Fire Safety).

4.4.1 **Fire Prevention**

4.4.1.1 On projects in the SDG&E FTZ, conduct and document a formal “Tailgate Meeting” addressing the fire concerns as part of the “Tailgate Meeting”. Have regular tailgate meetings for the duration of the project to include fire safety discussions. As usual, these documents must be retained at the district for three years, including formal **Fire Plans** when required.

4.4.1.2 Smoke only in designated smoking areas or in a 10’ clearing void of all grass and other vegetation.

4.4.1.3 Idling or parking in areas of brush, grass, or vegetation litter is prohibited.

4.4.1.4 Consider work hour restrictions where applicable, limiting exposure during the heat of the day and taking forecasted wind conditions into account as well.

4.4.1.5 Use a “Fire Patrol” (person specifically dedicated to mitigate fire hazards, observe for immediate detection of fire starts, and coordinate rapid response for extinguishment) on high fire danger days (days that are warm, dry, and/or windy and present a likelihood for wildfire). Their duties would include: verification of compliance with the **fire plan**, observation of activities for fire prevention & safety, and checking the work area after the day’s activities have been completed.

4.4.1.6 Provide vegetation clearance or reduction around particularly hazardous work activities or work areas. Use special mitigation, as appropriate, to reduce the hazard, following all environmental protocols. Clear 10' circle to mineral soil around compressors, generators, and other equipment when required to use them in the FTZ or provide a non-combustible ground cover 10' diameter minimum.

4.4.1.7 Follow all special requirements associated with Red Flag Warnings (section 4.5), Project Activity Levels (section 4.6), and site specific Project Specific **Fire Plans**.

4.4.1.8 Have all required tools & equipment off the vehicle and on-site or within 50' of the work location, readily available for use when vehicle is 50' or more from actual work site.

4.4.1.9 Ensure exhaust systems are clear of vegetation and other combustible debris before operation of portable equipment.

4.4.1.10 When it is possible, wet down adjacent vegetation when performing at risk work.

CAUTION: DO NOT UNDER ESTIMATE THE ABILITY OF A FIRE TO QUICKLY SPREAD TO AN UNMANAGEABLE SIZE.

4.4.2 **Fire Safety**

4.4.2.1 Use proper Personal Protective Equipment (P.P.E); standard SDG&E requirements apply. When working within or adjacent to uncontrolled fire perimeter company issued fire resistant clothing should be worn. Respiratory protection (painter's mask or bandana) is recommended as well.

4.4.2.2 When working on or adjacent to a wildland fire, positive communications must be maintained internally using SDG&E work protocols. It is critical that employees have the ability to communicate with fire agencies as well, both for reporting fires and for the exchange of critical information for the duration of an incident. Cross communication with the fire agencies is the responsibility of the SDG&E Incident Commander (single point of contact assigned to manage all SDG&E resources), the Fire Coordinator (FC), or the On-Site (pre-designated work supervisor for affected area) Supervisor in the absence of a Fire Coordinator or SDG&E Incident Commander.

4.4.2.3 Know what the fire is doing at all times, observe personally or be in direct communication with a competent person (IC, FC, or On-Site Supervisor) who is monitoring fire activity.

4.4.2.4 Work within the Incident Command System (ICS) while assigned to a fire incident. Understand the chain of command for the incident and who you are accountable to. Check in and check out when entering an uncontrolled fire perimeter after it is determined to be safe by the IC, FC, or On-Site Supervisor.

4.4.2.5 Pre evaluate/designate safety zones (areas large enough to provide a safe retreat) and escape routes (safe access to these safety zones) when working in the wildland areas during high fire danger days.

4.4.2.6 Get proper rest and adequate water during extended fire activity to avoid fatigue and help prevent accidents and/or injuries. It is recommended that you receive an average of 1 hour rest for every 2 hours worked. An individual in hot, dry weather may require up to 1 to 2 gallons of water per day.

4.4.2.7 Exercise extreme caution when driving within a fire area and/or in smoky conditions. Be aware of falling rocks, trees, and other debris as well as road obstructions and other traffic. Keep driving speeds down when visibility is limited.

4.5 **RED FLAG WARNINGS:**

4.5.1 Red Flag Warnings (RFW); a joint effort between state, federal and local fire agencies, was brought about after a very catastrophic 1970 Southern California fire season. The intent is to pass along critical fire weather information to users and occupants in the wildland areas to bring about more prudent actions in all their wildland related activities. The National Weather Service (NWS) is responsible for declaring RFW and identifying the period of time to which they apply. There are currently two criteria established for RFW by the NWS (see definitions). The SDG&E service territory falls into multiple weather zones identified by the NWS and RFW requirements of this document will apply to each zone identified in a declared RFW including Imperial Valley when applicable. Currently SDG&E is operating under the direction of TMC1320 (aka DOP3013, ESP109), SDG&E Fire Preparedness, which addresses specifically the actions SDG&E will take with regard to Red Flag Warnings. The Operations Shift Supervisor (OSS) at Grid Operations will make notifications to company personnel; the following are field related considerations during a declared RFW.

4.5.1.1 All transmission and distribution lines within the SDG&E Wildland Fire Area will not be tested without patrol for the duration of the RFW.

4.5.1.2 A fireguard *(fire patrol)* will be assigned to any operation that could cause a fire. See Section 4.4.1.5.

4.5.1.3 All non-critical line clearance tree pruning and removal activities will cease. (Hand pruning activities are permissible)

4.5.1.4 All Blasting will be discontinued.

4.5.1.5 All grinding and welding will discontinue, except in enclosed buildings or within areas cleared of all flammable material for a radius of 15 feet.

4.5.1.6 Vehicular travel will be restricted to cleared roads except in case of an emergency. In no case will vehicles with hot exhaust systems be driven over or parked in grassy areas.

4.5.1.7 Smoking will not be permitted.

4.5.2 **In addition to these requirements a good rule is; all non-critical "at risk" work should not be done during a RFW except for that work which creates a greater hazard if not accomplished.**

DEPARTMENT	DIVISION	EFFECTIVE DATE
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SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

4.6 **PROJECT ACTIVITY LEVELS:**

4.6.1 The United States Forest Service has a program it utilizes to reduce the risk of fire on National Forest land, particularly in the timber or mountain areas. It is referred to as Project Activity Levels *(PAL's).* Each day, at 4:00 p.m., the PAL level will be determined for the following day. It may be a different level for different geographic areas of the county. This information will be available by calling (619) 557-5262 *(U.S. Forest Service Dispatch)*. Although the intent of the PAL system is to reduce the risk of fire start from timber harvesting activities, restrictions should apply to any potential fire starting activities. The Cleveland National Forest is collaborating with SDG&E to establish Project Activity Levels specific to utility Operation & Maintenance activities and the restrictions and/or appropriate mitigation for each level are detailed in Attachment 2. SDG&E work activities must comply with the guidance of this document or exceptions approved by an appropriate Forest Service Line Officer. The On-duty Fire Coordinator can be used to help discern PAL requirements on a case by case basis.

4.7 **SDG&E PROJECT SPECIFIC FIRE PLANS:**

NOTE: This fire prevention and fire safety standard practice will be sufficient for most routine work conducted by company employees and contractors performing work for SDG&E. On larger more complex work projects and major construction activities in the **Fire Threat Zone**, a project specific "Fire Plan" may be recommended. The Fire Coordinator should be consulted to review the magnitude of your project and determine if a fire plan is needed. A standard template is available from the Fire Coordinator that can be used to help determine;

4.7.1 If a Project Specific **Fire Plan** is required for your particular work activity.

4.7.2 What work activity restrictions will be necessary over and above those required of this plan

4.7.3 What mitigations will be necessary to reduce fire risk potential, specific to that project.

4.7.4 What special tools or equipment are required to be available at work site

4.7.5 What involvement the company Fire Coordinator(s) needs to have in assisting with development and implementation of your Project Specific **Fire Plan**

4.7.6 If an inspection by the jurisdictional fire department for the area of your project is required, recommended, or not necessary.

4.7.7 Any additional site specific instructions or requirements.

4.8 **OTHER CRITICAL FIRE DANGER PROCLAMATIONS:**

4.8.1 The Fire Chiefs with jurisdictional responsibility for a given area have the authority to proclaim certain restrictions in extreme fire conditions or when they are experiencing a critical shortage of resources. These cases will be very rare and it will be incumbent on them to insure we are informed of any temporary changes in fire restrictions for a particular area. Upon notification we would be required to comply as appropriate.

4.9 **RECOMMENDED FIRE RELATED TRAINING:**

4.9.1 It is recommended that all field employees have basic fire safety training and T/D Compliance Training on an annual basis. Managers should assess individually whether an employees work activities would cause this training to be mandatory using the existing ESCMP training tracking system to monitor compliance. This can be accomplished in one hour at a routine safety meeting just prior to fire season. For those employees who are likely to be asked to work within or immediately adjacent to an uncontrolled fire area, the following additional training is recommended: Two hours of Fire Safety, Incident Command System Basic Training, and Basic Fire Behavior. For supervisors, managers, and company officers, who could be assigned as the SDG&E Incident Commander or EOC "Officer in Charge" on a major incident, additional advanced Incident Command System training is recommended. The Fire Coordinator will provide this training or assist with arranging qualified instruction. The fire coordinator may bring in additional qualified instructors, or qualify additional SDG&E employees as instructors, using the "train the trainer" approach to assist with this effort. Documentation of this training shall be done by the work supervisors and recorded in the employees training records.

4.10 **EOC AND CONTROL CENTERS:**

4.10.1 Service Dispatch, Electric Distribution Operations, Electric Grid Operations, & EOC play a vital role in any fire emergency. Communications with these groups, when applicable, is critical. Provide information updates and feedback to each of these groups as their areas of responsibility become affected. This should continue through the duration of the incident.

4.10.2 Early notification to the EOC of potential activation is recommended when appropriate. Notification procedures are identified in ESP 113 FIRE COORDINATION and should be followed as prescribed.

4.11 FIRE COORDINATION:

4.11.1 SDG&E has established three permanent positions in the Fire Coordination group, (1) Fire Program Manager and (2) Fire Coordinators. They are essentially the company liaison to the fire services, both during an emergency and in the course of daily business. Back-up coordinators are available as well to cover off time for the primary coordinators and for when multiple incidents occur. Questions regarding this plan or other fire related inquiries should be made through the Fire Program Manager or Fire Coordination group. The Fire Coordination group would be a key contact for other fire related training as well.

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

5.0 REFERENCES

5.1 State Forest Standard Practice Act (http://www.fire.ca.gov/resource_mgt/downloads/2009_Forest_Practice_Rules_and_Act.pdf)

5.2 TMC 1320 (aka DOP3013, ESP109 – SDG&E Fire Conditions)

5.3 ESP 113 – FIRE COORDINATION

5.4 Power Line Fire Prevention Field Guide – 2008 edition (http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fppguidepdf126.pdf)

6.0 ATTACHMENTS

6.1 Attachment 1: Service Territory with SDG&E 2012 Highest Fire Risk Areas & FTZ

6.2 Attachment 2: CNF Utility specific Project Activity Level guidance matrix (Under development, to be attached in next revision)

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

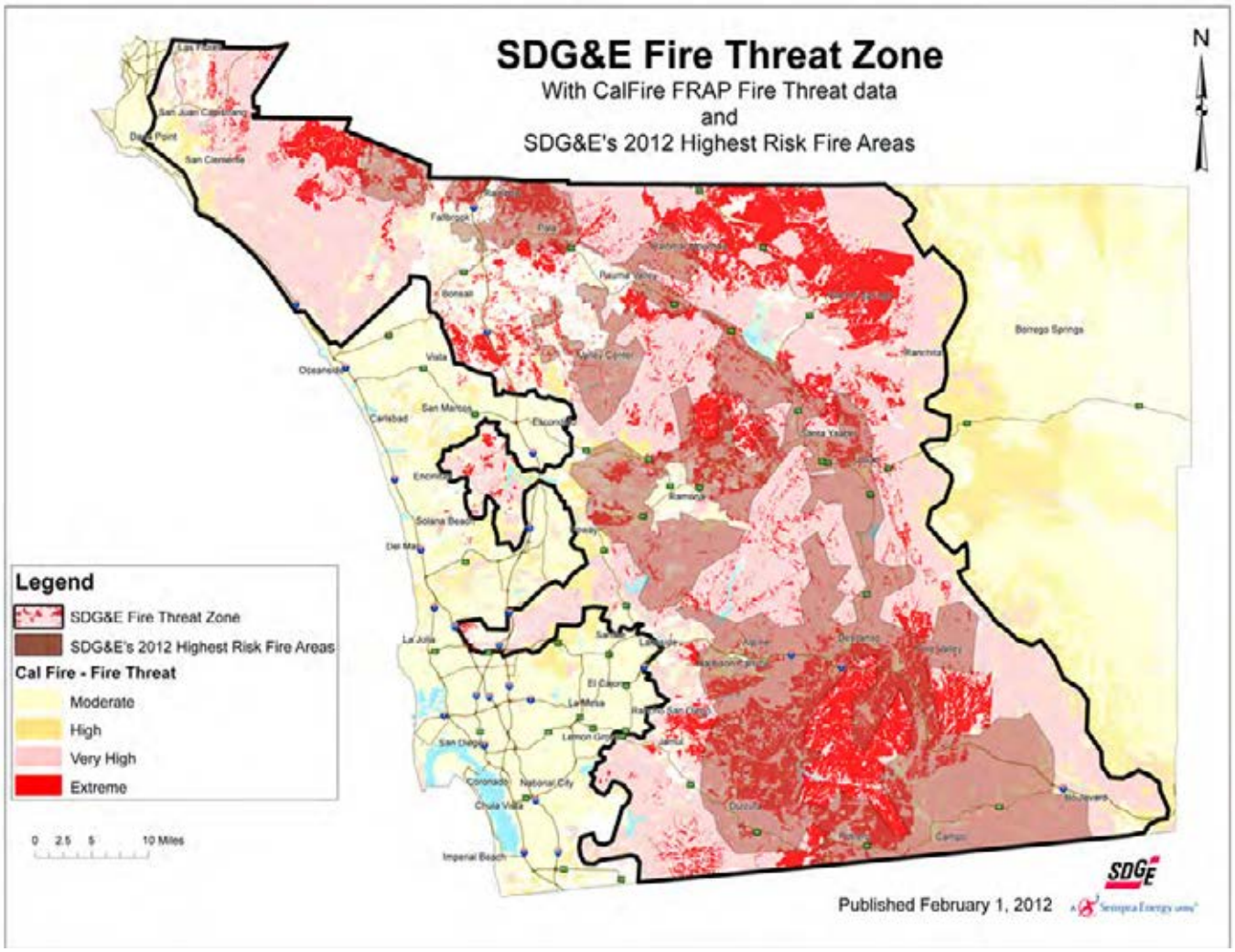
SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

ATTACHMENT 1



ISSUED BY	APPROVED BY
HAL MORTIER/GASPARE CIARAVINO, VINO	*MICHAEL J COLBURN*

DEPARTMENT	DIVISION	EFFECTIVE DATE
TRANS. & DISTRIB. ENGINEERING	DISTRIBUTION ENGINEERING	JULY 05, 2012

SECTION

GENERAL PRACTICES

SUBJECT TITLE

WILDLAND FIRE PREVENTION & FIRE SAFETY

ATTACHMENT 2

Under development, to be attached in next revision

ISSUED BY	APPROVED BY
HAL MORTIER/GASPARE CIARAVINO, VINO	*MICHAEL J COLBURN*

East County Substation Project

Helicopter Flight Safety Protocol

Passenger Transport

The safe transport of personnel in helicopters is of the highest priority. Utilizing standard procedures for transport will ensure safe and efficient transportation of personnel. All passengers must take general helicopter safety training and have the appropriate authorization prior to boarding.

External Load Operations

As a general rule, only the pilot(s) shall be aboard helicopters when conducting external load operations. The only exception is when another person:

- Is a flight crewmember;
- Is a flight crewmember trainee;
- Performs an essential function in connection with the external-load operation; or
- Is necessary to accomplish the work activity directly associated with that operation.

The pilot shall ensure that all persons are briefed before takeoff on all pertinent procedures to be followed (including normal, abnormal, and emergency procedures) and equipment to be used during the external-load operation. The pilot has the final authority regarding all aspects of external load operations.

Arrival of personnel at the fly yard

The person in charge of any group of people needing helicopter transportation shall report to the assigned pilot. The person in charge should give the pilot a list of the people with accurate weights, including all personal gear and cargo to be transported. Passengers should be appropriately clothed and ready for transportation.

Passenger Safety Briefings

Prior to boarding the helicopter for the first flight of the day, the pilot will give a safety briefing to every passenger. This briefing will cover all elements included in the Helicopter Safety Briefing (Exhibit A). The pilot must:

- Ensure that instructions are clear and understood.
- Ensure in-flight emergency procedures are covered.
- Ensure all questions are answered to the satisfaction of the passengers.

Loading Procedures after Safety Briefing
After the safety briefing has been given, proceed with the following loading procedures:

- Only qualified, designated loaders are authorized to load cargo onto the aircraft;
- Explosives, flammables, firearms, or other dangerous materials are prohibited from carriage on all SDG&E contracted aircraft.
- Personal items carried on board must be adequately secured;
- Carry all materials to or from the helicopter in a horizontal position not above waist level;
- Prior to approaching the helicopter, remove items which might impede proper fastening of seatbelts/shoulder harnesses; these items must be placed and secured in an appropriate area;
- Stay in safe area prescribed by pilot or other authorized personnel until given the direction to load;
- Do not wear hats or loose clothing that can blow away;
- Do not carry any item in a vertical position;
- Approach only from the front of the helicopter and, when able, remain in sight of the pilot—NEVER go behind or under the tail boom;
- First person into the helicopter passenger compartment should move as far in as possible, or to the seat assigned by the Pilot;
- Find seat belt and fasten; if unable, advise the helicopter pilot who will assist;
- Ensure that personal protective equipment is properly worn (that is, sleeves rolled down and collars up, earplugs inserted).
- Large gear such as fire tools should be handled by the pilot or designated personnel;
- Ensure that all personnel understand the instructions given by the Pilot.

CAUTION: When opening hinged doors (not on sliding tracks) to embark/disembark passengers, keep one hand on the door at all times until the door is securely re-latched.

In-Flight Precautions:

- No smoking at any time;
- Keep clear of controls: DO NOT TOUCH controls, except in an emergency. If the pilot is incapacitated, a passenger may shut down the fuel and electrical supply;
- Secure all items, especially when flying with the door(s) off;
- Be aware of emergency exit procedures. If in doubt, ask the pilot.

Unloading Procedures.

- Only qualified, designated loaders are authorized to unload cargo from the aircraft;
- Off-loading during shutdown of helicopter should be avoided;
- Wait for the pilot to give a clear signal for offloading;
- Doors should be opened only at direction of the pilot;
- Remove seat belts, refasten, and lay them on the seat when exiting.
- Maintain tight control of all personal items. If an item is lost, **do not** go after it.
- Exit the helicopter slowly and use the departure route indicated by the Pilot.
- After leaving the helicopter, move to an area clear of the helicopter's departure flight path.

Exhibit A: Helicopter Safety Briefing Checklist

General Information

- **Pilot Certification:** Pilots are pre-qualified and have current certifications for aircraft type and mission.
- **Aircraft:** Only aircraft approved for the mission will be utilized.
- **Idle chatter:** During takeoffs and landings there should be no idle chatter that might distract the pilot.
- **Nature of Mission:** The pilot will be briefed on the nature and sequence of the mission(s).
- **Analysis of Known Hazards:** Known hazards discussed; high-level recon prior to descent to low-level.
- **Pilot-in-Command (PIC) Concept:** The pilot shall not be pressured into doing anything he/she feels is unsafe. The pilot has final say in all landing decisions.
- **Hazardous Materials:** Hazardous Materials are not allowed on any ECO project flight.
- **Smoking:** Do not smoke within 50 feet of a helicopter, fuel storage, fuel tanker or fueling operation.
- **Helicopter Passenger Briefing:** Pilot must brief all passengers prior to flight; all passengers should be briefed in a group rather than individually.

Personal Protective Equipment:

- Appropriate Clothing (long-sleeved shirt and pants, or flight suit)
- Leather work boots
- Hearing Protection
- Eye Protection (preferably goggles)

Approach and departure paths:

- Board and depart only on instruction from the pilot.
- Keep in pilot's field of vision at all times where possible.
- Always approach and leave the helicopter in plain view of the pilot—never from the rear.
- Always approach and leave the helicopter from the down slope (lower) side, as directed by the pilot—never approach or leave from higher ground than that of the helicopter.
- Do not approach or leave a helicopter while its engines are running unless the pilot signals that it is safe to do so. Do not run.
- Stay well clear of landing area when helicopter is landing or departing
- Stay away from the main and tail rotors.
- Do not wear hats, caps, or loose fitting clothing. Do not reach up for, or chase any unsecured item.
- Never go around, under, or near the tail of a helicopter.
- When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and tail rotors.

Tools and Equipment:

- Secure hand tools and equipment awaiting transport.
- Keep landing and hovering areas clear of loose and lightweight materials.
- Make assignments for carrying tools/equipment to/from helicopter.
- Carry all tools/materials parallel to the ground and never above waist level—never on your shoulder.
- All tools and equipment shall be loaded/unloaded by qualified personnel.
- Portable Radios must be turned off.
- Helicopter Doors: Be aware of location and normal operation.

In-Flight Discipline:

- Follow the instructions of the pilot.
- Loose items are not permitted inside of aircraft. All items must be secured and manageable.
- All carry-on items must be secured in aircraft or cargo compartment.
- Never throw any object from the helicopter.
- Use seat belts during take-off, flight, and landing. Unbuckle only when directed to do so by pilot.
- Remain seated the entire time you are aboard.
- Do not talk unnecessarily to the pilot.
- Watch for other airborne aircraft and navigational hazards and call them to the attention of the pilot. Communicate location by clock-hand method based on 12 o'clock as the nose of the aircraft. i.e. Do you see aircraft at 3 o'clock? If no response ask again until confirmed.
- Keep clear of the flight controls at all times.
- Leave doors closed; wait for pilot's instruction to exit aircraft.
- Know location and operation of first aid kit, survival kit, fire extinguisher, ELT (Emergency Locator Transmitter), fuel and battery shutoff switches, and radio.

In-Flight Emergency Procedures

- Follow instructions of Pilot.
- Tighten seat belt and shoulder harness; secure gear.
- Emergency Seating Position WITH SHOULDER HARNESS (four point OR single diagonal strap): sit in full upright position with head and back pressed against seat and use arms to brace in position. If time permits and so equipped, lock the inertia reel.
- Emergency Seating Position WITH LAP BELT ONLY: bend over as far as possible and hold onto your legs.
- Emergency Exits: Location and emergency operation.
- Know the escape procedure at each operational site.
- If able, assist any injured person who cannot leave the aircraft on their own.
- Move clear of the aircraft only after rotor blades stop or when instructed to do so by the pilot.
- Assess situation, follow pilot's instructions, render first aid, remove first aid kit, survival kit, radio, ELT and fire extinguisher.

Always be alert and keep safety first!

Appendix I-2 – Helicopter Operations Code of Safe Practices

Code of Safe Practices

Contractor shall strictly adhere to the minimum Code of Safe Practices involving the use of a helicopter as stipulated in Article 35, Helicopter Operations, in subchapter 4, Construction Safety Orders, provided in CAL/OSHA Title 8, and included in Appendix L.

1. Do not approach or leave a helicopter while its engines are running unless in a crouched position and the pilot or pilot's designee signals that it is safe to do so.

2. Always approach and leave the helicopter in plain view of the pilot or as directed by the pilot's designee; never from the rear.

3. Approach and leave the helicopter on a level with the craft or a lower level, never from or to higher ground than that of the helicopter.

4. Wear goggles and head protection with chin strap under the chin when in the vicinity of an operating helicopter. Loose-fitting clothing likely to flap in the downwash and possibly be snagged on the hoist line shall not be worn.

5. Load all cargo and secure it to the satisfaction of the pilot or pilot's designee.

6. Do not put tag lines on sling loads without the pilot's or pilot's designee's permission and limit their numbers, their placement, and their lengths to the pilot's satisfaction.

7. Do not place explosives, flammables, or other dangerous materials on board any aircraft without the pilot's knowledge.

8. Carry all materials to or from the helicopter in a horizontal position not above waist level.

9. Do not stand directly under a hovering helicopter longer than necessary to hook-up or unhook the load.

10. Always watch the helicopter, sling load, hook, or bottom end of the cable to avoid being hit.

11. Know the escape procedure at each operation site.

12. Keep landing and hovering areas clear of loose and lightweight materials.

13. Notify the person in charge of the project when erecting a suspended line, tower or other navigational hazard.

14. Turn off radio transmitter when in vicinity of explosives or explosive loading operations.

15. Passengers transported by helicopter shall be instructed to:

(A) Board and depart only on instruction from the pilot.

(B) Use seat belts during take off, flight, and landing.

(C) Do not talk unnecessarily to the pilot.

(D) Remain seated during the time you are aboard.

(E) Watch for other airborne aircraft and navigational hazards and call them to the attention of the pilot.

(F) Do not smoke unless permitted by the pilot.

16. When performing as a crew member in external operations, listen to and be familiar with the normal sounds emitted by the helicopter in flight so that you will have the earliest notice of trouble and can avoid dangerous exposure.

17. When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and stabilizing rotors.

Tailgate Guide Checklist

Crew Leader:_____ Date:_____
Street/Descriptive Address:_____
_____
Lat/Long Coordinates:_____
Expected job flow:_____
_____
Crew member assignments:_____
_____
Assisting Crews:_____
Traffic Control:_____
Purpose of Job:_____
_____
Hazards and potential hazards-how will risk be eliminated/reduced:_____
_____
Compliance issues and how they'll be mitigated:_____
_____
Base Radio Procedures: Radio Check in _____
Base phone # **619-717-8118**_____
Verify Materials, tools first aid kits, fire extinguishers, cups & water for hydration, etc.
Vehicle Inspections: Circle of Safety_____Environmental Cleanliness_____
Verify everyone has/is wearing appropriate Personal Protective Equipment (PPE)
Approved head, eye, foot ear, and hand protection_____
Appropriate clothing and shoes (Long Sleeve Shirt and Steel Toe Shoes on or around construction zones)
Traffic Vest (Main and access roads and in equipment operation areas)
Q&A Encourage participation_____
_____
Insure everyone understands what was communicated_____
Verify everyone understands what is expected of them_____
Safety Reminder: Refer to list on back for suggested topics_____
_____

Re-Tailgate: If anything changes on this job that impacts the work or crew you must re-tailgate ensure everyone knows what has changed and document below

Time Conducted	What Changed	Initials of Crew Leader

Tailgate Conducted By:_____Date:_____

Tailgate Reviewed By:_____Date:_____

Tailgate Guide Checklist

Attendees

NAME	SIGNATURE	COMPANY

SAFETY TOPICS

Bee Awareness	Heat Illness Prevention	Inclement Weather
Snakes, Spiders, Scorpions	Extreme Cold	Lightning
Fire safety/prevention	Circle of Safety	Flashflood
Fall Protection	Enclosed Space Protection	Trench Awareness
Helicopter Operations	Customer Communications	Heavy Equipment Operations
Safe Working Distances	Emergency Response Procedures	Spill Clean Up

APPENDIX K – HEAT ILLNESS PREVENTION

SDG&E SAFETY STANDARD G-8366

PURPOSE **Prevent employee heat illnesses during outdoor work**

1. POLICY AND SCOPE

1.1. The purpose of this policy is to protect employees from heat illnesses while performing outdoor work by providing heat illness training, specifying drinking water and shade requirements, and providing emergency procedures as needed.

1.2. The standard applies to all employees who work outdoors such as but not limited to field crews, meter readers, and customer service representatives.

2. PROGRAM

2.1. Heat Illness Training

2.1.1. All employees, who work outdoors, must attend an initial training class. All new employees must attend an initial training class prior to field assignments. The training must cover:

- Environmental factors and personal risk factors of heat illness;
- Different types of heat illness;
- Common signs and symptoms of heat illness and the importance immediately reporting symptoms or signs of heat illness in themselves, or in co-workers;
- The importance of acclimatization;
- The importance of frequent consumption of water;
- Control and emergency provisions;
- The requirements of this standard.

2.1.2. Each supervisor (including crew leads and working foremen) with outdoor employees must have the same initial heat illnesses training as well as emergency response training.

2.2. Drinking Water Requirement

2.2.1. One quart of drinking water per employee per hour for the entire shift must be provided unless water is plumbed or continuously supplied.

NOTE: Employees may begin the shift with smaller quantities of water if they can replenish their water supplies during the shift as needed to allow them to drink one quart or more per hour.

2.2.2. The frequent drinking of water shall be encouraged.

2.3. Shade Requirement

2.3.1. Shade area shall be provided that is either open to the air or provided with ventilation or cooling for a period of no less then five minutes to recover from heat. Employee may be provided with vehicles capable of providing air conditioning or must have provisions for shade.

2.3.2. Access to shade shall be permitted at all times and especially for employees suffering from heat illness or require a break from the heat exposure.

2.4. Heat Illness Emergency Procedure

2.4.1. Heat illness is a potentially serious medical condition and must be responded to with the same procedures as other serious health and safety conditions using the respective departmental current emergency response procedures. It is important to be able to provide clear and precise directions to the work site.

3. RESPONSIBILITIES

3.1. Employees

3.1.1. Attend initial heat illness training.

3.1.2. Follow heat illness precautions when working outdoors.

3.1.3. Immediately reporting to their supervisor any symptoms or signs of heat illness in themselves, or in co-workers.

3.2. Supervisors (including crew leads and working foremen)

3.2.1. Ensure new or transferred employees receive initial employee heat illness training before working outdoors.

3.2.2. Attend initial employee and emergency response heat stress training.

3.2.3. Provide adequate water supplies, shade, other engineering controls and best management practices to reduce the potential for heat illness, i.e. mechanical ventilation, rotate crews and workers, air-conditioned vehicles, etc.

3.2.4. Ensure that heat illnesses precautions are used. This includes ensuring adequate water supply and shade is provided as well as encouraging frequent employee water drinking.

3.2.5. Be alert to any employee symptoms or signs of heat illness and take precautions as needed.

3.2.6. Prepare, maintain, and follow emergency response plans in the event of an employee heat illness.

3.3. Safety and Health Department

3.3.1. Develop heat illness training and provide program assistance as needed or requested.

4. DEFINITIONS

4.1. Environmental risk factors for heat illness- are those working conditions that create the possibility that heat illness could occur. This includes: air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

4.2. Heat Illness- means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

4.3. Personal risk factors for heat illness - are those individual factors that could place an employee at higher risk of heat illness such as an individual’s age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body’s water retention or other physiological responses to heat.

4.4. Shade- the blockage of direct sunlight to allow the body to cool. Canopies, umbrellas and other temporary structures or devices may be used to provide shade. Sitting in a vehicle without air conditioning is not adequate.

5. REFERENCES

5.1. California Code of Regulations, Title 8, Section 3395, General Safety Orders, Heat Illness Prevention

5.2. Heat Illness Prevention, Safety Department Lesson Plan

6. SAFETY REVIEW PROCESS

This safety standard was reviewed and approved by members of the Safety Action Committee, Safety Action Team, and the Field Operations Council.

■

SUMMARY OF DOCUMENT CHANGES & FILING INSTRUCTIONS	
Brief: New safety program for SCG and revised SDG&E program.	
Circulation Code	**Filing Instructions**
SAFE	File numerically behind Operational/Field Safety tab.
SAFESD	File numerically behind Operational/Field Safety tab.

DOCUMENT PROFILE SUMMARY NOTE: Do not make any changes to this table. Data in this table is automatically posted during publication.	
Document Number:	**166.09/G8366**
Document Title:	**Heat Illness Prevention for Outdoor Work**
Document Type:	**SHRD**
Category (FCD Only):	
Document Status:	**Active**
If Merged, Merged to:	
Current Revision Date:	**8/9/2006**
Prior SoCalGas Numbers:	
Prior SDG&E Numbers:	
Company:	**SoCalGas/SDG&E**
Referenced Documents - SoCalGas:	
Referenced Documents - SDGE:	
Part of SoCalGas O&M Plan (reviewed annually):	**No**
Part of SDG&E O&M Plan (reviewed annually):	**No**
O&M Plan 49 CFR Code(s):	
Other 49 CFR Codes(s):	
Impacts the Integrity Management Program:	**No**
Contains OPQUAL Covered Task:	**No**
Common Document (if applicable):	
Incoming Materials Inspection Required (MSP only):	
Contact Person:	**Terry Thedell**

APPENDIX L – RULE 1800

RULE 1800

INCIDENT AND INJURY REPORTING

1800. SCOPE

This applies to all employees involved in an incident or injury, on the scene of an incident, or reporting an incident or injury.

1801. EMPLOYEES ON THE SCENE OF A SERIOUS INCIDENT

A. In case of injury, immediately obtain medical assistance (call 911 or request Dispatch – SD (Trouble) to do so) and provide first aid to the injured. Dispatch – SD (Trouble) can be reached @ (619) 725-5199.

B. Notify Dispatch – SD (Trouble) of all items on the Scene Assessment Checklist. (see Attachment A). Dispatch – SD (Trouble) will notify the employee's department head or delegate, Safety & Health Department, SEU Communications Department, SEU Claims Department and Corporate Security as needed.

C. Secure the incident scene. Perform only that work that can safely be done to mitigate any immediate hazards. Do not allow any crew members, any member of the public, or any emergency response personnel to take any action involving our facilities that will compromise their safety.

D. With the exception of that work necessary to mitigate immediate hazards, ensure that nothing is moved before the scene has been thoroughly inspected and released by Safety or SEU Claims Department. All evidence must be tagged and preserved until released in writing by the manager of Safety or the manager of SEU Claims Department.

E. Do not discuss the incident with any member of the public.

F. Obtain names, addresses and phone numbers of all parties involved and any witnesses of the incident.

G. Request the presence of a safety representative during any interview involving Cal-OSHA.

H. Provide a detailed description of all activities leading up to the incident to the Safety & Health Department or SEU Claims Department.

1802. INJURIES REQUIRING MEDICAL TREATMENT

A. In case of a life-threatening emergency:
   1. Call 911.
   2. Contact area dispatcher.
   3. If a telephone is not available, radio the area dispatcher and request that they call 911 immediately.
   4. Notify the area supervisor and the Safety & Health Department, (858) 650-4002 during normal business hours and (619) 725-5199 after hours, weekends and holidays.

B. All other injuries or illnesses requiring a physician:
Contact one of the Occupational Health Nurses. During regular work hours in North County call (760) 480-7684, or in San Diego call (858) 654-8758 for a physician referral. This will ensure that proper medical treatment is provided.

C. FORM TO BE COMPLETED: The report of injuries requiring medical treatment is completed electronically by the supervisor in the Safety Incident Management System (SIMS) from the Safety Website *http://utilinet.sempra.com/departments/safety/SIMSLanding.cfm*

1803. MINOR INJURIES

A. Steps to be taken are:
   1. Administer first aid if trained.
   2. If not trained, or if additional services are needed, contact an Occupational Health Nurse for assistance.

B. FORM TO BE COMPLETED: The report of Minor Injury is completed electronically by the supervisor in the Safety Incident Management System (SIMS) from the Safety Web site http://utilinet.sempra.com/departments/safety/SIMSLanding.cfm

1804. INJURIES AFTER HOURS (WEEKDAYS 5 P.M. THROUGH 7 A.M., WEEKENDS AND HOLIDAYS)

A. Call Service Dispatch - SD (Trouble) at (619) 725-5199.
B. Relay the nature, condition, and exact location of the injured employee. Service Dispatch will contact the Safety Department and others if necessary.

C. If assistance is needed, an Occupational Health Nurse will make the necessary arrangements.

1805. VEHICLE INCIDENTS

A. Ensure you are safe and able to discuss the incident with other involved drivers or persons. Exchange names, drivers' license information, address, phone number at home and work, auto insurance company and policy number (Sempra Energy is self insured).

B. Contact SEU Claims Department immediately to relay information about the incident if a member of the public is injured or there is damage to property or a vehicle.

C. Vehicle Incident Reports are made electronically by the supervisor in the Safety Incident Management System (SIMS) from the Safety Web site within three (3) working days.
http://utilinet.sempra.com/departments/safety/SIMSLanding.cfm

Attachment A

SCENE ASSESSMENT CHECKLIST

- ☑ Has 911 been called?
- ☑ Who's in charge?
- ☑ What is their phone number?
- ☑ What is the location of the incident?
- ☑ How many people are injured?
- ☑ What is the extent of the injuries?
- ☑ Where are they being transported?
- ☑ What additional assistance is required at the site to mitigate immediate hazards? (specific crews, equipment, emergency response etc.)
- ☑ What was the employee/crew doing when injured?

☑ Are any customers effected?

☑ Who has been notified?

☑ Secure and preserve the scene for investigation purposes.

NOTE: <u>Do not state the name of any injured employee over the radio</u>.

ALPINE FIELD OFFICE
1010 TAVERN ROAD, ALPINE, CA 91901

1. **PURPOSE AND SCOPE:**

1.1. The primary goal of this Emergency Action Plan (EAP) is the safety of all employees during a workplace emergency. It should be followed whenever possible; however, it does not replace the use of common sense by an individual employee. During any workplace emergency, when elements of this plan cannot be carried out, or if personal safety would be compromised, each employee should conduct themselves in a manner that provides for their own safety and the safety of other employees.

1.2. This document describes responsibilities of the Facility Responsible Official, Supervisors, Employees, and Emergency Response Teams (ERT) of each facility during emergencies in the workplace.

2. **ROLES AND RESPONSIBILITIES**: Ref. OSHA, CFR 29, 1910.38(c)(6) & 1910.38(e)

2.1. **Facility Responsible Official:** It is the responsibility of the Facility Responsible Official to:

2.1.1. Develop, implement, and update the EAP.

2.1.2. Appoint a Building Leader who will facilitate the development of the ERT.

2.1.3. Ensure that all equipment and systems are properly maintained and inspected.

2.1.4. Ensure that a copy of this plan is on site and made available for employees to review.

2.1.5. Ensure that the plan is reviewed with each employee as outlined in this plan.

2.2. **Emergency Response Team**

2.2.1. The ERT is comprised of trained employees who assist the Building Leader in responding to a workplace emergency. At a minimum their responsibility includes reporting of emergencies, coordinating evacuations and employee accountability procedures.

2.2.2. In addition, the ERT may elect to train employees to be able to render first aid, CPR, AED, or implement fire fighting measures. If a team elects to have employees trained in these areas, those employees must maintain current training and certification in the corresponding areas.

2.2.3. The ERT members are the Building Leader, Floor Leader(s), Assistant Floor Leader(s) and other employees trained to respond in an emergency; however, any employee may be assigned responsibilities during an emergency.

2.3. **Building Leader's** primary duties are to:

2.3.1. Form the ERT comprised of volunteer employees at his/her designated facility. Ensure that the ERT is trained and capable of implementing the EAP as outlined in this procedure.

2.3.2. Ensure that the ERT members obtain training to perform their duties as outlined in the plan.

2.3.3. Ensure this plan is implemented during an emergency.

2.4. **Floor Leader's** primary duties are to:

2.4.1. Report or verify that emergency has been reported as outlined in this plan.

2.4.2. Coordinate and implement the evacuation and employee accounting procedures as defined outlined in this plan.

2.4.3. Enlist the help of others as needed.

2.4.4. Assume the Building Leader's responsibilities in his/her absence.

2.5. **Assistant Floor Leader's** duties are to:

2.5.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

2.5.2. Assist with any other duties assigned.

2.5.3. Assume the Floor Leader's responsibility in his/her absence.

2.5.4. **In the absence of the Building Leader, Floor Leader(s) and Assistant Floor Leader(s), other employees should assume the responsibilities outlined in this plan.**

2.6. **Supervision:** It is the responsibility of each Supervisor to:

2.6.1. Ensure that each employee under his/her supervision is adequately trained on how to respond to emergency situations in the workplace.

2.7. **Employee:** It is the responsibility of each employee to

2.7.1. Understand his/her responsibilities as outlined in this plan.

2.7.2. Become familiar with this Emergency Action and Fire Prevention Plan or the employee ***Emergency Procedures*** brochure. Copies of the Brochure can be obtained from Emergency Services.

2.7.3. Notify his/her supervisor or any member of the ERT immediately of any potential fire hazard or emergency.

3. REPORTING PROCEDURES: Ref. OSHA, CFR 29, 1910.38(c)(1)

3.1. **During an emergency**:

3.1.1. Assess the situation and call 911 if appropriate. If you are unsure about the seriousness of the emergency, call 911

3.1.2. Notify your supervisor or any member of the ERT as soon as practical.

3.2. **When reporting an emergency**

3.2.1. Describe the nature of the emergency.

3.2.2. Provide the exact address, including the nearest cross street and actual location of emergency.

3.2.3. Provide a call back telephone number (yours, your Supervisor's or the Security desk).

3.2.4. Give them your full name.

3.2.5. Provide the building, Floor number, office or cubicle number or general area where the emergency is taking place.

3.2.6. Do not hang up until instructed to do so as emergency personnel might need more information from you, unless doing so poses a greater threat to you or anyone else.

3.2.7. If possible, send someone outside to flag down emergency personnel and guide them to the location of the emergency.

3.3. **Emergency Response Team Members**:

3.3.1. Report or ensure the emergency has been reported and call 911 if necessary.

3.3.1.1. Notify Building Security, Building or Floor Leader.

3.3.1.2. Notify Department or Facility Manager as soon as practical.

4. EMERGENCY COMMUNICATION STRATEGY / ALARM SYSTEM: Ref OSHA, CFR 29, 1910.38(d)

4.1. The Alpine Field Office is equipped with a wet pipe fire suppression sprinkler system. In addition, there is an audible fire alarm system including fire alarm panel, battery cabinet and remote annunciator; devices such as smoke detectors, pull stations, audible/visual alarms, and interface modules to wet sprinkler system. The emergency is also communicated by ERT staff members and other employees sweeping the area and making voice announcements to evacuate.

4.2. The alarm system is inspected and tested semi-annually by an outside company.

4.3. The inspection, maintenance and testing records are maintained by Real Estate and Facilities department.

5. **FIRE PREVENTION AND SUPPRESSION EQUIPMENT:** Ref OSHA, CFR 29, 1910.39(c)

5.1. **Hazardous Materials** Ref OSHA, CFR 29, 1910.39(c)(1) & 1910.39(c)(5)

- There are no flammable materials of concern found in this site other than the normal office products such as paper, toner, etc.

5.2. **Housekeeping Policy** Ref OSHA, CFR 29, 1910.39(c)(2)

5.2.1. Office areas are to be kept free of paper clutter that could create a fire hazard. Every employee should see that un-needed paper is placed in the recycle receptacles. Cubicles are to be kept free of paper clutter that could create a fire hazard

5.2.2. The Facility Manager, with support of the ERT, are responsible for ensuring that routine checks of the entire workplace are performed to remove any possible fire hazards.

5.2.3. Employees should immediately report any suspected workplace fire hazard to the Facility Manager or any member of the ERT for corrective action..

5.3. **Installation, Inspection, Maintenance and Testing of Safeguard Equipment** Ref OSHA, CFR 29, 1910.39(c)(3) & (4)

5.3.1. The Alpine Field Office facility is equipped with fire extinguishers and a sprinkler system. The fire extinguishers are inspected internally and the sprinkler system is maintained and tested by an outside agency contracted and managed by Sempra Real Estate and Facilities department.

5.3.2. Sempra Real Estate and Facilities department maintains the inspection, maintenance and testing records.

6. **EVACUATION PROCEDURES:** Ref. OSHA, CFR 29, 1910.38(c)(2) & 1910.38(c)(3)

6.1. There could be a number of reasons to evacuate the building. In some situations, evacuating may not be the best alternative. In an emergency, follow the instructions from the ERT, the Facility Manager or Security personnel unless doing so poses a greater threat of injury to you or anyone else.

6.2. Once the decision to evacuate has been made, ERT members will announce and initiate evacuation procedures.

6.3. Assigned members of the ERT will sweep meeting rooms, restrooms, and work areas to verify that everyone has been notified of the emergency and evacuated. PA systems can be used to announce the evacuation where they are available.

6.4. The ERT will enlist the help of others as needed to make the announcement.

6.5. **Evacuation Exits and Routes** Ref. OSHA, CFR 29, 1910.38(c)(2)

6.5.1. Employees should know the nearest exit from their work area and the route they'll take to reach that exit in an emergency. Employees should request a copy of their facility floor map from their Floor Leader and mark the exits and two evacuation routes specific to their individual location.

6.5.2. When instructed by the ERT, proceed to the nearest exit. As people are exiting the building it is important to follow the instructions of the ERT. Some basic guidelines for safe evacuation are:

6.5.2.1. Know the exits available to you at any point on the floor. AT THE TIME OF EVACUATION, USE THE NEAREST SAFE EXIT.

6.5.2.2. Take your personal belongings with you (such as keys, purse or briefcase, and personal emergency supplies) as you exit.

6.5.2.3. Walk, don't run and keep noise to a minimum so evacuation and safety instructions can be heard.

6.5.2.4. **Do not use elevators**.

6.5.2.5. In stairwell, use the inside handrail. Remove high heels to avoid tripping.

6.5.2.6. Yield to emergency response personnel.

6.5.2.7. Don't push or crowd others.

6.5.2.8. As you walk out, inform those around you of the need to evacuate the building.

6.5.2.9. If you encounter someone who needs help evacuating, assist them if you can do so without risk to your own safety.

6.5.2.10. Proceed to the assembly area and check in with the Floor Leader or designee.

6.5.2.11. Report any employee left behind or injured, as well as anyone missing that you are aware of.

6.6. **Assembly Area** - Ref OSHA, CFR 29, 1910.38(c)(4)

6.6.1. All employees need to report to the assembly area: Ask your Floor Leader for a copy of the latest floor plan and assembly area map or location.

6.6.2. Each employee is responsible for checking in with the Floor Leader or their designee at the assembly location.

6.6.3. Each employee should report the whereabouts, if known, of any employee not present at the assembly area, as well as anyone injured or left behind.

6.6.4. Employees are to remain at the assembly area until informed by the ERT members that either it is safe to re-enter the building, report to an alternate work location, or they are released to go home.

6.7. **Elevators**

6.7.1. There are no elevators to be concerned with at this facility

6.8. **People with Special Needs**

6.8.1. Anyone with a physical disability, including temporary conditions which would limit their ability to exit safely during an emergency, shall be assigned persons to help them. The ERT should be made aware of these situations and make assignments as soon as possible. If you see anyone who has a problem exiting the building, stay with that person and, if possible, help with their evacuation. If you can't, notify any member of the ERT of the problem. If you can, stay and wait for help or instructions from the ERT, unless immediate evacuation is needed to avoid personal injury.

6.9. **Procedures for Rendering First Aid and Fire Fighting Measures** Ref OSHA, CFR 29, 1910.38(c)(5)

6.9.1. Emergencies will be reported and handled as stated in sections **3 – Reporting procedure, 7.1– Fire procedures** and **7.5 - Medical emergency procedures.**

6.10. **Procedures for Employees Performing Critical Operations Prior to Evacuation** Ref OSHA, CFR 29, 1910.38(c)(3)

6.10.1. **Not applicable.** However, if any department requires an employee to stay behind, that information must be communicated to the Building Leader and noted on the employee roster that the ERT maintains.

6.11. **ERT Responsibilities**

6.11.1. **Building Leader's duties during evacuation**:

6.11.1.1. Report or verify that emergency has been reported as defined in section 3.3.

6.11.1.2. Ensure that evacuation procedures have been initiated.

6.11.1.3. Establish a command post in the assembly area.

6.11.1.4. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

6.11.1.5. Enlist the help of others as needed.

6.11.2. **Floor Leader's duties during evacuation**:

6.11.2.1. Report or verify that emergency has been reported as defined in section 3.3.

6.11.2.2. Coordinate and implement the evacuation and employee accounting procedures.

6.11.2.3. Ensure first aid kit is taken to the assembly location and coordinate that first aid is rendered to injured employees by trained ERT members as applicable.

6.11.2.4. Assign someone to take the roster and coordinate employee check-in procedures.

6.11.2.5. Attempt to account for anyone who did not check in at the evacuation assembly area.

6.11.2.6. Report any missing or injured persons to the Building Leader or other emergency personnel.

6.11.2.7. Enlist the help of others as needed.

6.11.2.8. Assume the Building Leader's responsibilities in his/her absence.

6.11.3. **Assistant Floor Leader's duties during evacuation**:

6.11.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

6.11.3.2. Assist with any other duties assigned.

6.11.3.3. Assume the Floor Leader's responsibility in his/her absence.

7. EMERGENCY PROCEDURES (by type of emergency): Ref. Cal/OSHA, Title8, Section 3220.(d)

7.1. Fire

7.1.1. If you hear the fire alarm:

7.1.1.1. Follow the instructions from the ERT, unless immediate action is needed to avoid personal injury or injury to others.

7.1.1.2. After working hours, evacuate the building, call 911and follow instruction from Security if they are on site.

7.1.2. If you discover a fire in your work area:

7.1.2.1. Call 911 to report the location of the fire. Give building or suite number and location, including the nearest cross street.

7.1.2.2. Activate the fire alarm if applicable, alert others and move away from the area of the fire.

7.1.2.3. Notify building Security and any member of the ERT, and/or your supervisor as soon as practical.

7.1.2.4. Use a fire extinguisher only on small fires (waste-basket size) if it's safe to do so and you have been trained on how to use one.

7.1.2.5. Close doors to confine the fire but do not lock them, and evacuate to a safe area.

7.1.2.6. Follow the instructions of the ERT.

7.1.2.7. If evacuation is necessary, immediately evacuate the work area, proceed to the assembly area and check-in with the Floor Leader or designee.

7.1.3. If trapped in a room:

7.1.3.1. Place cloth material around/under the door to prevent smoke from entering.

7.1.3.2. Retreat. Close as many doors as possible between you and the fire.

7.1.3.3. Be prepared to signal from a window, but do not break the window glass unless absolutely necessary to escape, because outside smoke could be drawn inside.

7.1.4. If caught in smoke:

7.1.4.1. Drop to your hands and knees and crawl toward the exit.

7.1.4.2. Hold your breath as much as possible.

7.1.4.3. Breathe shallowly through your nose, and use a shirt or jacket as a filter.

7.1.5. If forced to advance through flames:

7.1.5.1. Cover your head and hair.

7.1.5.2. Hold your breath and move quickly

7.1.5.3. Keep your head down and close your eyes as much as possible.

7.1.6. If clothes catch on fire:

7.1.6.1. Remove burning clothes only if you can do so quickly. Otherwise, smother the flames with a heavy coat or blanket, or by dropping to the floor and rolling. (Stop, drop and roll.)

7.2. **ERT Responsibilities**

7.2.1. **Building Leader's duties during fire emergencies**:

7.2.1.1. Ensure the emergency has been reported as defined in section 3.3.

7.2.1.2. Determine if evacuation is needed and initiate evacuation procedures as applicable.

7.2.1.3. Establish a command post in the assembly area.

7.2.1.4. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.2.1.5. Enlist the help of others as needed.

7.2.2. **Floor Leader's duties during fire emergencies**:

7.2.2.1. In case of fire, initiate reporting procedures as outlined in section 3.3.

7.2.2.2. If unable to extinguish the fire, evacuate immediately and close all doors behind you - Do not lock the doors.

7.2.2.3. If notified evacuation is necessary, begin evacuation procedures as outlined in section **6**.

7.2.2.4. If notified of a fire in the building but not on your floor, give the order to prepare to evacuate. Employees should secure computers, sensitive documents, close file cabinets and prepare to leave for the day. If immediate action is required to avoid personal injury or injury to others, evacuate immediately.

7.2.3. **Assistant Floor Leader's duties during fire emergencies**:

7.2.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.2.3.2. Assist with any other duties assigned.

7.2.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.3. **Earthquake**

7.3.1. When an earthquake begins:

7.3.1.1. Stay calm and use the "Duck, Cover and Hold" drill. Get under a desk or other sturdy object and stay there until shaking stops.

7.3.1.2. Be aware of aftershocks that may equal the primary quake in magnitude.

7.3.1.3. Keep clear of windows that could break or objects that might fall, such as a bookcase or computer monitor.

7.3.1.4. If you are in an elevator that becomes stuck, be patient. Call if equipped with a phone, either "O" for operator or dial 911. Some phones automatically ring to the elevator company. Someone will contact the car as quickly as possible and advise you how rescue will occur. Do not attempt to pry open a door and escape.

7.3.1.5. Evacuation is not always needed in an earthquake. Wait for direction from the ERT, unless immediate action is needed to avoid personal injury.

7.3.1.6. If evacuation is deemed necessary, evacuate the work area, proceed to the assembly area and check in with the Floor Leader or their designee.

7.3.2. **ERT Responsibilities**

7.3.2.1. **Building Leader's duties during earthquake emergencies**:

7.3.2.1.1. After the shaking has stopped, the safety of the employees and attending to the injured are the first priorities. Unless it is unsafe to do so or immediate evacuation is required, search for injured and report them to Manager.

7.3.2.1.2. Call 911 (if appropriate).

7.3.2.1.3. Determine if evacuation is needed and initiate evacuation procedures as applicable.

7.3.2.1.4. Establish a command post in the assembly area.

7.3.2.1.5. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.3.2.1.6. Enlist the help of others as needed.

7.3.2.2. **Floor Leader's duties during earthquake emergencies**:

7.3.2.2.1. After the shaking has stopped, the safety of the employees and attending to the injured are the first priorities. Unless it is unsafe to do so or immediate evacuation is required, search for injured and report them to Manager.

7.3.2.2.2. Call 911 (if appropriate).

7.3.2.2.3. Report condition of building and employee status to Security and the Building Leader.

7.3.2.2.4. If it is appropriate or you are notified by Security or the Building Leader to do so, begin evacuation of the work area.

7.3.2.2.5. After ensuring that the work area has been evacuated, proceed to the assembly area and check with Floor Leader for reports of missing or injured employees.

7.3.2.2.6. Report injured and missing employees to the Building Leader and Department Manager.

7.3.3. **Assistant Floor Leader's duties during earthquake emergencies**:

7.3.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.3.3.2. Assist with any other duties assigned.

7.3.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.4. **Bomb Threat**

7.4.1. All bomb threats should be treated as serious. The safety of the building occupants should be the primary consideration. If you receive a note or letter, immediately contact building security, any member of the ERT and/or your supervisor.

7.4.2. If a bomb threat is received by phone, keep the person on the line and get as much information as possible.

7.4.2.1. Listen carefully, especially for identifying voice characteristics such as an accent.

7.4.2.2. Be calm and courteous, even friendly.

7.4.2.3. Do not interrupt the caller.

7.4.2.4. Obtain as much information as possible by asking questions such as:

- When is the bomb going to explode?
- Where is it right now?
- What does the bomb look like?
- What kind of bomb is it?
- What will cause it to explode?
- Did you place the bomb?
- What is your name?
- What is your address?

7.4.2.5. As soon as the call has ended, report the threat.

7.4.2.6. Don't evacuate unless told to do so, or if danger is imminent.

7.4.3. If evacuation is ordered, evacuate the threat area immediately as if leaving for the day.

7.4.4. Take briefcases, purses or other personal containers that may become "suspect" if the area is searched later.

7.4.5. Look in your immediate area for object(s) that do not belong or are out of place. If such an object is found, do not touch it. Under no circumstances should a suspect object be handled, moved or opened. Immediately notify security or any member of the ERT.

7.4.6. If the device is outside, clear an area all around the object for 300 feet. If inside, evacuate the floor the device is on as well as the floor above and below the device.

7.4.7. Evacuees should proceed to the assembly area and check in with the Floor Leader or designee. The exiting route should be away from the object and its cleared area.

7.4.8. **ERT Responsibilities**

7.4.8.1. **Building Leader's duties during bomb threat**:

7.4.8.1.1. Report or verify that emergency has been reported as defined in section 3.3

7.4.8.1.2. Communicate with security and determine if evacuation procedures are necessary.

7.4.8.1.3. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.4.8.1.4. Enlist the help of others as needed.

7.4.8.2. **Floor Leader's duties during bomb threat**:

7.4.8.2.1. Notify the Building Leader and Security and wait for instructions from them.

7.4.8.2.2. Notify the Department Manager.

7.4.8.2.3. If instructed to do so, ask employees to check their immediate area for anything unusual. INSTRUCT THEM NOT TO TOUCH ANYTHING THEY DON'T RECOGNIZE OR IS SUSPICIOUS. Report anything found to Security.

7.4.8.2.4. If you are notified by Security to evacuate, initiate evacuation procedures as defined in section **6**.

7.4.8.2.5. After ensuring that the work area has been evacuated, proceed to the assembly area.

7.4.8.2.6. Report injured and missing employees to the Building Leader and Department Manager.

7.4.8.3. **Assistant Floor Leader's duties during bomb threat**:

7.4.8.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.4.8.3.2. Assist with any other duties assigned.

7.4.8.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.5. **Medical Emergency** Ref. OSHA, CFR 29, 1910.38(c)(5)

7.5.1. If you are unsure about the seriousness of the emergency, call 911 then notify the appropriate building security, Floor Leader or Supervisor as soon as practical.

7.5.2. If the person is unresponsive and you are trained to do so, administer first aid or CPR, or use an AED unit where available.

7.5.3. If the person is responsive and can tell you what the problem is, relay that information to the 911 operator. If they have medication with them that may help the situation, assist them in administering their medication (e.g., nitroglycerin pills for heart).

7.5.4. If possible, send someone outside to escort emergency personnel into the correct area.

7.5.5. Provide any information you can to arriving emergency personnel.

7.5.6. **ERT Responsibilities**:

7.5.6.1. **Building Leader's duties during medical emergency**:

7.5.6.1.1. Report or verify that emergency has been reported as defined in section 3.3.

7.5.6.1.2. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.5.6.1.3. Enlist the help of others as needed.

7.5.6.2. **Floor Leader's duties during medical emergency**:

7.5.6.2.1. Report or verify that emergency has been reported as defined in section 3.3.

7.5.6.2.2. Notify the Department Manager.

7.5.6.2.3. Assume the duties of the Building Leader in his/her absence.

7.5.6.3. **Assistant Floor Leader's duties during medical emergency**:

7.5.6.3.1. Assist Floor Leader with notifications and implementation of the evacuation and employee accountability procedures as needed.

7.5.6.3.2. Assist with any other duties assigned.

7.5.6.3.3. Assume the Floor Leader's responsibility in his/her absence.

7.6. All Other Emergencies

7.6.1. If unsure about the seriousness of the emergency, call 911.

7.6.2. Report the emergency to any member of the ERT and wait for instructions unless delay would result in injury.

7.6.3. If evacuation is necessary, evacuate the work area and proceed to assembly area and check in with Floor Leader or his designee.

7.6.4. **ERT Responsibilities**

7.6.4.1. **Building Leader's duties for all other emergencies**:

7.6.4.1.1. Report or verify that emergency has been reported as defined in section 3.3.

7.6.4.1.2. Assess situation and coordinate communications between ERT members, Security and Emergency personnel, and Management as needed.

7.6.4.1.3. Determine if evacuation is necessary and implement evacuation procedures

7.6.4.1.4. Enlist the help of others as needed.

7.6.4.2. **Floor Leader's duties for all other emergencies**:

7.6.4.2.1. Call 911 (if applicable), Security and the Building Leader.

7.6.4.2.2. Notify the Department Manager, if he/she is offsite.

7.6.4.2.3. If it is appropriate or you are notified by Security or the Building Leader to do so, begin evacuation of the work area.

7.6.4.2.4. After ensuring that the work area has been evacuated, proceed to assembly area and check with Floor Leader for reports of missing or injured employees.

7.6.4.2.5. Report injured and missing employees to the Building Leader and Department Manager.

7.6.4.3. **Assistant Floor Leader's duties for all other emergencies**:

7.6.4.3.1. Assist the Building Leader with notifications.

7.6.4.3.2. Assume duties as previously outlined.

7.6.4.3.3. Assume the duties of the Building Leader in his/her absence.

8. EMPLOYEE TRAINING: Ref. OSHA, CFR 29, 1910.38(f) & 1910.39(d)

8.1. The facility's Responsible Official and Supervisors are responsible for the training of all employees covered under this plan. As part of our Emergency and Fire Prevention Plan, we train all of our employees under the following circumstances:

8.1.1. New employees are provided with the Emergency Procedures Brochure and are asked to meet with members of their ERT to review site specific information.

8.1.2. Whenever new hazards are introduced into their work area or the employee transfers to new work areas.

8.1.3. Whenever the plan is changed.

While it is not required by the regulations, it is recommended that the plan be reviewed with all employees at least annually. A more frequent review is preferable.

8.2. Building Leaders, with support from Emergency Services and Safety, conduct training for the members of the ERT. Training topics include:

8.2.1. Initial and re-certification of CPR, First Aid and AED.

8.2.2. Potential fire hazards in their work area and the proper storage and/or handling procedures.

8.2.3. General housekeeping procedures associated with fire prevention.

8.2.4. Any specific housekeeping procedures for highly combustible or flammable materials in their work area.

9. APPENDICES AND OTHER REFERENCE DOCUMENTS:

9.1. **Appendix A** – Site Security Alarm Procedures -

9.2. **Emergency Procedures Brochure** - Copies of the Emergency Procedures brochure can be requested from the Emergency Services Department.

9.3. **Floor Map**

9.3.1. Refer to your Supervisor, Floor Leader or Building Leader for a copy of the latest version of the floor map.

9.3.2. Mark two evacuation routes relevant to your specific location.

9.3.3. Become familiar with the location of fire extinguishers.

9.3.4. Become familiar with the location of AED units where available.

9.4. **Training Records**

9.4.1. Employees are provided with the Emergency Procedures Brochure.

9.4.2. ERT members conduct training sessions as needed. Records are kept by the Responsible Official or Building Leaders at each facility.

9.4.3. Records of CPR, First Aid and/or AED training are kept in MyInfo or copies of certificates are kept by the ERT.

9.5. **ERT Roster** are generated and maintained by the ERT at each facility.

9.6. **Employee Check-In Roster**- Employee rosters, to aid in the accounting of employees during an evacuation, are generated and maintained by the ERT at each facility.

Appendix A – Site Security Alarm Procedures INTERIM

- ## Hours of Operation:

  Alpine Headquarters (HQ) will be operational between the hours of 0500 to 1900 Hours Monday through Saturday. Exceptions to this, e.g. Holidays, operational Sundays, etc, will be communicated to all employees.

- ## AM Alarm Deactivation:

  The building alarm will be deactivated by 0500 by the Securitas Guard who will call CSOC to deactivate the alarm remotely.

- ## PM Alarm Activation:

  The last employee leaving the premise after 1900 hours will make every effort to ensure the building is clear of personnel and **will** advise the Securitas Guard, upon leaving, the building is clear.

  The Securitas Guard will ensure the building is clear (after 1900 hours) and the guard will call CSOC to set the alarm remotely.

- ## Entry during Non-Operational Hours:

  Employees entering the property during non-operational hours ***must contact*** the Securitas Guard prior to entering the premises to ensure the alarm status. The Guard will deactivate the particular building alarm by calling CSOC and advise the employee that the alarm is de-activated

- ## Exit during Non-Operational Hours:

  The last employee leaving the premise during non-operational hours will make every effort to ensure the building is clear of personnel and will advise the Securitas Guard, upon leaving, the building is clear. The Securitas Guard will ensure the building is secure and contact CSOC to set the alarm remotely.

EMERGENCY ACTION PLAN (SUMMARY)

Alpine Field Office

Major Projects Base: (619) 717-8118 **Corporate Security: (858) 503-5067**

Alpine Field Office EMERGENCY TEAM

Building Leader:	**Jesse Thrush**	**Phone: (619) 717-8118**
Asst. Building Leader:	**TBD**	**Phone: (619) 717-8118**
Facility / Site Manager:	**Tim Devlin**	**Phone: (619) 441-3819**

Building 1 Floor Leaders

Melinda Michael (West)……**858-654-1526**
Renee Taylor (East)……**858-637-7959**

Building 2 Floor Leaders

Chris Mellett…….. **858-654-8778**
TBD……

Building 3 Floor Leaders

Martha Velarde…….. 858-637-7994
TBD……..

AED Trained Employees

Most Major Project site employees are trained to use an AED.

First Aid

Most Major Project site employees are trained in First Aid.

REPORTING PROCEDURES

IMMEDIATELY report all emergencies to the Building Leader, Floor Leaders and Major Projects Base.

FIRE

When appropriate, call 911 (dial **9 + 911**) and report fire, give building number and location

Address: **1010 Tavern Road, Alpine, CA 91910**
Cross Street: **Victoria Park Terrace**

EARTHQUAKE

Stay calm, "duck and cover", get under a desk or other sturdy object and stay there until shaking ends.

BOMB THREAT

Questions to ask if you receive a bomb threat call:

- What is your name?
- What does the bomb look like?
- Where is the bomb?
- What will cause it to explode?

MEDICAL EMERGENCIES

If an incident occurs where outside medical attention or intervention is needed (ambulance or paramedics) any employee may call 9-911 to summon assistance or Major Projects Base.

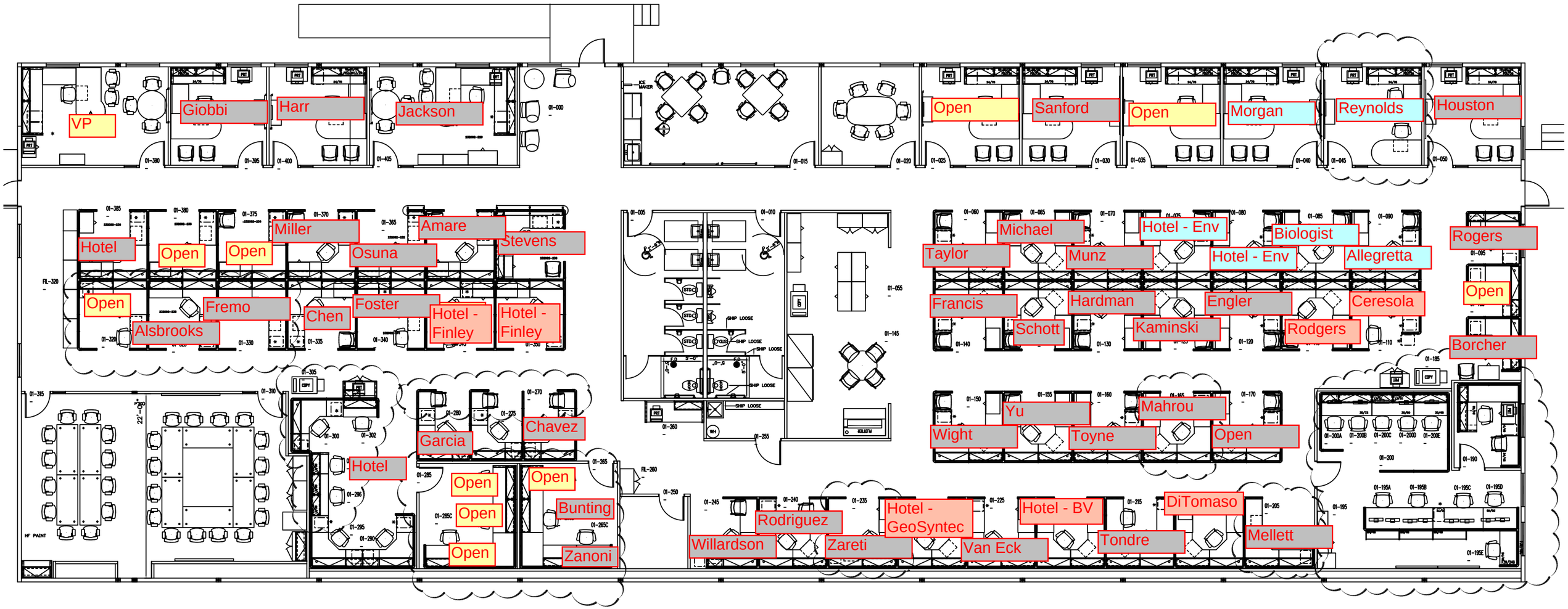
ALL OTHER EMERGENCIES

- **IMMEDIATELY** contact the Floor Leader(s) or Building Leader.
- Wait for directions from the Emergency Team, unless delay would result in injury.
- If evacuation is necessary, evacuate the work area and proceed to assembly area.

EVACUATION PROCEDURES

- Use the **nearest safe** exit, follow the instructions of the Emergency Team, and take your emergency preparedness cubicle kit.
- Assembly Area: **Alpine Field Office Parking Lot,** northeast corner.
- Check in with a Floor Leader when you arrive to ensure accurate head count.

Alpine HQ - Building 1



ALPINE HEADQUARTERS BUILDING

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Alpine HQ - Building 2

ALPINE 230kV BUILDING

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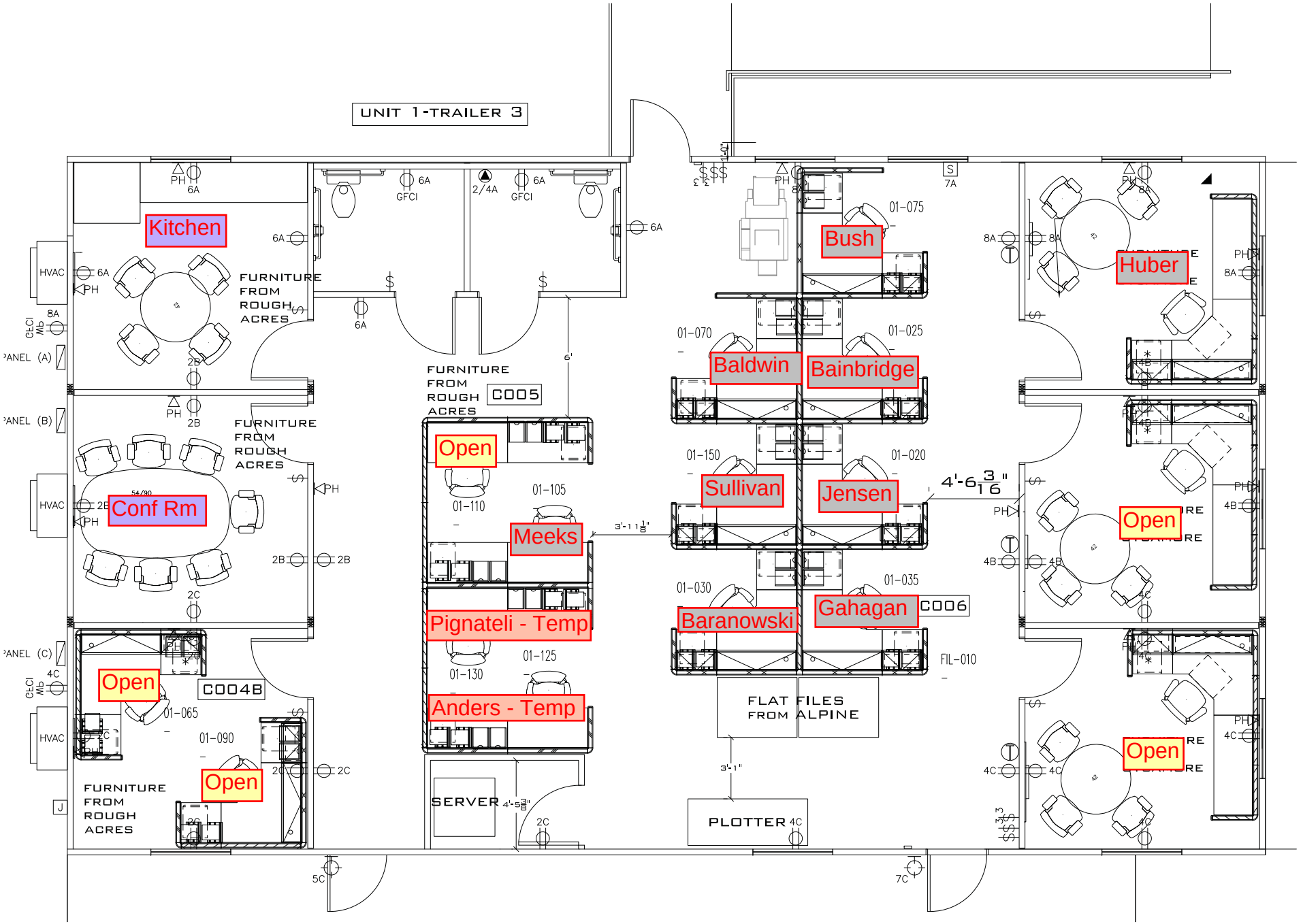

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CLIENT: ALPINE TRAILERS 3 & 4
WO2873578
1010 TAVERN ROAD
ALPINE, CA 91901

PROJECT #	76674
DATE:	06.08.11
ACCOUNT EXEC:	JASON STIERL
PAS:	CW
CHECKED BY:	–
DRAWING:	FILE PATH

REVISIONS

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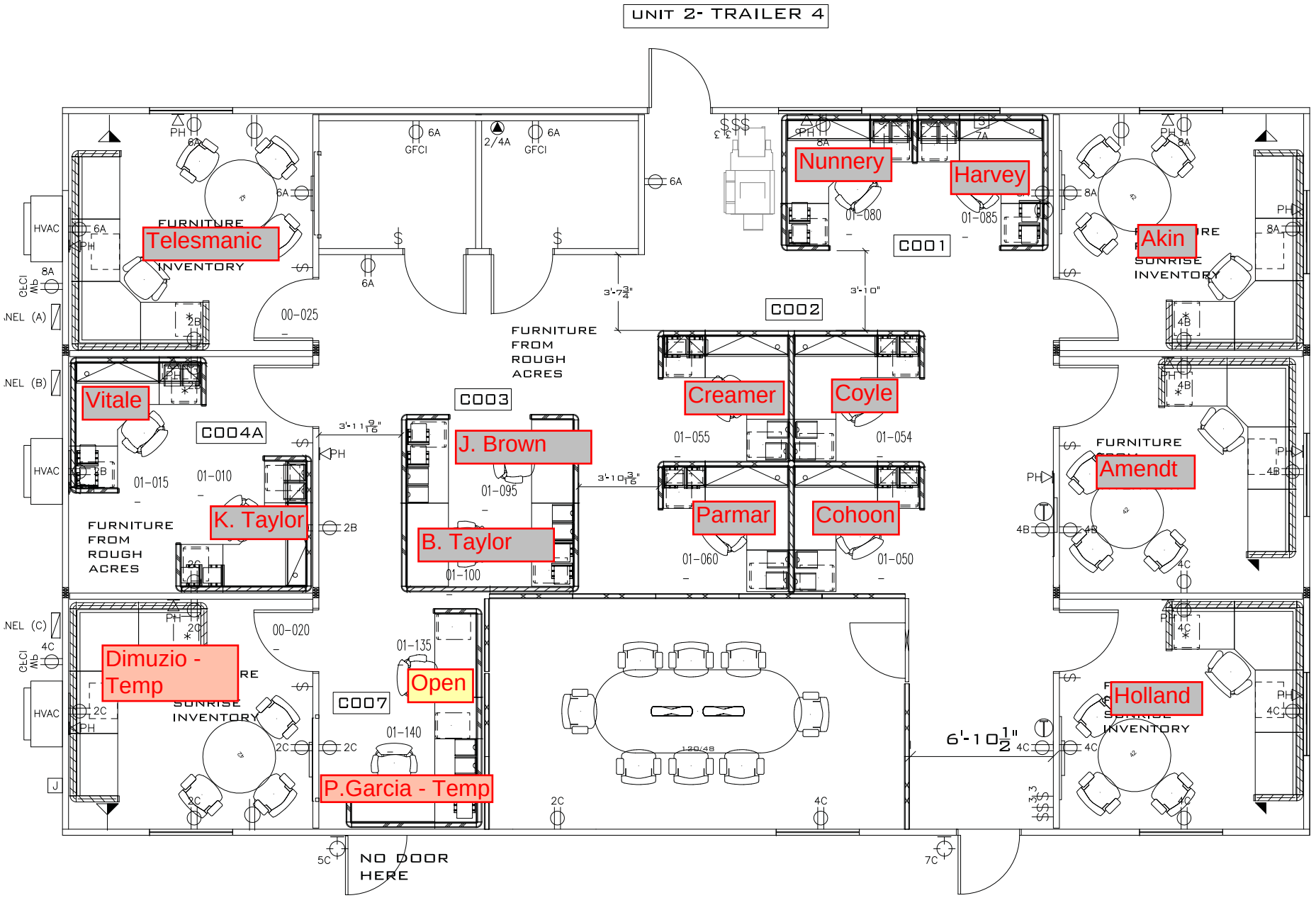

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Appendix N -- Incident Action Plan

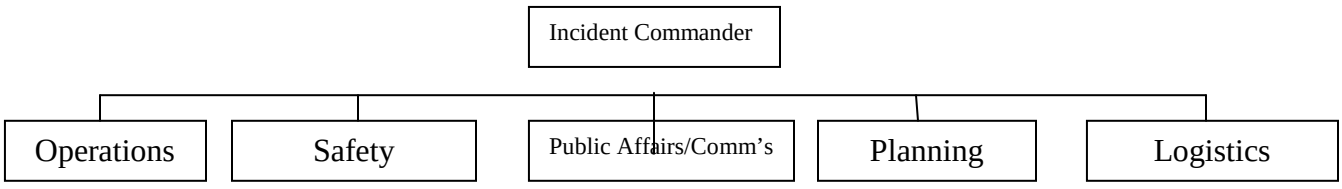
Incident Action Plan

I. Purpose – The purpose of this document is to establish processes and provide a general plan that will help effectively manage moderate to large scale incidents that may occur during the East County Substation Project. Principles of the Incident Command System (ICS) will be used to manage each incident and help bring structure to what can often be a chaotic event lacking organization and communication.

II. General– Construction of the East County Substation Project involves technical and challenging work in some of the most difficult and dangerous terrain in San Diego and Imperial counties. The higher risk work activities involve heavy equipment operations, helicopter operations, trenching & shoring, tower construction, traffic control along major thoroughfares and driving on unpaved mountainous roads. This work will frequently be done during harsh weather conditions in areas that are prone to wild fire and other natural disasters. Additionally, this project has its opponents that include sensitive land owners, residents and various organizations that involve an added level of concern for project employees.

III. Incident Management Team (IMT) – An IMT will be assembled with project personnel who are familiar with the key functions needed to manage an Event Level III incident. Team members will include, but are not limited to; Incident Commander (IC) , Operations Lead, Public Affairs/Communications Lead, Planning Coordinator, Safety Lead and Logistics Coordinator. Depending on the nature and level of complexity of the incident one person may handle multiple functions or several people may be assigned to a single function. Additionally, the IMT members may change based on availability of personnel or need during an incident.

IV. Incident Command Structure



V. Determining Event Levels

a. **Event Level I** – An internal SDG&E or project contractor incident only, minor consequences or affect to the company, level of command – Supervisor (IC), and the IC designated or approved at the Manager level.

Examples; 1) SDG&E employee sprains ankle while hiking down a hill from tower site, 2) property owner upset with contractor crew shouts obscenities and locks them out of property preventing work for the day 3) vehicle incident involving project employees with minor injuries.

b. **Event Level II** – Incident involves multiple agencies or issues, moderate consequences or affect to the company, level of command – Manager (IC), IC designated or approved at Director level.

Examples; 1) small brush fire started due to project activities. Crew is able to extinguish with on-site fire tools at less than 1 acre but CAL FIRE and USFS engines respond. 2) Contractor lineman suspended from tower with minor head injury and broken leg requires multi-agency rescue operation. 3) break in at material yard with significant damage to numerous underground cable reels.

c. **Event Level III** – Major incident with potential high consequence politically, financially, or legally to company and/or a fatality on the incident, level of command – Director (IC) designated or approved at the VP level.

Examples; 1) contract helicopter crashes along route with fatalities 2) member of public is seriously injured by work related activities and draws expansive media coverage 3) rapidly moving wildfire starts in project area where multiple employees and contractors are working.

For Event Level III incidents on ECO a pre-established Incident Management Team will be used whenever possible and include officers, directors, and managers associated with the ECO who have been trained in the Incident Command System. Other team members can and should be brought in based on availability and need. The primary assembly location for the IMT will be the Alpine Headquarters located at 1010 Tavern Road in Alpine, unless requested otherwise by the IC. For Event Levels I & II, incidents teams will be formed as the need dictates with ICS trained participants whenever possible.

**** An interim IC at a lower level may be designated during the initial stages of the incident to manage the incident until the qualified IC arrives and assumes command.***

VI. Command & Control - It is critical that positive command and control be established by identifying an Incident Commander(IC) as early as possible during an event. Key information and decisions will be passed through the IC and help prevent duplication of effort and assumptions that someone else is handling it. For minor incidents this can be the person on scene, the Major Projects Base Supervisor. The IC can change during the course of an incident. This change must be communicated to all involved with the incident in order to maintain positive command and control.

VII. General Steps of Incident Management;

1. Notification and Assessment of an Incident and Identification of an Incident Commander.
    a. Information comes into Major Projects Base from the field.
        i. Collect as much incident information as possible. Who, what, when and where?
        ii. Determine incident event level (Level I, Level II or Level III.
        iii. Establish positive command and control by determining who will be the Incident Commander(IC). Major Projects Base supervisor or manager to determine who this is using the protocols addressed above.
2. If needed, place request for emergency response via 911 or established Major Projects Base protocol.
    a. Identify Incident Command Post (could be same as emergency responders ICP, Alpine HQ, temporary work headquarters on the ROW)

3. Internal & External Notifications

    a. Major Projects Base to make appropriate internal notifications based on; confirmed facts, nature of the incident and the determined Event Level. Updates will be provided through Major Projects Base as more information becomes available.
    b. Public Affairs Lead will determine what, if any, additional external notifications need to be made based on the nature of the incident. The IC will approve what information is released.
    c. If the incident involves a contractor, their primary point of contact will be notified and regular communications established. If necessary, a joint

command will be set up between SDG&E and the contractor to help manage the incident.

d. *Depending on magnitude and severity of the incident, simple information exchange & coordination, up to a unified command structure maybe instituted between SDG&E and the Agency in-charge of the incident (sheriff, fire department, etc.). The SDG&E Incident Commander at the very least will contact the responding agency incident commander with a briefing on current actions and the company's plan of action.*

4. Identify Location of Incident Command Post (ICP).

    a. Communicate ICP to those who need to know (notification distribution list).

5. For Event Level III incidents, assemble SDG&E Incident Management Team as required.

    a. If IMT members are unavailable or on extended delay, the IC should select others to fill the need.
    b. Planning Meeting – A planning meeting should be held as soon as possible once the IMT is assembled and as needed until the event is concluded.
        i. Identify immediate, short-term and longer-term needs for the incident. Have someone take notes and document the information exchange and action items.
        ii. Safety; has danger/risk been eliminated/mitigated? If not, what measures need to be taken? Safety messages/direction to employees?
        iii. Operations; status of incident scene, determine operational needs.
        iv. Communication/Public Affairs; internal, external, employee families.
        v. Logistics; additional equipment or personnel, coordination with contractor(s), if extended incident consider shifts for field personnel and IMT.

    c. Status Meetings – Hold regular status meetings during the event for each functional area to provide updates and description of needs. As the event

winds down, determine what items remain (financial documents, Claims reports, incident detail reports (legal), and logistics.

Legend

- Rally_Points
- ECO - Structures
- Evacuation Routes

ECO - TieLines

TYPE

- OVERHEAD
- UNDERGROUND
- Substation Areas

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Appendix P – Emergency Contact Information

East County Substation Project
Emergency Contact Information

Employee Name: _____

Employee Cell Phone: (_____) _____ - _____

Current Street Address: _____

City, State, Zip _____

Permanent Street Address: _____

City, State, Zip: _____

Employer: _____

Supervisor's Name: _____

Supervisor's Cell Phone: (_____) _____-_____

Friend/Co-worker's Name: _____

Friend/Co-worker's Cell Phone: (_____) _____-_____

Family Emergency Contact Name: _____

Relationship: _____Cell Phone: (_____) _____-_____

Name of Nearest Relative NOT living with Employee: _____

Relationship: _____Cell Phone: (_____) _____-_____

Employee's Signature: _____date: _____

Appendix Q
East County Substation Project
Project Security Plan

1.0 Yard/Site Protection – Power Sources

The site/yard power source should have adequate protection from theft or vandalism.

2.0 Establish an End of Day Security Check Routine

The end-of-day routine is recommended and best enforced by the person who is responsible for jobsite loss-prevention. An end-of-day security routine should include locking all access points to the site, ensuring that all materials, ignition access, and equipment are accounted for and locked down, and that all Conex boxes are secured. The posting of security personnel is recommended for site/yards.

3.0 Disabling Equipment at Night and During the Weekend

Disabling tools should be considered during periods of inactivity such as overnight. This may include such actions as battery removal, securing ignition locks, removing spark plugs, and utilizing locking fuel caps. Key boxes should be removed from the site if possible. Keys should not be left at the site 'hidden' in the vehicle. Recognized protocols for immobilizing vehicles are recommended.

4.0 Yard/Site Security

Where fencing is installed to prevent unlawful access to a site and or yards, minimal access points should be developed and maintained. Proper security of the site/yards should include consultation with the Project Security Coordinator.

Storage areas often require lights, video cameras, and motion detectors. Lighting should follow the Project Construction Lighting Mitigation Plan. The top of the fencing should be constructed to prevent unauthorized access. All aspects of safety and security risks should be considered to ensure adequate and qualified security personnel are placed where appropriate. When guard service at a site is used to perform access control and asset protection, and it is deemed appropriate, 24 hour coverage should be considered.

5.0 Security Guard Services

- Notification of the placement of qualified guards along the ROW or related sites must be made to the security coordinator on a timely basis. Contact information for the guards will be supplied to the security coordinator. The security coordinator will inform the project operations base of any changes.
- Guards must be issued an appropriate cell phone or radio for communications with the operations base.
- Guards will be offered suitable protection from environmental conditions.
- General Duty Protocols for the guards must be reviewed by the security coordinator and when possible be reviewed regularly with the contractor and security coordinator.

- Guard Station protocols must be established—preferably by the guard service and approved by the security coordinator.
- Guards will document incidents. Immediate notifications established in the guard protocols will be made. These incidents will be documented and reviewed by the guard service within the next day and submitted to the security coordinator. Routine reports must be reviewed by the guard service on a weekly basis and maintained by the guard service until the end of the project.
- Guard supervisors will inspect the guards on a periodic basis as designated and approved by the security coordinator. Supervisors will review the logs, inspections, and incidents and should submit a summary to the security coordinator on a timely basis as set by the security coordinator.

6.0 Right-of-Way: Motor Vehicles

Operators of motor vehicles in construction yards and along the ROW must possess a valid Driver's License for the type of vehicle at the time of operation by the operator.

Motor vehicles must be properly maintained for the road as well as the ROW.

Operators must follow Rules of the Road as well as obey the posted speed limit.

- 15 MPH on access roads
- 5 MPH in construction yards

When operating any motor vehicle, all distractions, including texting and talking on a cell phone, must be avoided.

7.0 Reporting Requirements

Incidents of thefts, hostile incidents, vandalism, or 'sensitive customer' issues should be reported to project security as soon as possible but no later than 24 hrs after they are discovered. Reports may be made via telephone if necessary.

Employees terminated for theft or hostile acts, incidents involving hostile employees, or criminal acts must be reported immediately. These employees will not be allowed to work on SDGE properties for any contractor.

All project keys, badges, and/or other project access identifiers used by former employees must be returned to the office of the Security Coordinator.

8.0 Gate Protocols

Lock/secure gates after entering. Gates should only be left open if workers are immediately present to control access through the gate. Gates should not be 'dummy locked' without prior approval.

Ensure the gate lock is in the proper daisy chain or locking tab order. Remember, after removing the lock; replace the same lock, in the same position. Do not use any other securing devices or ropes other than the approved locking system to secure the gate.

Keys may be distributed to project personnel on a limited basis as needed and returned upon leaving the project. Keys will be disseminated by Project Security or their designated representative.

9.0 Personal Awareness Advisory

Personal safety is based on one simple concept...**prevention**.

10.0 Security Awareness

- Call Base to report suspicious persons or activity in or around your worksite.
- Avoid walking alone at night unless absolutely necessary.
- Walk purposefully, know where you are going, and project a no-nonsense image.
- Avoid potentially dangerous situations. Avoid distractions like cell phone use without scanning your immediate area occasionally.
- If you feel threatened, leave the area, locate an emergency phone, call Base or 9-1-1
- Have your car door keys ready; as well as your cell phone at the ready.

11.0 Contact and Reporting Information

- ECO Base –Phone # 619.717.8118

- SDG&E Security Coordinator – Jack Strumsky
  Phone # 858.740.1519
  jstrumsky@semprautilities.com

- SDG&E Security Agent – Andrew Kincaid
  Phone # 213.798.8331
- SDG&E Security Agent – Charles Gouge
  Phone # 619.609.6397
- SDG&E Project Safety Lead – Mike Toby
  Phone # 619.209.9076

1.0 PROJECT OVERVIEW (SEE APPENDIX A)

The East County Substation Project will be constructed in southeastern San Diego County. It will consist of the rebuild of SDG&E's existing Boulevard Substation located in the community of Boulevard, the new East County Substation (ECO) to be constructed just east of the community of Jacumba, a new 138 kV transmission line from the rebuilt Boulevard Substation to ECO, and an interconnect (loop-in) to the SDG&E's existing 500kV Southwest Powerlink (SWPL) at the ECO Substation. The total distance of the new 138kV transmission line is 13.9 miles with an affected right of way area that ranges from 60 to 100 feet across. The Project will be constructed and maintained within the wild land areas of southern San Diego County including areas determined to be moderate, high, and very high Fire Hazard Severity Zones

All SDG&E employees are covered under the SDG&E Injury and Illness Prevention Plan (IIPP) which is provided as Appendix A. The IIPP is the governing safety policy for all SDG&E Employees. Where differences are found between the IIPP and any Project Specific Safety Plans, the more stringent requirement will be enforced.

2.0 PLAN OBJECTIVES

The objectives of this Project Specific Health and Safety Plan are as follows:

- Promote a safe work environment free from recognized hazards to workers and the public. Commit resources to detect hazards and ensure hazard correction.
- Achieve an incident-free project by advocating the belief that all incidents are preventable. Encourage consultants and contractors selected to work on this project to share and promote that same belief.
- Verify that safety policies and procedures are in place to assure worker and public health and safety.
- Enlist employee involvement with project safety to improve the quality of safety and health. This includes brainstorming, inspecting, detecting and correcting, from project startup to project completion.
- Ensure that all employees, consultants, and contractors have the knowledge, awareness, and training to accomplish the task ahead.
- Implement emergency response plans and procedures. Provide effective project communication plans and equipment.

3.0 PROJECT ORGANIZATION (SEE APPENDIX B)

A project organization chart is provided in Appendix B. The organization chart is subject to frequent revision and should only be relied upon after verifying with the appropriate manager.

4.0 RESPONSIBILITIES

4.1 Safety Team

The East County Substation Project Safety team is to work with the larger project team, and our partnering Contractors and consultants, to identify and minimize safety risks throughout the project. This will be accomplished by ensuring the proper systems and procedures are in place in

advance of construction and that, during construction, project personnel are following safe work practices as determined by applicable Federal and State rules and regulations and job safety analyses (JSAs). The East County Substation Project Safety team will draw upon expertise as required from the San Diego Gas & Electric (SDG&E) Safety team, SDG&E's construction & operations departments, Contractor's operations and safety personnel, and Cal/OSHA consultation services. The East County Substation Project Safety team's main areas of responsibility include:

- Arranging for SDG&E Employee Safety Training as needed
- Ensuring Safety Awareness presentations are administered for all Project personnel
- Identifying and acquiring Personal Protective Equipment (PPE) for SDG&E employees
- Reviewing of Contractor Safety Programs
- Inspecting and auditing Contractor field operations for compliance with safe operating procedures. Reporting deficiencies to Construction Manager
- Ensuring project personnel comply with the project Fire Plan
- Reviewing Site Security requirements and implementing necessary protocols
- Ensuring adequate Communications are in place
- Monitoring and reporting on SDG&E and Contractor Project Safety Metrics
- Ensuring Incident Notification, Investigation, & Reporting is effective
- Providing Safety & Training Records
- Coordinating Emergency & Disaster Response Procedures
- Ensuring Company Safety Compliance Requirements are met in accordance with the Environmental & Safety Compliance Management Program (ESCMP). ESCMP provides the framework for effective compliance programs in order to protect SDG&E's employees and the environment. This includes initial and annual training as well as training upon transfer to a new department or job description.
- Regularly attending and participating in Contractor's daily safety/tailboard meetings

4.2 Project Base (Base) (see Appendix C)

Project Base is located in the East County Substation Project Headquarters in Alpine. Its responsibilities are set out in Appendix C-1 and include:

- Monitoring construction field activities (both air & ground)
- Providing and/or coordinating emergency response
- Making required notifications and formally document events
- Perform routine training in various emergency scenarios as depicted in Appendix C-2

4.3 Burns & McDonnell

Burns & McDonnell (BMcD) has been retained as an owner's agent in support of the project's environmental, safety, and construction management requirements. BMcD's responsibilities with respect to safety include the following:

- Provide safety expertise and support as requested by SDG&E.

- Review Contractor safety submittals.
- Provide field safety advisors as requested to augment the efforts of SDG&E's safety team.
- Immediately report all incidents, unsafe work practices, security breaches or and third party complaints/concerns to SDG&E.

4.4 Project Manager

An SDG&E Project Manager has been assigned to lead specific areas of the Project, including the ECO substation, the underground segment, the overhead segment and the Boulevard substation upgrade. The Project Manager has the following general responsibilities with respect to safety:

- Monitor construction of the entire project, including safety performance.
- Establish and maintain safe and secure site facilities for use by SDG&E and BMcD.
- Assure all contractual requirements, including safety & health obligations and daily reporting, have been met by each Contractor and sub-Contractor on the Project.
- Act on any safety related issues brought forward for resolution by the safety team, BMcD, or the Contractor.
- Report any Contractor safety deficiencies and associated corrective action plans to the SDG&E Project Director.
- Ensure that the Contractor is taking adequate security precautions to protect the Project from risk related to associated environmental, health and safety non-compliance concerns.

4.5 Contract Administrator

The Contract Administrator will:

- Always be alert to site safety issues.
- Consult with Contractor's foreman regarding any safety concerns.
- Not hesitate to request assistance from the Safety Team on issues that are not resolved to his/her satisfaction.

The Contract Administrator is also responsible to:

- Verify that the Contractor has provided equipment and material necessary to prevent starting any fire
- Control spread of fires if started, and
- Provide assistance for extinguishing fires started as a result of transmission line construction activities.
- Report any security concerns to the project security team for investigation and resolution.

4.6 Contractors and Subcontractors (See Appendix D)

At a minimum, every Contractor and subcontractor shall establish, implement and maintain an effective Injury and Illness Prevention Program (IIPP) in accordance with Section 3203 of the

General Industry Safety Orders. The following elements are required in the IIPP:

- Management commitment/assignment of responsibilities;
- Safety communications system with employees;
- System for assuring employee compliance with safe work practices;
- Regularly scheduled inspections/evaluation system;
- Accident investigation;
- Procedures for correcting unsafe/ unhealthy conditions;
- Safety and health training and instruction; and
- Recordkeeping and documentation.

Every Contractor shall adopt a written Code of Safety Practices which relates to the employer's operations. The Code shall contain language equivalent to the relevant parts of Plate A-3 of the Appendix contained within the Cal/OSHA Construction Safety Orders. The Code of Safe Practices shall be posted at a conspicuous location at each job site office or be provided to each supervisory employee who shall have it readily available. Plate A-3 is provided as Appendix D to this Health & Safety Plan.

Every Contractor shall provide a Heat Illness Prevention Program (HIPP) in accordance with CAL-OSHA provisions.

Periodic meetings of supervisory employees shall be held under the direction of management for the discussion of safety problems and accidents that have occurred. Supervisory employees shall conduct safety meetings with their crews at least every 10 working days to emphasize safety.

Crew leaders shall conduct "toolbox" or "tailgate" meetings with their crews each day prior to commencing work. The tailgate meeting will typically cover a job task Job Safety Analysis (JSA) and ensure that all crewmembers are aware of potential hazards associated with the work to be performed and safety measures to mitigate those hazards.

5.0 APPLICABLE CODES AND SAFETY REGULATIONS

All work will be performed in compliance with the following Health and Safety Standards and applicable references there in.

- California Department of Industrial Relations, Division of Occupational Safety and Health (CAL-OSHA)
- Federal Aviation Regulations (FARS)
- State of California Public Utilities Commission, General Order 95 and 128
- Uniform Building Code (UBC)
- California Department of Transportation (CALTRANS)
- Federal OSHA

6.0 COMMUNICATIONS (SEE APPENDIX E-1)

Safety is absolutely critical for the employees working on the East County Substation Project. Effective communications are necessary to ensure everyone's safety. Appendix E-1 provides the East County Substation Project Field Communications Policies and Procedures. Everyone who goes to the field must be familiar with this policy.

7.0 COMPLIANCE WITH SAFE WORK PRACTICES

7.1 Project Safety Orientation (See Appendix F-1)

Compliance begins with awareness and training. All project personnel must attend the Safe Worker and Environmental Awareness Program (SWEAP) orientation. Wild land Fire training will be provided as part of this orientation. The SWEAP training roster is maintained by Burns & McDonnell. Hardhat stickers shall be affixed to each worker's hardhat showing they have completed this orientation.

Key elements of the SWEAP orientation are included in a SWEAP Visitor Form to be reviewed and signed by personnel making short term, non-construction related visits to the ECO project right of way. The form is included as Appendix F-1.

7.2 Employee Safety Training (SEE APPENDIX F-2)

SDG&E employees must complete all training designated as part of the annual Environmental and Safety Compliance Management Program (ESCMP). All ESCMP training is monitored on the Employee Training Matrix and entered into the MyInfo Learning Module. Some training is identified for SDG&E employees based on specific CAL-OSHA requirements, such as Heat Illness Prevention and CPR/AED/First Aid. Other Company sponsored safety training requirements include Smith System Defensive Driving. Depending on the specific job hazards anticipated for each employee, various training is assigned. Training records are documented by a sign-in sheet (normally a Form 5300) and entered into the Learning Module for SDG&E employees. For ease of tracking, a training matrix is maintained showing all required "R" and Completed "C" classes. The training matrix is frequently updated with the most current version available on the Project Share Point site. A copy of the Form 5300 is included in Appendix F-2.

7.3 Hazard Communication Program (HAZ-COM) (SEE APPENDIX G)

The Haz-com program provides employees with information and training on hazardous substances in the workplace. This Hazard Communication Program does not apply to employees who use consumer products except when consumer products are used in a duration and frequency of exposure greater than normal consumers' experience. The Haz-com program is provided as Appendix G.

7.4 Contractor Safety Training

Contractors are responsible for documenting and maintaining all training records and safety meetings for their employees and making them available to SDG&E upon request.

8.0 WILDLAND FIRE SAFETY & PREVENTION (SEE APPENDIX H)

The East County Substation Project route is located in part of San Diego County prone to wildfires. An East County Substation Project Construction Fire Prevention Plan has been developed and will be implemented on the project. The Major Projects Fire Marshal, who reports to the Major Projects Safety Lead, will be responsible for overseeing compliance with this Plan. All project employees will follow the approved Fire Prevention Plan. The Plan is included as Appendix H-1. All Fire Emergencies will be coordinated with the prime construction Contractor.

Fire safety and prevention measures will be taken to reduce the risk of fire ignition on the project. These measures include, but are not limited to:

- Training of all project personnel on wild land fire safety and prevention
- Fire patrols and fire reporting
- Fire suppression tools & equipment requirement for work in high risk fire areas
- Vegetation clearance for certain work locations or activities
- Implementing work restrictions during high or extreme fire conditions

Fire Suppression Equipment will be maintained in all project vehicles as noted above or in fire boxes to be maintained at remote work locations or as an alternative to tools carried in vehicles at accessible work locations. Equipment maintained in fire boxes will include the following (per Electric Standard Practice, ESP-113.1, attached as Appendix H-2):

- 1 - Round point shovels 46” for each employee on site
- 1 - 5 gallon backpack pump
- 2 – Pulaski’s or axes
- 2 – McLeod fire tools
- During “Elevated” fire conditions 1-5 gallon backpack pump with 10 gallons of refill water is required per 3 personnel at the work site.

Pad clearing accessible areas in or adjacent to wild land vegetation during “Elevated” fire conditions will require a standby water truck w/pump and hose with a minimum of 50 gallons staged, available, and within 1 mile of work site. Supplies of 250 gallons within 3 miles and 500 gallons within 5 miles can serve more than 1 work site.

9.0 HELICOPTER OPERATIONS (SEE APPENDIX I)

Minimal helicopter operations are anticipated on this project; however, when required, the provisions established in Appendix I-1 Helicopter Flight Safety Checklist, Appendix I-2 – Helicopter Operations Code of Safe Practices will apply.

10.0 CONSTRUCTION SAFETY--GENERAL

10.1 Job Briefing (See Appendix J)

The Contractor shall have an all-hands safety briefing at the start of each work day wherever employees congregate. This should include all personnel at the site including subcontractors, environmental monitors, and owner's representatives. In addition, the Contractor shall ensure that prior to starting any construction activity the foreman or employee in charge will call the crew and any other on-site personnel together for a "Tailgate" or "Job Briefing." Each worker should understand:

- The purpose of the job.
- What he/she is to do.
- What the other members of the crew are to do.
- The intended manner of carrying out the job.
- Any environmental considerations identified and any measures to be taken to address them.
- Potential safety hazards or trouble spots anticipated.
- How the employee in charge is proposing to overcome such problems.
- Evacuation procedures for weather, fire, other emergencies.

The employee in charge will encourage questions, comments and suggestions by the crew members. The briefing will continue until all crew members understand the job at hand. If, during the course of the work, changes in procedure become necessary, all crewmembers will be called together so that the change can be properly explained and any questions are answered. If, during the course of the work new crewmembers or visitors show up to the jobsite, they will not enter the construction zone until first meeting with the foreman or his designee and receiving a full tailgate describing the work and hazards of the job. A sample Tailgate form is provided as Appendix J.

10.2 Qualified and authorized to do work

Only those qualified and authorized to do the work will be allowed to perform any function on the Project.

- Competent Person

  One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate problems.

- Qualified Person

  One who, by possession of a recognized degree, license, certificate or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work or the project.

- Authorized Person

  A person approved or assigned by the employer to perform a specific type of duty or duties, or to be at a specific location or locations at the job site.

All personnel operating vehicles or equipment must have the proper license or permit to operate it.

10.3 Job Safety Analysis or Job Hazard Assessment

A Job Safety Analysis or Job Hazard Assessment (JSA or JHA), is required for all construction activities. The results of the analysis will be shared at tailgate meetings with all employees involved in that work.

10.4 Personal Protective Equipment (PPE)

All PPE will be furnished as needed by the workers' employer. Workers shall be familiar with the hazards of the job and wear PPE furnished to provide protection from hazards which cannot be engineered out of the work or otherwise mitigated through administrative measures. All personnel on any construction site must wear hi visibility clothing or safety vest. PPE is the last defense in providing for a worker's safety. PPE must be appropriate for the work at hand and worn properly by the worker involved. Project Managers, Field Safety Advisors, and Contract Administrators will monitor use of appropriate PPE on job sites and request Company and Contractor leadership to enforce their respective safety rules.

10.5 Awareness of Natural Hazards

There are several natural hazards in the vicinity of the project site, including rough terrain, remote worksites, dangerous species of cactus, and several species of rattlesnakes, black widow and desert recluse spiders, stinging or biting insects, ticks, and poison oak.

10.6 Prevention of Heat Illness (See Appendix K)

Heat illness is a potentially dangerous problem for those working outdoors during hot weather. All SDG&E employees will abide by the Heat Illness Prevention Plan provided as Appendix K, which includes Heat Illness Training, Drinking Water Requirements, Shade Requirements, and Heat Illness Emergency Procedures. All Contractors will have a Heat Illness Prevention Plan and will administer it per applicable Federal and State Rules and Regulations.

10.7 Fall Protection

Prior to starting operations that require fall protection, a competent person will provide a fall protection plan. The fall protection plan shall include, but not be limited to, the following: Name of qualified person in charge of the operation, description of work operation, list of fall exposures, description of fall protection methods used to eliminate the fall exposures, and training and enforcement methods used to ensure employee compliance with the plan.

10.8 Rigging

Many types of cranes, hoists, and rigging devices are used for lifting and moving materials. Competent person(s) must ensure all equipment is properly inspected and all workers are properly trained for the planned tasks.

11.0 CONSTRUCTION SAFETY--OVERHEAD TRANSMISSION

There are many hazards associated with overhead power line construction. Below are some of the areas of greatest concern with overhead transmission line construction, which require constant vigilance in adhering to all safety procedures. Just because a function or activity is not specifically addressed below does not mean it can't also be dangerous if all safety precautions are not taken. Always be aware of the hazards associated with any activity you are working around, follow all safety rules, and wear all required PPE as specified in section 10.4 or otherwise required. Always refer to the contractor's safety plan for specific hazard mitigation for the types of work being performed.

11.1 Foundation Construction

Employees entering drilled pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it in accordance with all Cal-OSHA standards. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation. Proper fall protection shall be worn by employees working on the surface around the pier holes. Contractor shall submit its Fall Protection Plan to SDG&E for review.

Jobsite personnel will verify that excavations, protection of excavations, and disposal of excavated material are being performed accordingly. Holes must be checked after digging for cave-ins, providing proper cover for personal protection for unattended holes, and setting of forms prior to pouring of concrete.

When soil material is too hard to excavate with auger or a loose boulder is encountered, it may require the use of explosives or other means. The CA is responsible to check the permits to make sure blasting is allowed and that the Contractor's personnel are qualified for the type of work required. Blasting shall be in accordance with the project permits and or local, state and federal jurisdictions, if applicable.

11.2 Induced Voltage

Induced voltage and current in a de-energized transmission line, caused by other high voltage lines nearby or by a hovering helicopter, can be created by electric-field and magnetic-field induction. These voltages and currents present a serious work hazard for line-crew personnel. Proper understanding and identification of the associated hazards are necessary to safely perform de-energized line work.

11.3 Grounding

Personal Protective Grounding (PPG) provides protection against an induced voltage from parallel and/or adjacent lines as well as accidental re-energizing of lines or cables from unknown sources. Protective Grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential. There shall be a minimum of one ground on the conductors or equipment being worked on. Contractor shall provide its grounding plan to SDG&E for review.

Multiple crews working on the same circuit shall provide their own work site Personal Protective Grounds.

12.0 CONSTRUCTION SAFETY--UNDERGROUND TRANSMISSION

There are many hazards associated with underground power line construction. Below are some of the areas of greatest concern with underground transmission line construction, which require constant vigilance in adhering to all safety procedures. Just because a function or activity is not specifically addressed below does not mean it can't also be dangerous if all safety precautions are not taken. Always be aware of the hazards associated with any activity you are working around, follow all safety rules, and wear all required PPE. Always refer to the contractor's safety plan for specific hazard mitigation for the types of work being performed.

12.1 Trenching & shoring

Trenches in soft or unstable soil, 5 feet or more in depth, must be sloped, shored or otherwise supported by means of sufficient strength to protect persons working in them.

Trenches in hard or compact soil, 5 feet in depth and 8 feet or more in length, shall be shored or the trench sides above the 5 foot level sloped to be not steeper than one foot vertical to each 1/2 foot horizontal.

Proper fall protection per Federal and State rules and regulations shall be installed and employed around trench and vault excavations.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

12.2 Traffic Safety

Employees exposed to construction and public vehicular traffic shall work within safety zones properly identified and coned off in accordance with approved traffic plans. Workers shall be provided with and shall wear warning vests or other suitable garments marked with high-visibility reflective material.

13.0 CONSTRUCTION SAFETY--SUBSTATION

There are many hazards associated with electric substation construction. Below are some of the areas of greatest concern, which require constant vigilance in adhering to all safety procedures. Just because a function or activity is not specifically addressed below does not mean it can't also be dangerous if all safety precautions are not taken. Always be aware of the hazards associated with any activity you are working around, follow all safety rules, and wear all required PPE. Always refer to the contractor's safety plan for specific hazard mitigation for the types of work being performed.

13.1 Site work

Mobile earth-moving equipment used for road construction or site development, including, but not limited to, bulldozers, motor graders, scrapers, loaders, skid steer loaders, compaction equipment, backhoes, end dumps, side dumps, and dump trucks, shall have all factory installed and/or OSHA required safety devices and alarms.

Operators and all other employees working on the ground, exposed to mobile earth-moving equipment, shall be trained in the safe work procedures pertaining to mobile earth-moving equipment and in the recognition of unsafe or hazardous conditions.

Each employee working on the ground who is exposed to mobile earth-moving equipment shall be provided with and required to wear a high-visibility warning vest or other high-visibility garments. For work during hours of darkness or low light conditions, this protective equipment must be made of or marked with retro-reflective material.

13.2 Construction Yards

A single point-of-contact yard manager needs to be in charge of each yard to manage placement of equipment and materials, to resolve issues relating to compliance, parking, etc. The final site plan must be communicated to all subcontractors working on the site and any changes must be approved by the designated site manager. The yard manager needs to oversee move-in of all subcontractors to ensure plans are carried out.

When laying out a yard, the following critical activities must be considered:

- Security related to all points of ingress/egress
- Established flight corridors and helicopter landing zones,
- Office space and delineated parking,
- Material and equipment staging areas,

- Fuel and other hazardous material storage.
- Structure assembly areas, etc.

14.0 SCHEDULED INSPECTIONS/EVALUATIONS

14.1 Environmental & Safety Compliance Program (ESCMP)

Bi-annual facility inspections will be conducted by Safety Team personnel and documented in SIMS. These facility inspections along with employee safety training will be used to demonstrate compliance with the Sempra ESCMP.

14.2 Environmental & Safety Audits

In addition to routine inspections, Sempra Internal Auditing may be requested to perform an Environmental & Safety Audit of the project. All personnel and contractors will cooperate with the audit team assigned.

15.0 INCIDENT INVESTIGATIONS (SEE APPENDIX L)

15.1 Company personnel

All SDG&E East County Substation Project employees are responsible for reporting every safety related incident, including serious injury, vehicle incident, property damage, minor injury or close call, to their Supervisor immediately after said occurrence. The employee's immediate supervisor is responsible for gathering the necessary information from the employee(s) involved and performing an incident investigation in accordance with Safety Rule 1800, Incident and Injury Reporting (attached as Appendix L).

15.2 Contractor personnel

Contractors and Consultants will immediately notify the SDG&E Construction Manager or other primary contact, by the most effective means, of all safety incidents including near misses, vehicle incidents, first-aids, OSHA recordables, hospitalization, property damage in excess of $25,000, or any serious incident resulting in death. A written summary of the incident will be submitted to the appropriate Construction Manager with a copy to the Safety Manager within 24 hours and a complete incident investigation report will be submitted within 20 calendar days of the incident. Contractor/Consultant shall cooperate with SDG&E and responsible Governmental Authorities with respect to their independent investigations of the incident.

16.0 EMERGENCIES

The frequency and severity of emergency situations can be dramatically reduced through training, safety awareness, and daily safety briefings. However, if an emergency does occur, quick and decisive action is required since delays in minutes can create or escalate life-threatening situations. In an emergency situation, SDG&E personnel involved must be prepared to respond immediately.

16.1 Emergency Action and Fire Prevention Plans (See Appendix M)

Required Emergency Action and Fire Prevention Plans, emergency phone numbers and procedures, and hospital locations are included in this section to ensure rapid, effective response to an emergency.

Each facility for the East County Substation Project will have a written Emergency Action and Fire Prevention Plan specific for that facility. These plans will be distributed, posted, and SDG&E personnel will be trained on the procedures within.

Emergency Action/Fire Prevention Plans (EAFPP) are in place to facilitate a coordinated response in the event of a workplace emergency. These plans describe the roles and responsibilities of the Facility Responsible Official, Supervisors, Employees, and Emergency Response Teams (ERT) during workplace emergencies. The plans include, but are not limited to: communication strategies; evacuation routes; procedure for accounting for all employees; rescue and medical duties (for those assigned to perform). See Appendix M for Alpine EAFP Plans.

16.2 Incident Action Plan (See Appendix N)

An Incident Action Plan was developed to establish processes and provide a general plan to help effectively manage moderate to large scale incidents that may occur during the East County Substation Project. Principles of the Incident Command System (ICS) will be used to manage each incident and help bring structure to what can often be a chaotic event lacking organization and communication. The IAP is provided in Appendix N.

16.3 Evacuation Procedures at work sites (See Appendix O)

Preparation for potential evacuation is important due to the concerns regarding the environmental hazards associated with the remote locations on East County Substation Project. An Evacuation Route Map has been developed to show safe exit routes and assembly locations. This is incorporated as Appendix O.

NOTE: This plan is to work in conjunction with Contractor's Emergency Action Plan.

16.4 Helicopter Coordination for evacuation

Flying helicopters to extraction points must be coordinated with Base and Emergency Responders. High wind or poor visibility may prevent helicopters from flying, and therefore retrieving personnel. This must be evaluated before leaving the work area.

16.5 Evacuation

In the event of fire or other site emergency, the following evacuation procedures should be followed in tracking personnel leaving the work site:

- At each work site the designated Point of Contact (POC) will verify the current head-count and notify Base.

- Base will notify Fire Dispatch and Emergency Responders of personnel locations, head-count, rally points and headings to assist in evacuation operations.
- Radios and GPS tracking units will be monitored at Project Base. Updated information will be relayed to the Project Base as needed.
- Upon arrival at rallying points, all personnel to be evacuated will be required to check out with Base before leaving.

16.6 Heavy Rain or Snow

When possible, avoid entering the project right of way during or within 24 hours following a rain event—greater than a half inch of rain. However, in the event that vehicles have already entered the right of way prior to a rain event occurring and an emergency situation arises, serious consideration must be made to traveling on access roads due to the slick conditions. Additionally, during heavy rain or snow, it may not be possible to fly helicopters due to visibility. Personnel with vehicles are advised to stay with their vehicles.

16.7 Earthquake & Landslides

Helicopter evacuation may be the safest method of evacuation if available. If an evacuation by hiking and vehicle pick up is necessary, Project Base will make an assessment of the roads to be traveled by vehicle for safety before personnel attempt to hike to an extraction point. If roads are blocked or deemed unsafe for travel, Emergency Services will be notified.

16.8 Responsibilities of All Field & Monitoring Personnel

- Assess situations and determine the action to take to ensure your safety.
- If evacuations are required, prioritize evacuations of field personnel by proximity to the immediate danger.
- Plan extraction site locations (rally points) for evacuation.
- Coordinate evacuation personnel and vehicles / helicopters
- Maintain contact with Base to coordinate efforts.
- Verify head-count at each work site with radio or cell phone.
- Assign recovery location and personnel to verify head-count.

Project Base will maintain a daily work site and head-count list of all SDG&E, Burns & McDonnell, and sub-consultants on-site personnel.

16.9 This section is intentionally left blank

16.10 This section is intentionally left blank

16.11 Emergency contact information (SEE APPENDIX P)

All SDG&E employees must ensure their emergency contact data in MyInfo is accurate.

Contract employees working under SDG&E supervision must fill out and keep current at all times, an Emergency Contact Card as shown in Appendix P. This will be kept on file at Base. All Contractors and Consultants must ensure they have current emergency contact information for all their employees.

16.12 Hazardous Spill and Waste Control

Contractor shall provide equipment and material to prevent spill of any hazardous or non-hazardous materials, control any waste generated during construction, and cleanup of all hazardous waste spills generated by the vehicles, equipment, or construction activities.

All spills and releases shall be reported to agencies in accordance with the ECO Project Hazardous Spill and Waste Control Plans.

In case of an emergency, contact Base immediately at 619-717-8118.

17.0 SAFETY EQUIPMENT

17.1 Personal Protective Equipment (PPE)

Personal protective equipment (PPE) is provided by the Company and is issued to employees to protect them from hazards that cannot be effectively engineered out of the work or administratively controlled. PPE will be issued through the East County Substation Project Safety team or through the SDG&E storerooms as needed.

Some PPE is required for every employee who works in and/or visits the field, while additional PPE is required only on a situational basis. Optional PPE is recommended but not required for employees who may encounter hazards where a specific requirement has not been established or when an individual has sensitivities to environmental conditions he/she may encounter. All PPE, required and optional, is to ensure the safety of employees from jobsite/worksite hazards. A list of required and optional PPE is provided below for all field employees:

Required Personal Protective Equipment
Hard hat meeting ANSI Z-89.1
Safety glasses meeting ANSI Z-87.1
Hi Visibility Safety vests meeting ANSI/ISEA107
Safety Toed Work boots with ankle support meeting ASTM F2413
Ear plugs (when conditions warrant) meeting ANSI S12.68
Safety goggles (when conditions warrant) meeting ANSI Z-87.1

Optional PPE and Safety Items*
Back pack (for storing small PPE items)
Sun visor
Snake chaps
Sunscreen (highly recommended) minimum SPF30
Small flash light
Mylar blanket (space blanket)

*Optional PPE is highly recommended based on conditions encountered.

17.2 Office Safety Equipment

Field offices shall be equipped with First Aid Kits, Fire Extinguishers, an Automated External Defibrillator (AED), and additional PPE and first aid supplies for restocking and employee checkout. All first aid kits shall be supplied and fully stocked per Company requirements in accordance with Cal/OSHA.

17.3 Vehicle Safety Equipment

At a minimum, all Project vehicles shall be equipped with the following: refer to ESP 113.1

First aid kit	
Fire extinguisher	2BC
Fire tools	1 round point shovel with overall length of at least 46", 1 axe or Pulaski, 1 5 gallon backpack pump.

18.0 PROJECT SECURITY (SEE APPENDIX Q)

Secure worksites are important to the safety of all project personnel. Appropriate measures must be taken to account for material and to prevent theft and vandalism. A Project Security Plan is attached as Appendix Q.

19.0 RECORDS & DOCUMENT MANAGEMENT

All records, documents, reports, and inspections including and/or pertaining to SDG&E employees or SDG&E contract employees, will be kept at the Alpine headquarters location. Some records, such as incident investigations and ESCMP inspections, may also be found archived within the SDG&E Safety Information Management System (SIMS) but a physical copy will be kept at the Alpine Headquarters location. Project documentation will also be maintained on the Project SharePoint site.

19.1 Daily Reports

Field Safety Advisors, along with Contract Administrators and other field personnel, will observe Contractor activities and document observations daily. Any unsafe conditions, effects of weather, job hazards, crew actions, etc. shall be recorded. Any violations of safety rules, regulations, suggestions, warnings, and instructions to the Contractor regarding unsafe conditions and any corrective action taken by the Contractor regarding unsafe conditions shall be recorded. Serious violations and incidents shall be reported immediately to the East County Substation Project Base and then to the East County Substation Project Safety Manager and assigned Construction Manager.

19.2 Safety Meetings and Training Documentation (See Appendix F)

All safety meetings conducted or administered by any SDG&E personnel shall be documented at a minimum by a sign-in sheet (See Appendix F-2 for a 5300 form). Sign-in sheets will note the date, time, location, topic, and every participant shall print and sign their name to show attendance.