APPENDIX A.1

COMPRESSOR STATION AND METER FACILITY DESIGN DETAILS

Table A-1. Preliminary Compressor Station Equipment List

TAG NO	QTY	DESCRIPTION	Size	PFD DWG. NO.
	1	Pig Launcher/ Receiver	36" Barrel, 1.25" Wall, 17'-10" Long	12361-1100-010
	2	Pig Receiver	16" Barrel, 0.938" Wall, 8'-8" Long	12361-1100-010
	1	Plant Flow Meter	20" OD x 72' Long	12361-1100-010
V-100	2	Slug Catcher (2 pieces)	32'-10" x 5'-4" & 29' x 5'-4"	12361-1100-010
	2	ESD Valves	30" 600lb rating	12361-1100-010
	1	Actuated Valves	30" 600lb rating	12361-1100-010
C-300(A, B,C, D, E)	5	Compressor 9000 hp EMD/Ariel KVB Frame	Skid 75' x 14'	12361-1100-011
	5	Gas Aftercooler (2 50 hp motor drive fans)	15' x 51' - 30mm btu/hr	12361-1100-011
	5	Coalescing Filter Separator 1415 psig @ -20/150 °F	Size TBD	12361-1100-011
F-300	1	Vortex Separator 1415 psig @ -20/150 °F	Size TBD	12361-1100-011
H-100	1	Heater (TBD)	Size TBD	12361-1100-011
	4	Actuated Valve (Monitor Regulators)	Size TBD	12361-1100-011
	9	Control Valve	16" - 1500lb rating	12361-1100-011
	1	Fixed Position Back Pressure Valve	16" - 1500lb rating	12361-1100-011
F-400	11	Filter Coalescer	Size TBD	12361-1100-011
V-400 (A, B)	2	Dehydration Regen skid	13' x 40' x 12' H	12361-1100-011
	2	Overhead Cooler Skid	12' x 25' x 12' H	Vendor
	2	TEG Reboiler	72" O.D. x 24'	Vendor
	2	TEG Contactor	78" ID x 28' S/S	Vendor
	2	Stahl Column	20" O.D. x 10'	Vendor
	2	Still/Reflux condenser	30" O.D. x 20'	Vendor
	2	TEG Surge Tank	54" O.D. x 24'	Vendor
	1	Pig Launcher/Receiver	16" Barrel, 0.938" Wall, 8'-8" Long	12361-1100-012
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-012
V-600 (A,B,C,D)	3	Wellhead Separator 3540 psig @ -20/150°F	24" O.D. x 96" Long	12361-1100-012
	1	Chemical Injection skid	10' x 10'	12361-1100-012
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-012
	3	Control Valves	6" - 1500lb rating	12361-1100-012
	6	Actuated Valve	10" - 1500lb rating	12361-1100-012
	3	ESD Valve	10" - 1500lb rating	12361-1100-012
	2	Pig Launcher/Receiver	16" Barrel, 0.938" Wall, 8'-8" Long	12361-1100-013
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-013

Table A-1. Preliminary Compressor Station Equipment List

TAG NO	QTY	DESCRIPTION	Size	PFD DWG. NO.
V-700 (A,B,C)	3	Wellhead Separator 3540 psig @ - 20/150°F	24” O.D. x 96” Long	12361-1100-013
	1	Chemical Injection skid	10' x 10'	12361-1100-013
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-013
	3	Control Valves	6" - 1500lb rating	12361-1100-013
	6	Actuated Valve	10" - 1500lb rating	12361-1100-013
	3	ESD Valve	10" - 1500lb rating	12361-1100-013
`	2	Pig Launcher/Receiver	20" Barrel, 0.938" Wall, 9’-7” Long	12361-1100-014
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-014
V-800 (A,B,C)	3	Wellhead Separator 3540 psig @ - 20/150°F	24” O.D. x 96” Long	12361-1100-014
	1	Chemical Injection skid	10' x 10'	12361-1100-014
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-014
	3	Control Valves	6" - 1500lb rating	12361-1100-014
	6	Actuated Valve	10" - 1500lb rating	12361-1100-014
	3	ESD Valve	10" - 1500lb rating	12361-1100-014
`	1	Pig Launcher/Receiver	20" Barrel, 0.938" Wall, 9’-7” Long	12361-1100-015
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-015
V-800 (A,B,C)	3	Wellhead Separator 3540 psig @ - 20/150°F	24” O.D. x 96” Long	12361-1100-015
	1	Chemical Injection skid	10' x 10'	12361-1100-015
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-015
	3	Control Valves	6" - 1500lb rating	12361-1100-015
	6	Actuated Valve	10" - 1500lb rating	12361-1100-015
	3	ESD Valve	10" - 1500lb rating	12361-1100-015
T-500	3	Produced Water Storage Tank (750 Bbl API-12F)	15'-6" O.D. x 24" High	12361-1100-016
P-500	1	Produced Water Disposal Pump TBD	Size TBD	12361-1100-016
	5	VFD's (1400.13kv-6kv 380fla)	10' x 35'	Electrical Drawings
	1	Transformer 1000.115kvD-13.8kvY	12' x 20'	Electrical Drawings
	2	MCC (1010.480V 1600aH 800aV 65kaI)	10' x 40'	Electrical Drawings
	1	13kv Switch gear	TBD	Electrical Drawings
	1	Transformer 1001. 13kvD-480vY	12' x 20'	Electrical Drawings
	3	Manual 115Kv1200a No Load Switch	TBD	Electrical Drawings
	3	BusMtd 115Kv74kMCOV Arrestor	TBD	Electrical

Table A-1. Preliminary Compressor Station Equipment List

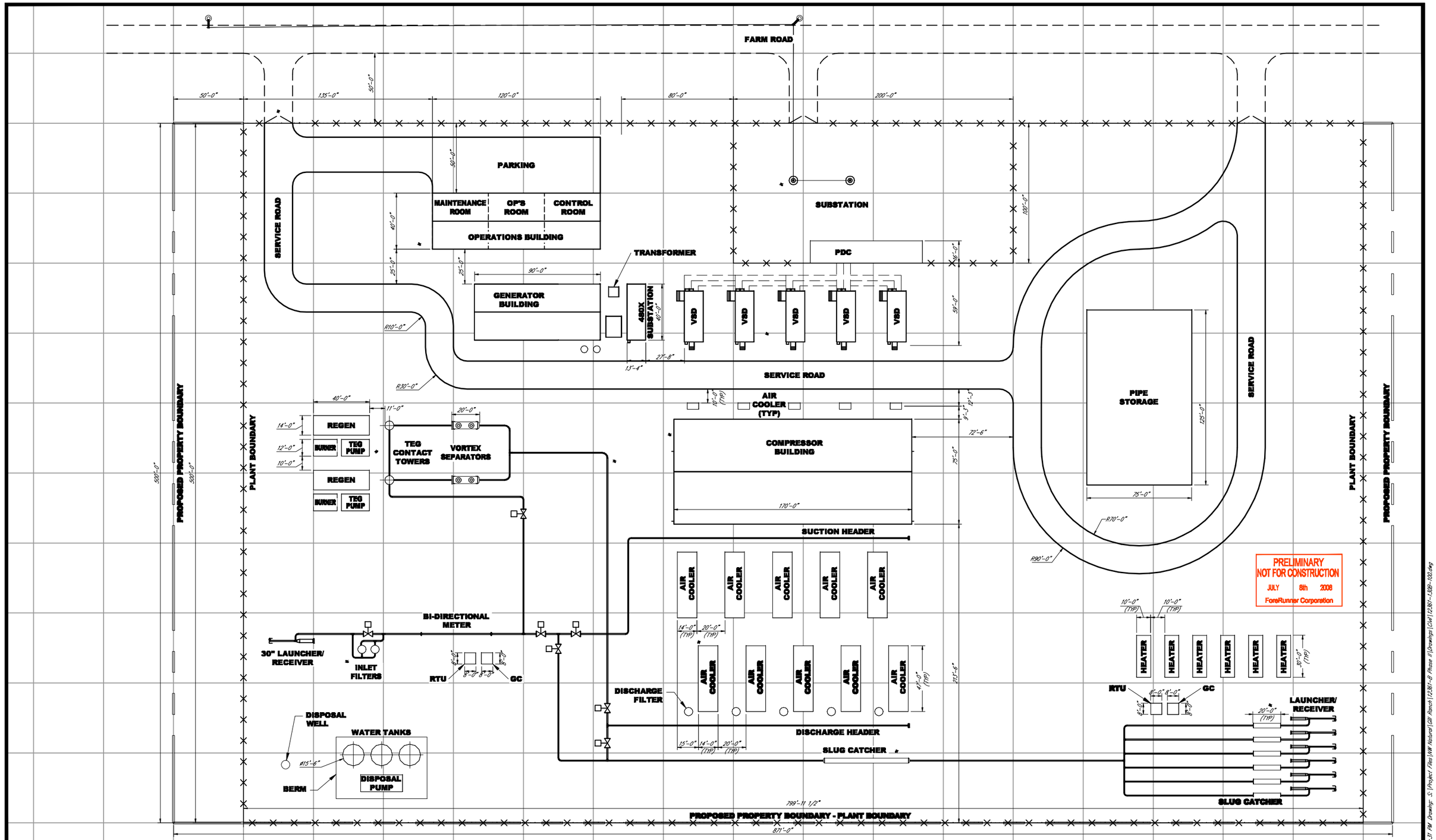
TAG NO	QTY	DESCRIPTION	Size	PFD DWG. NO.
				Drawings
	3	BusMtd Combo Current Voltage Transformer	TBD	Electrical Drawings
	1	Revenue Meter	TBD	Electrical Drawings
	1	GFC Switch 115Kv1200a	TBD	Electrical Drawings
	2	Communication Tower	Apprx 100'	Electrical Drawings

Table A-2. Compressor Station Estimated Surface Area of Impervious Surfaces

Description	Length	Width	Number	Total SA
Compressor Bldg	165	65	1	7507.5
Air Coolers	15	49	5	3675
Water Tank & Containment	65	50	1	3250
Main Transformer Pad	12	20	1	240
Protective Relay Enclosure	8	8	1	64
PDC	80	16	1	1280
Generator Bldg	75	50	1	3750
420V MCC	10	40	1	400
480V Transformer	10	10	1	100
Operations Bldg	150	50	1	7500
Dehy Regen Skids	14	40	2	1120
Dehy Towers	15	15	2	450
Compressor VFD's	10	35	5	1750
Service Road E	1131	20	1	22620
Service Road W	325	20	1	6500
Estimate surface area with 20% extra factor			**72247.8**	**sq ft**

Table A-2. Compressor Station Estimated Surface Area of Impervious Surfaces

Description	Length	Width	Number	Total SA
Compressor Bldg	165	65	1	7507.5
Air Coolers	15	49	5	3675
Water Tank & Containment	65	50	1	3250
Main Transformer Pad	12	20	1	240
Protective Relay Enclosure	8	8	1	64
PDC	80	16	1	1280
Generator Bldg	75	50	1	3750
420V MCC	10	40	1	400
480V Transformer	10	10	1	100
Operations Bldg	150	50	1	7500
Dehy Regen Skids	14	40	2	1120
Dehy Towers	15	15	2	450
Compressor VFD's	10	35	5	1750
Service Road E	1131	20	1	22620
Service Road W	325	20	1	6500
Estimate surface area with 20% extra factor			**72247.8**	**sq ft**



NOTES:

1.

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		P6	ISSUED PRELIMINARY	SJB	5/29/08				CLIENT		
		P5	RESIZED COMP BLD, ADDED COOLERS & PWR LINES	MCW	05/13/08				PROJECT MGMT.		
		P4	**REVISED EQUIPMENT LAYOUT & RENAMED DWG NUM**	**MCW**	**04/02/08**				PROCESS		
		P3	**REVISED SUBSTATION SIZE**	**NBH**	**03/5/08**				MECHANICAL		
		P2	REVISED COMPRESSOR/ELECTRICAL LAYOUT	NBH	02/20/08				PIPING		
–	–	P1	PRELIMINARY FOR CLIENT REVIEW	GAN	10/18/07				STRUCTURAL		
									ELECTRICAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE	I & C		

FORERUNNER CORPORATION
2000 S. Bannock Ste. #200
Littleton, CO 80120
303-201-1325

GILL RANCH STORAGE

GILL RANCH SITE PLAN

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
1"=30'	12361-B		12361-130B-100	P7

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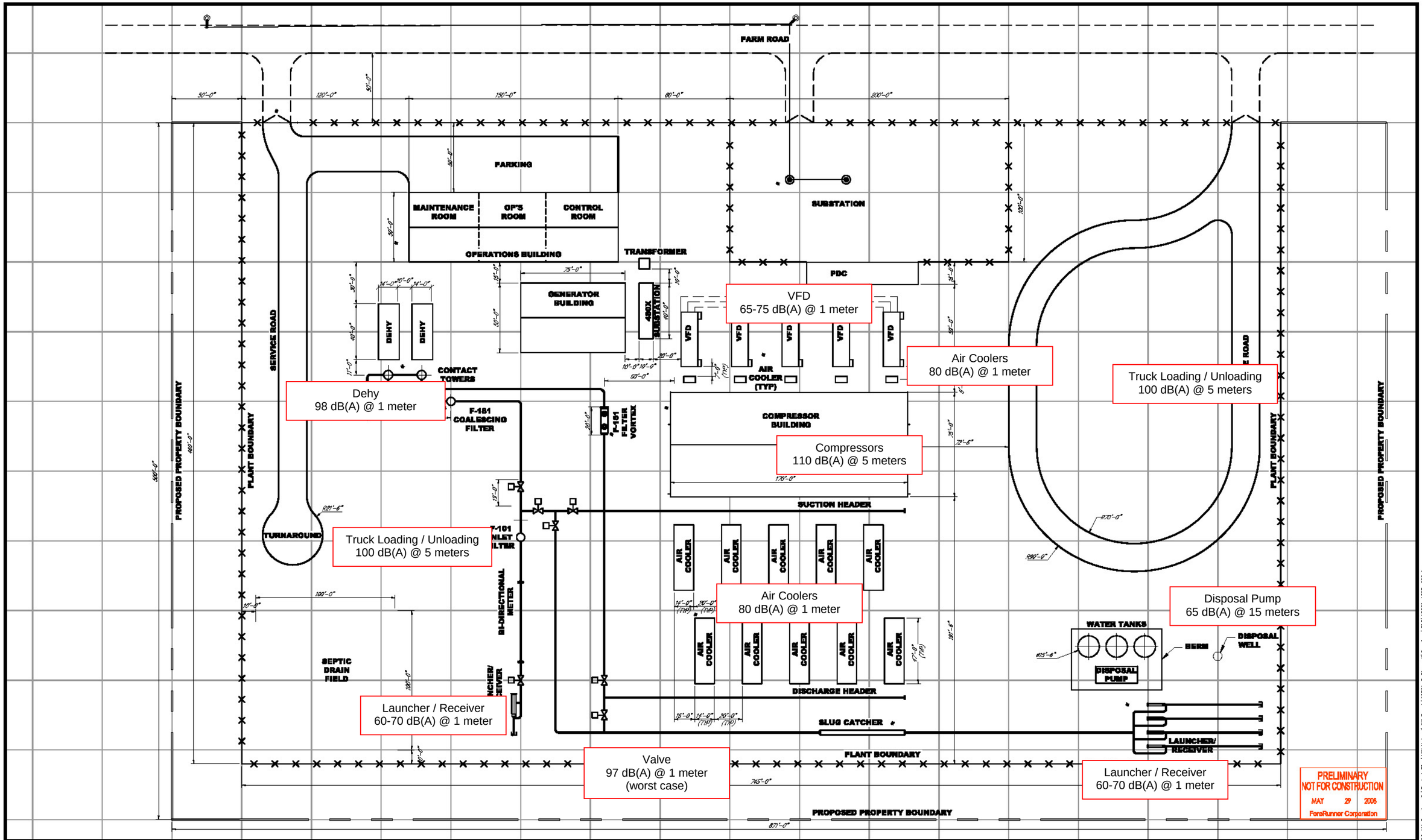

NOTES:
1.

REFERENCE DRAWINGS			
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DWG. NO.	TITLE		

REVISIONS						
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P5	RESIZED COMP BLD, ADDED COOLERS & PWR LINES	MCW	05/13/08			
P4	REVISED EQUIPMENT LAYOUT & RENAMED DWG NUM	MCW	04/02/08			
P3	REVISED SUBSTATION SIZE	NBH	03/15/08			
P2	REVISED COMPRESSOR/ELECTRICAL LAYOUT	NBH	02/20/08			
P1	PRELIMINARY FOR CLIENT REVIEW	GAN	10/18/07			
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE

ENGINEERING RECORD		
DRAWN	G.NELSON	10/16/07
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH SITE PLAN

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
1"=30'	12361-B		12361-130B-100	P6

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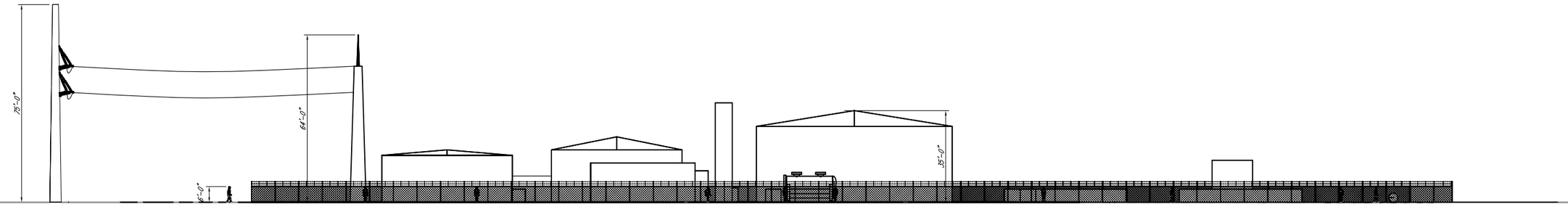

ELEVATION LOOKING EAST

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

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		P1	PRELIMINARY FOR CLIENT REVIEW	MCW 04/11/08			
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE	

ENGINEERING RECORD		
DRAWN	G.NELSON	10/16/07
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

FORERUNNER CORPORATION
2900 E. Wadsworth Blvd. #300
Lakewood, CO 80228
303-989-0228

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING EAST

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV.
NONE	12361-B		12361-130B-100B	P4

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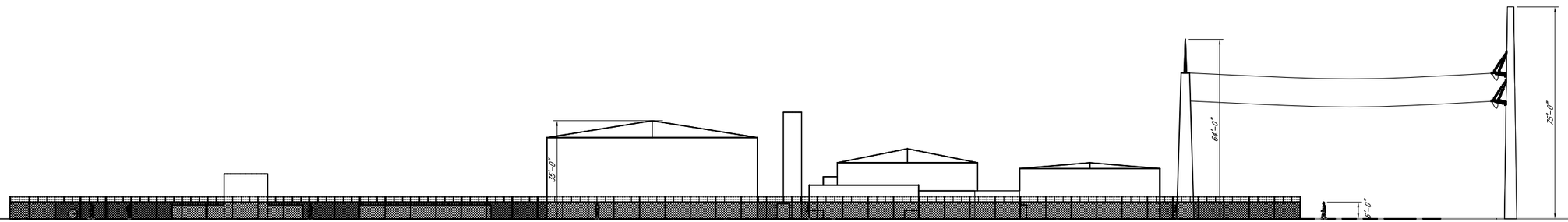

ELEVATION LOOKING WEST

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS		REVISIONS						ENGINEERING RECORD		
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								CHECKED		
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								PROJECT MGMT.		
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		P3	ADDED VIEWING DISTANCE	DRO	05/22/08			MECHANICAL		
		P2	RESIZED COMP BLD, ADDED COOLERS & PWR LINES	MCW	05/13/08			PIPING		
		P1	PRELIMINARY FOR CLIENT REVIEW	MCW	04/10/08			STRUCTURAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE	ELECTRICAL		
										I & C		

FORERUNNER CORPORATION
2900 S. Wadsworth Blvd. #800
Lakewood, CO 80228
303-989-0228

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING WEST

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
NONE	12361-B		12361-130B-100C	P4

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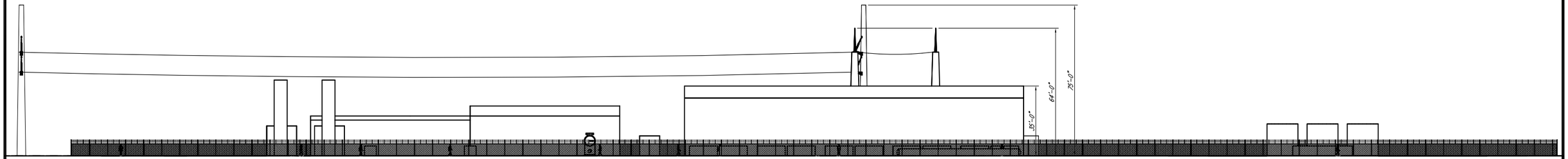

ELEVATION LOOKING NORTH

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS		REVISIONS						ENGINEERING RECORD		
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								CHECKED		
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								PROJECT MGMT.		
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		P1	PRELIMINARY FOR CLIENT REVIEW	MCW 04/11/08				STRUCTURAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE		ELECTRICAL		
								I & C		

FORERUNNER CORPORATION
2900 E. Wadsworth Blvd. #200
Littleton, CO 80123
303-933-0123

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING NORTH

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV.
NONE	12361-B		12361-130B-100D	P4

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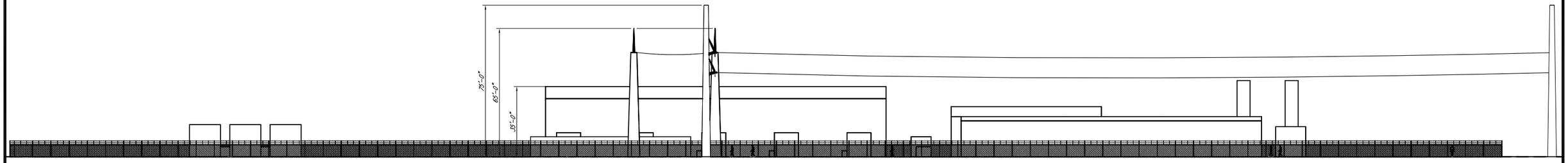

ELEVATION LOOKING SOUTH

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS		REVISIONS					ENGINEERING RECORD		
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							CLIENT		
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		P2	RESIZED COMP BLD, ADDED COOLERS & PWR LINES	MCW 05/13/08			PIPING		
		P1	PRELIMINARY FOR CLIENT REVIEW	MCW 04/11/08			STRUCTURAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE	ELECTRICAL		
							I & C		

FORERUNNER CORPORATION
2900 S. Wadsworth Blvd. #800
Lakewood, CO 80228
303-989-0228

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING SOUTH

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
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PIG LAUNCHERS / RECEIVERS

WATER HANDLING

WATER SEPARATION

GAS COOLING

GAS COOLING

GAS COOLING

GAS COOLING

GAS COOLING

GAS COOLING

GAS COOLING

GAS COOLING

GAS COOLING

COMPRESSOR BUILDING

VFD

VFD

VFD

VFD

VFD

POWER DISTRIBUTION

ELECTRICAL SUBSTATION

STANDBY POWER GENERATION

OPERATIONS BUILDING

PIG RECEIVER

INLET GAS FILTRATION

GAS FILTRATION

GAS CONDITIONING

GAS CONDITIONING

CONTACT TOWERS

ELEVATION LOOKING FROM NORTHWEST

SCALE: NONE

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS		REVISIONS					ENGINEERING RECORD		
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DWG. NO.	TITLE	REV.	DESCRIPTION	BY	DATE	CHK DATE APPR DATE	ELECTRICAL		
							I & C		

FORERUNNER CORPORATION
2900 S. Wadsworth Blvd. #300
Lakewood, CO 80236
303-989-1028

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING FROM NORTHWEST

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
NONE	12361-B		12361-130B-100F	P3

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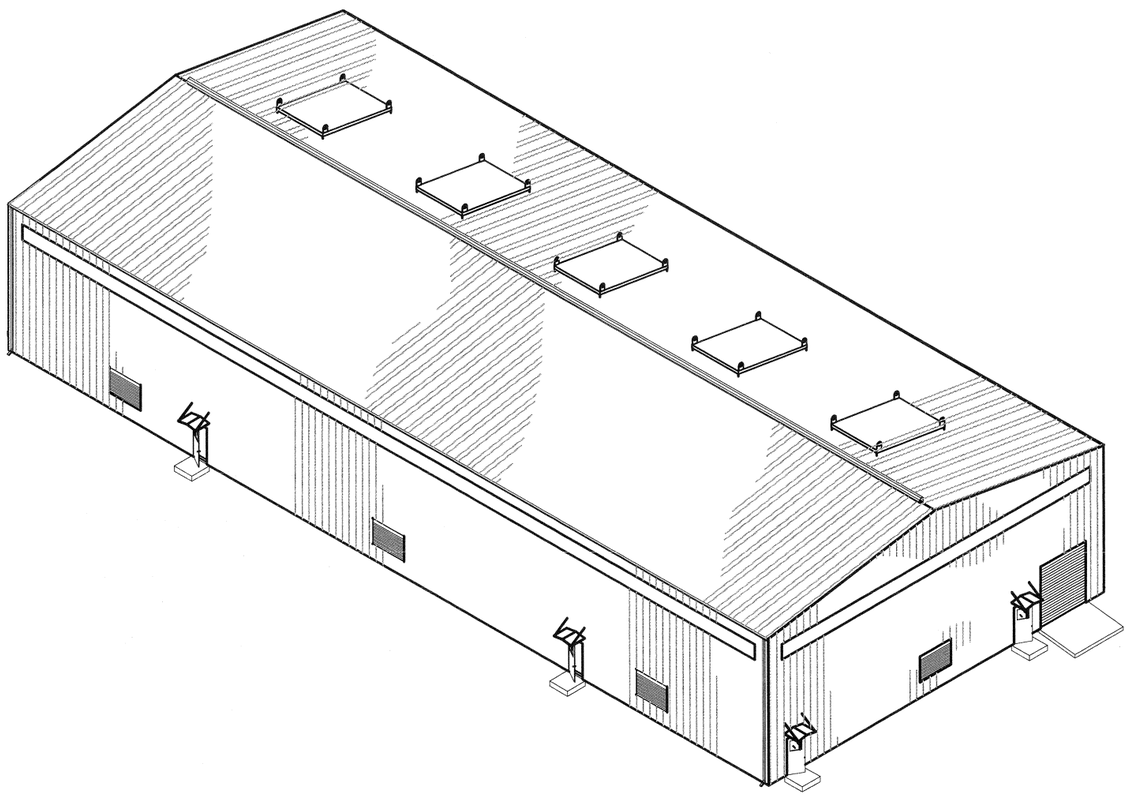


DESIGN CRITERIA & LOADS

DESIGN CODE	CBC-2007 (ADAPTATION OF IBC-2006/ASCE 7-05)
LOCAL ORDINANCES	MADEIRA COUNTY, CA
DEAD LOAD	WEIGHT OF ALL STRUCTURAL MATERIALS
SNOW	N/A, ROOF LL = 20 PSF
WIND	90 MPH, EXPOSURE "C" I_W = 1.0
SEISMIC	SDC = D, OCCUPANCY CATEGORY II, I_E = 1.0 Ss = 0.48, S_1 = 0.27
BRIDGE CRANE	7.5 T ELECTRIC-DRIVEN (ALL MOVEMENTS) REMOTE-CONTROLLED W/ACCESS LADDER AT THE END OF THE BUILDING, WITH PLATFORM AND HANDRAILS OVER THE GIRDER (S); W/SPARK-FREE FEATURES
COLLATERAL LOADS	10 PSF ROOF LOAD (MECHANICAL + ELECTRICAL) ROOF CONSTRUCTION LOAD POINT LOAD 250 lb.
CONTINGENCY LOADS AT FRAMES /RAFTERS	2 KIPS VERTICAL LOAD APPLIED AT ANY LOCATION 2 KIPS AT ANY POINT 2 FEET FROM THE COLUMN
SPECIAL LOADS	CABLE TRAYS & OTHER LOADS AS SHOWN & SPECIFIED
LATERAL DEFLECTION	AS PER TABLE 1604.3 IBC-2006
LOAD COMBINATIONS	AS RECOMMENDED BY ASCE 7-05
STRUCTURAL CONNECTIONS	ASTM A325 BOLTS

BUILDING SHOP DRAWINGS SHALL BE PE-STAMPED AND SUBMITTED FOR APPROVAL PRIOR TO FABRICATION.

ROOF, WALL PANELS & TRIM

BUILDING SHALL BE WEATHER TIGHT (NOT PRESSURIZED.)
ROOF SHALL BE WATERTIGHT

EXTERIOR ROOF PANELS	24 GAUGE MINIMUM/15 YEARS PAINT WARRANTY
EXTERIOR WALL PANELS	24 GAUGE MINIMUM
INTERIOR ROOF LINER PANELS	26 GA PERFORATED LINER FOR SOUND CONTROL
INTERIOR WALL LINER PANELS	26 GA FULL HEIGHT PERFORATED FOR SOUND CONTROL

EXTERIOR TRIM, FLASHING, GUTTERS AND DOWN SPOUTS 26 GAUGE MINIMUM

CADMIUM-PLATED CARBON STEEL SELF-DRILLING FASTENERS WITH LOOSE STEEL AND NEOPRENE WASHER, PAINTED TO COMPLIMENT ADJACENT PANELS, SHALL BE USED TO ATTACH THE PANELS TO THE SECONDARY MEMBERS.

CLOSED CELL, PRE-FORMED CLOSURE STRIPS HAVING A PROFILE MATCHING THE PANEL CONFIGURATION SHALL BE PROVIDED AT THE EAVE, RAKE AND RIDGE

ALL EXTERIOR, INTERIOR PANELS AND TRIM SHALL BE PAINTED PER SCHEDULE (SEE BELOW)

INSULATION

THERMAL INSULATION SHALL HAVE MINIMUM R-VALUES AS FOLLOWS:
R-13 FOR ROOF
R-11 FOR WALLS
R-11 FOR DOORS

ACOUSTIC INSULATION N/A

DOORS

PERSONNEL DOORS

ALL PERSONNEL DOORS SHALL BE EQUIPPED WITH THE FOLLOWING:

- RAIN CANOPIES W/BRACING
- INSULATED STEEL (16ga MIN.) (3) STEEL TEMPLATE HINGES
- DOOR CYLINDER, LOCK, LATCH, CLOSURE & BRACKET
- THRESHOLD, WEATHER-STRIPPING
- TEMPERED INSULATED SAFETY GLASS
- KEYED ALIKE
- PANIC HARDWARE
- PAINTED PER SCHEDULE (SEE BELOW)

(A) SINGLE PERSONNEL DOORS	3070 NOMINAL SIZE	
DOUBLE PERSONNEL DOORS	6070 NOMINAL SIZE	N/A

OVERHEAD DOORS

ALL ROLL-UP OVERHEAD DOORS SHALL BE:

- EQUIPPED WITH DRUM
- MANUAL CHAIN OPERATED
- INSULATED

(B) (2) 10' W X 12'H NOMINAL SIZE

WINDOWS & TRANSLUCENT PANELS

STANDARD BUILDING VENDOR ITEMS:

(C) 3'-HIGH TRANSLUCENT PANELS	AS SHOWN, INTERIOR & EXTERIOR FOR SOUND CONTROL	
4'X 4' DOUBLE – GLAZED WINDOWS	N/A	

HEATING, VENTILATION & A/C

HEATING

SPACE HEATERS	TBD
DESIGN TEMPERATURE RANGES	60F MIN DURING THE CLODEST AMBIENT

VENTILATION
NATURAL DRAFT VENTILATION SYSTEM WITH FORCED PURGE/EXCHAUST
PROVIDE MINIMUM OF (6) ACPH [AIR CHANGES PER HOUR] NORMALLY, 12 ACPH FOR EMERGENCY PURGE SYSTEM COMPONENTS:

(D)
- RIDGE VENT OR ROOFTOP VENTILATION UNITS FOR EXAHUST

(E)
- EXHAUST FANS
- INTAKE LOUVERS

DESIGN TEMPERATURE RANGES	85F MAX DURING THE HOTTEST AMBIENT

A/C N/A

FRAMED OPENINGS

ROOF FRAMED OPENINGS (CURB CONSTRUCTION W/REMOVABLE COVER) FOR MOTOR REMOVAL – 10'X15'
WALL FRAMED OPENINGS FOR PIPE PENETRATIONS AS SHOWN
WALL FRAMED OPENINGS FOR CABLE TRAYS ENTRY

VENDOR SHALL SUPPLAY EXTRA SIDING, INSUDATION, FLASHING, CAULCKING MATERIALS TO CLOSE THE GAPS AROUND THE WALL/ROOF PENETRATIONS & FRAMED OPENINGS

MISCELLANEOUS ACCESSORIES

(LATER)

ELECTRICAL

SEE ELECTRICAL DRAWINGS FOR WIRING, LIGHTING, LIGHTNING PROTECTION, GROUNDING, ETC.
ELECTRIC AREA CLASSIFICATION INSIDE THE BUILDING SHALL BE **CLASS 1, DIV. 2**

COLOR / FINISH SCHEDULE:

PRIMARY STRUCTURAL MEMBERS:	RED OXIDE PRIMED
SECONDARY STRUCTURAL MEMBERS:	PRE-PRIMED
ROOF PANELS:	.....
WALL PANELS:	.....
RAKE TRIM:	.....
DOWNSPOUTS:	.....
EXTERIOR WALL TRIM:	.....
PERSONNEL DOORS:	MANUFACTURER'S STANDARD PRIMER. FINISH PAINTED TO MATCH WALL COLOR
ROLL-UP DOOR:	MANUFACTURER'S STANDARD PRIMER. FINISH PAINTED TO MATCH WALL COLOR
ROOF HOODS: (EXTERIOR ONLY)	.....
WALL FANS: (EXTERIOR ONLY)	.....
ICE / SNOW CANOPY	.....

NOTES:
1.

REFERENCE DRAWINGS		REV.	DESCRIPTION	BY / DATE	CHK / DATE	APPR / DATE
		B	ISSUED FOR CLIENT'S REVIEW	SJB 7/09/08		
–	–	A	ISSUED FOR REVIEW	KLH 6/13/08		
DWG. NO.	TITLE					

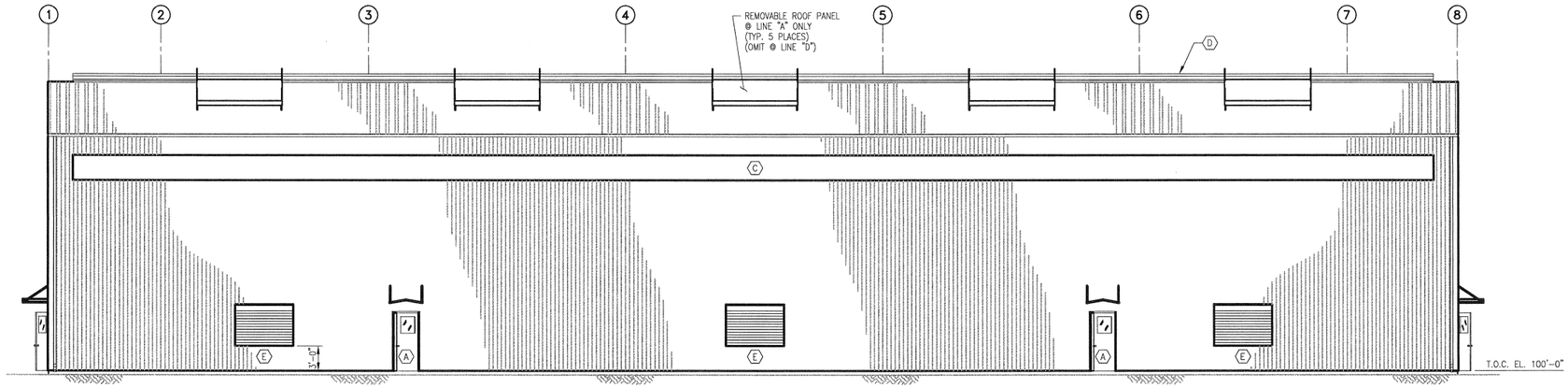
ENGINEERING RECORD		
DRAWN	KLH	6/13/08
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

FORERUNNER CORPORATION
2900 S. Washington Blvd. #900
Lawrence, CO 80239
303-980-8888

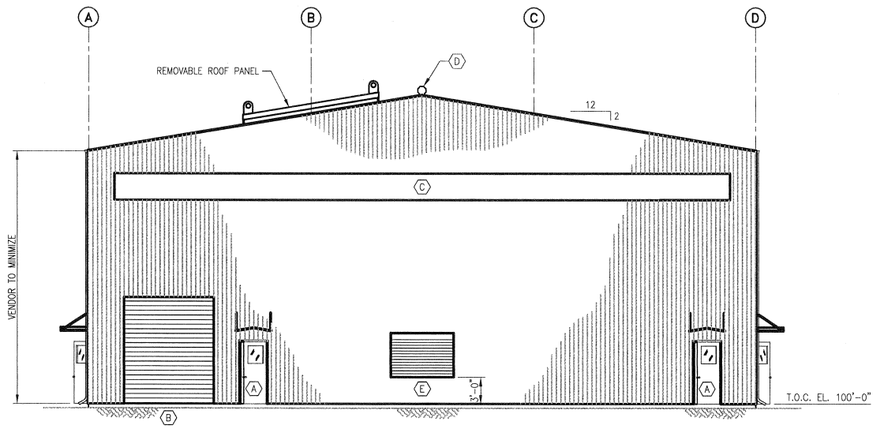
GILL RANCH STORAGE

GILL RANCH STORAGE
ARCHITECTURAL
COMPRESSOR BUILDING

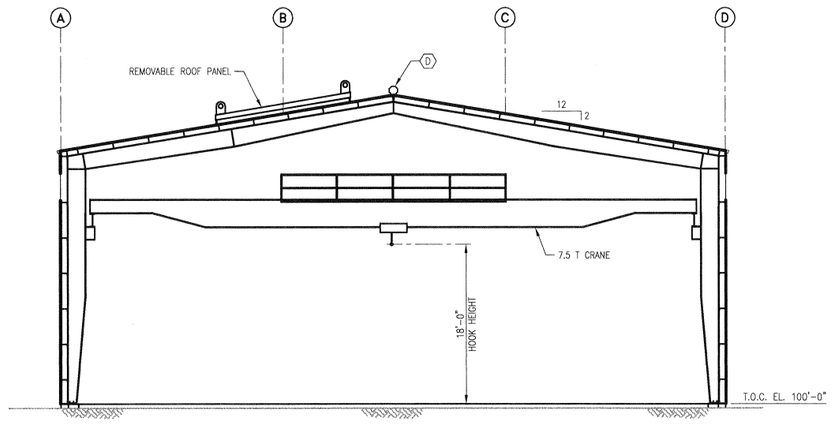
SCALE	PROJ. NO.	QTY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361–B		12361-160B-100	B



ELEVATION @ LINES D & A (O.H.)
SCALE: 1/8"=1'-0"



ELEVATION @ LINES 1 & 8 (O.H.)
SCALE: 1/8"=1'-0"



TYPICAL BUILDING SECTION
SCALE: 1/8"=1'-0"

NOTES:
1.

REFERENCE DRAWINGS		REVISIONS					ENGINEERING RECORD		
							DRAWN	KLH	6/13/08
							CHECKED		
							CLIENT		
							PROJECT MGMT.		
							PROCESS		
							MECHANICAL		
							PIPING		
		B	ISSUED FOR CLIENT'S REVIEW	SJB	7/09/08		STRUCTURAL		
–	–	A	ISSUED FOR REVIEW	KLH	6/13/08		ELECTRICAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY	DATE	CHK DATE / APPR DATE	I & C		

FORERUNNER CORPORATION
3200 S. Wadsworth Blvd. #800
Lakewood, CO 80227
303-989-8823

GILL RANCH STORAGE

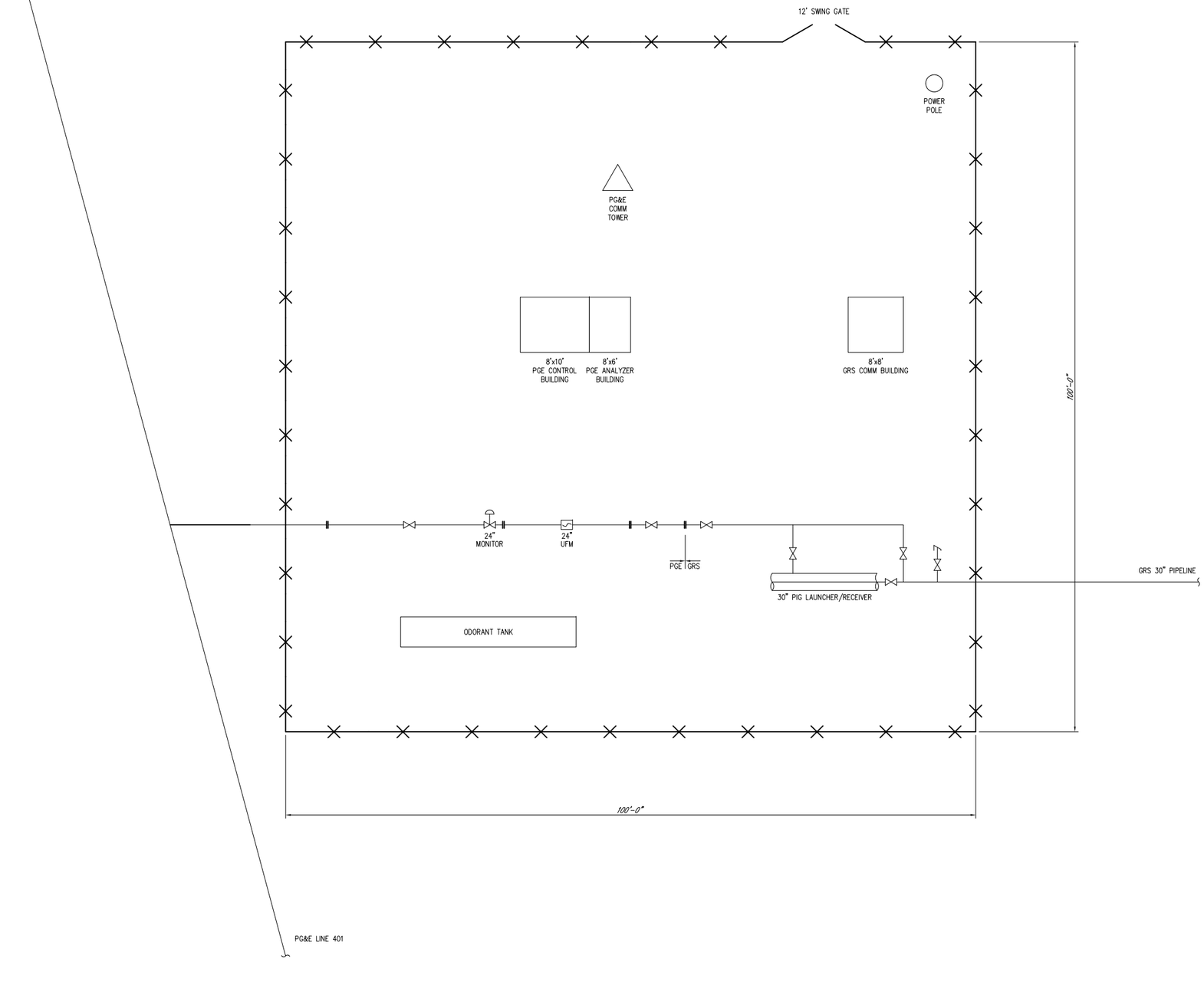
GILL RANCH STORAGE
ARCHITECTURAL
COMPRESSOR BUILDING
ELEVATIONS & SECTION

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-B		12361-160B-102	B

Table A-3. Storage Tap Facility Equipment List

TAG NO	QTY	ForeRunner Equipment	Size	PFD DWG. NO.
	1	Pig Launcher	36” Barrel 1.25” Wall 17’ -10” Long	TBD
	1	Block Valve	30” –600lb rating	TBD
	2	Blow Down Valve	4” – 600lb rating	TBD
		PLC	TBD	TBD
		Radio Tower	Apprx. 40'-100’	TBD

TAG NO	QTY	PG&E Equipment	Size	PFD DWG. NO.
TBD	TBD	Pressure Relief	Size TBD	TBD
TBD	TBD	ESD Valve	Size TBD	TBD
TBD	TBD	All other Equip TBD	Size TBD	TBD



PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS		REVISIONS					ENGINEERING RECORD		
							DRAWN	S. BOOTH	5/23/08
							CHECKED		
							CLIENT		
							PROJECT MGMT.		
							PROCESS		
							MECHANICAL		
		P2	ISSUED PRELIMINARY	SJB 5/29/08			PIPING		
–	–	P1	PRELIMINARY	SJB 5/23/08			STRUCTURAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE	ELECTRICAL		
							I & C		

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Lakewood, CO 80228
303-989-0228

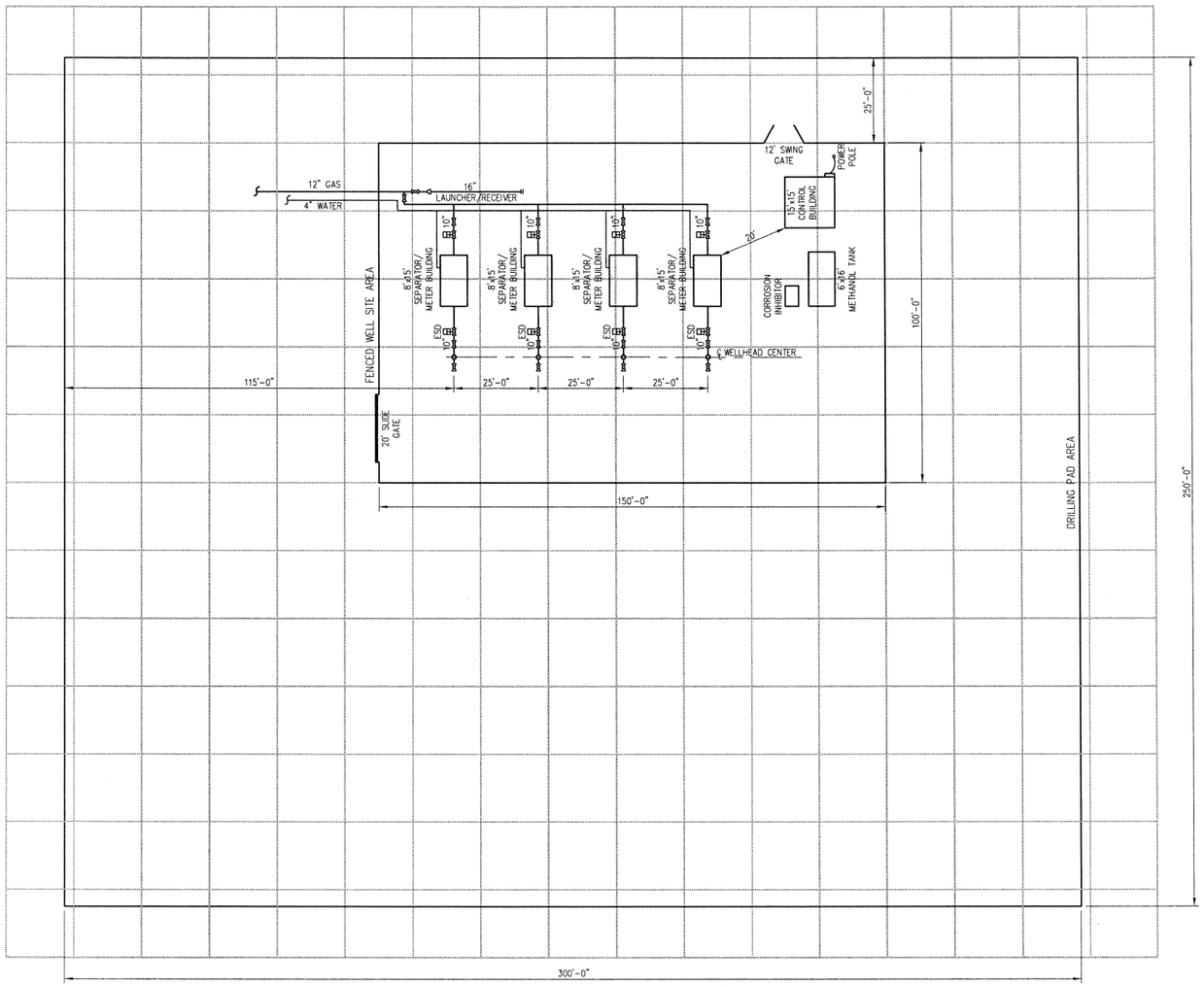
GILL RANCH STORAGE

GILL RANCH STORAGE / PG&E INTERCONNECT SITE PLAN

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV.
1/8"=1'-0"	12361-F		12361-130F-100	P2

Plotted by: SJBOOTH Date: 5/29/2008 9:29 AM Drawing: S:\Project Files\WM Natural\Gill Ranch\12361-F - Drawings\Civil\12361-130F-100.dwg

N



NOTES:
1.

REFERENCE DRAWINGS		REVISIONS						ENGINEERING RECORD		
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								CHECKED		
								CLIENT		
								PROJECT MGMT.		
		P4	REVISED PRELIMINARY	SJB	06/15/08			PROCESS		
		P3	REVISED LAYOUT	SJB	06/19/08			MECHANICAL		
		P2	REVISED DRAWING NUMBER	MCW	04/11/08			PIPING		
--	--	P1	PRELIMINARY	CAN	10/18/07			STRUCTURAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE	ELECTRICAL
										I & C

FORERUNNER CORPORATION
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GRS

GILL RANCH STORAGE

GILL RANCH STORAGE
TYPICAL WELL PAD SITE LAYOUT

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
1"=20'	12361-D		12361-130D-200	P4

Electric and Magnetic Fields

The California Public Utilities Commission (CPUC) and the California Department of Health Services (CDHS) have not concluded that exposure to magnetic fields from utility electric facilities is a health hazard. Many reports have concluded that the potential for health effects associated with electric and magnetic field (EMF) exposure is too speculative to allow the evaluation of impacts or the preparation of mitigation measures.

EMF is a term used to describe electric and magnetic fields that are created by electric voltage (electric field) and electric current (magnetic field). Power frequency EMF is a natural consequence of electrical circuits, and can be either directly measured using the appropriate measuring instruments or calculated using appropriate information.

Electric Fields

Electric fields are present whenever voltage exists on a wire, and are not dependent on current. The magnitude of the electric field is primarily a function of the configuration and operating voltage of the line and decreases with the distance from the source (line). The electric field can be shielded (i.e., the strength can be reduced) by any conducting surface, such as trees, fences, walls, buildings, and most types of structures. The strength of an electric field is measured in volts per meter (V/m) or kilovolts per meter (kV/m).

Magnetic Fields

Magnetic fields are present whenever current flows in a conductor, and are not dependent on the voltage present on the conductor. The strength of these fields also decreases with distance from the source. However, unlike electric fields, most common materials have little shielding effect on magnetic fields.

The magnetic field strength is a function of both the current on the conductor and the design of the system. Magnetic fields are measured in units called Gauss. However, for the low levels normally encountered near power systems, the field strength is expressed in a much smaller unit, the milligauss (mG), which is one thousandth of a Gauss.

Power frequency EMF is present where electricity is used. This includes not only utility transmission lines, distribution lines, and substations, but also the building wiring in homes, offices, and schools, and in the appliances and machinery used in these locations. Typical magnetic fields from these sources can range from below 1 mG to above 1,000 mG (1 Gauss).

Magnetic field strengths diminish with distance. Fields from compact sources (i.e., those containing coils such as small appliances and transformers) decrease in inverse proportion to the distance from the source cubed. For three-phase power lines with balanced currents, the

magnetic field strength drops off inversely proportional to the distance from the line squared. Fields from unbalanced currents, which flow in paths such as neutral or ground conductors, fall off inversely proportional to the distance from the source. Conductor spacing and configuration also affect the rate at which the magnetic field strength decreases.

The magnetic field levels of PG&E's overhead and underground transmission lines will vary depending upon customer power usage. Magnetic field strengths for typical PG&E transmission line loadings at the edge of rights-of-way are approximately 10 to 90 mG. Under peak load conditions, the magnetic fields at the edge of the right-of-way would not likely exceed 150 mG. There are no long-term, health-based state or federal government EMF exposure standards. State regulations for magnetic fields have been developed in New York and Florida (150 mG and 200 mG at the edge of the right-of-way). However, these are based on limiting exposure from new facilities to levels no greater than existing facilities.

The strongest magnetic fields around the outside of a substation come from the power lines entering and leaving the station. The strength of the magnetic fields from transformers and other equipment decreases quickly with distance. Beyond the substation fence, the magnetic fields produced by the equipment within the station are typically indistinguishable from background levels.

Possible Health Effects

The possible effects of EMF on human health have come under scientific scrutiny. Concern about EMF originally focused on electric fields; however, much of the recent research has focused on magnetic fields. Uncertainty exists as to what characteristics of magnetic field exposure need to be considered to assess human exposure effects. Among the characteristics considered are field intensity, transients, harmonics, and changes in intensity over time. These characteristics may vary from power lines to appliances to home wiring, and this may create different types of exposures. The exposure most often considered is intensity or magnitude of the field.

There is a consensus among the medical and scientific communities that there is insufficient evidence to conclude that EMF causes adverse health effects. Neither the medical nor scientific communities have been able to provide any foundation upon which regulatory bodies could establish a standard or level of exposure that is known to be either safe or harmful. Laboratory experiments have shown that magnetic fields can cause biologic changes in living cells, but scientists are not sure whether any risk to human health can be associated with them. Some studies have suggested an association between surrogate measures of magnetic fields and certain cancers while others have not.

California Public Utilities Commission Decision Summary

Background

On January 15, 1991, the CPUC initiated an investigation to consider its role in mitigating the health effects, if any, of electric and magnetic fields from utility facilities and power lines. A working group of interested parties, called the California EMF Consensus Group, was created by the CPUC to advise it on this issue. It consisted of 17 stakeholders representing citizens groups, consumer groups, environmental groups, state agencies, unions, and utilities. The Consensus Group's fact-finding process was open to the public, and its report incorporated concerns expressed by the public. Its recommendations were filed with the Commission in March 1992.

In August 2004 the CPUC began a proceeding known as a "rulemaking" (R.04-08-020) to explore whether changes should be made to existing CPUC policies and rules concerning EMF from electric transmission lines and other utility facilities.

Through a series of hearings and conferences, the Commission evaluated the results of its existing EMF mitigation policies and addressed possible improvements in implementation of these policies. The CPUC also explored whether new policies are warranted in light of recent scientific findings on the possible health effects of EMF exposure.

The CPUC completed the EMF rulemaking in January 2006 and presented these conclusions in Decision D.06-01-042:

- The CPUC affirmed its existing policy of requiring no-cost and low-cost mitigation measures to reduce EMF levels from new utility transmission lines and substation projects.

- The CPUC adopted rules and policies to improve utility design guidelines for reducing EMF, and provides for a utility workshop to implement these policies and standardize design guidelines.

- Despite numerous studies, including one ordered by the Commission and conducted by the California Department of Health Services, the CPUC stated "we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences."

- The CPUC said it will "remain vigilant" regarding new scientific studies on EMF, and if these studies indicate negative EMF health impacts, the Commission will reconsider its EMF policies and open a new rulemaking if necessary.

In response to a situation of scientific uncertainty and public concern, the decision specifically requires PG&E to consider "no-cost" and "low-cost" measures, where feasible, to reduce exposure from new or upgraded utility facilities. It directs that no-cost mitigation measures be undertaken, and that low-cost options, when they meet certain guidelines for field reduction and cost, be adopted through the project certification process. PG&E was directed to develop, submit and follow EMF guidelines to implement the CPUC decision. Four percent of total project budgeted cost is the benchmark in implementing EMF mitigation, and mitigation measures should achieve incremental magnetic field reductions of at least 15%.

Reviews of EMF Studies

Hundreds of EMF studies have been conducted over the last 20 years in the areas of epidemiology, animal research, cellular studies, and exposure assessment. A number of nationally recognized multi-discipline panels have performed comprehensive reviews of the body of scientific knowledge on EMF. These panels' ability to bring experts from a variety of disciplines together to review the research gives their reports recognized credibility. It is standard practice in risk assessment and policymaking to rely on the findings and consensus opinions of these distinguished panels. None of these groups have concluded that EMF causes adverse health effects or that the development of standards were appropriate or would have a scientific basis.

Reports by the National Research Council/National Academy of Sciences, American Medical Association, American Cancer Society, National Institute of Environmental Health Sciences, World Health Organization, International Agency for Research on Cancer, and California Department of Health Services conclude that insufficient scientific evidence exists to warrant the adoption of specific health-based EMF mitigation measures. The potential for adverse health effects associated with EMF exposure is too speculative to allow the evaluation of impacts or the preparation of mitigation measures.

National Institute of Environmental Health Sciences

In June of 1999, the federal government completed a $60-million EMF research program managed by the National Institute of Environmental Health Sciences (NIEHS) and the Department of Energy (DOE). Known as the EMF RAPID (Research And Public Information Dissemination) Program. In their report to the U.S. Congress, the NIEHS concluded that:

> The NIEHS believes that the probability that ELF-EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal, scientific support that exposure to this agent is causing any degree of harm.

The NIEHS report also included the following conclusions:

> The National Toxicology Program routinely examines environmental exposures to determine the degree to which they constitute a human cancer risk and produces the 'Report on Carcinogens' listing agents that are 'known human carcinogens' or 'reasonably anticipated to be human carcinogens.' It is our opinion that based on evidence to date, ELF-EMF exposure would not be listed in the 'Report on Carcinogens' as an agent 'reasonably anticipated to be a human carcinogen.' This is based on the limited epidemiological evidence and the findings from the EMF-RAPID Program that did not indicate an effect of ELF-EMF exposure in experimental animals or a mechanistic basis for carcinogenicity.
>
> The NIEHS agrees that the associations reported for childhood leukemia and adult chronic lymphocytic leukemia cannot be dismissed easily as random or negative findings. The lack of positive findings in animals or in mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but cannot completely discount the finding. The NIEHS also agrees with the conclusion that no other cancers or non-cancer health outcomes provide sufficient evidence of a risk to warrant concern.
>
> Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.
>
> The NIEHS suggests that the level and strength of evidence supporting ELF-EMF exposure as a human health hazard are insufficient to warrant aggressive regulatory actions; thus, we do not recommend actions such as stringent standards on electric appliances and a national program to bury all transmission and distribution lines. Instead, the evidence suggests passive measures such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. NIEHS suggests that the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards. We also encourage technologies that lower exposures from neighborhood distribution lines provided that they do not increase other risks, such as those from accidental electrocution or fire.

U.S. National Research Council/ National Academy of Sciences

In May 1999, the National Research Council/ National Academy of Sciences, an independent scientific agency responsible for advising the federal government on science, technology, and medicine, released its evaluation of the scientific and technical content of research projects conducted under the U.S. EMF RAPID Program, concluding that:

> The results of the EMF-RAPID program do not support the contention that the use of electricity poses a major unrecognized public-health danger. Basic research on the effects of power-frequency magnetic fields on cells and animals should continue, but a special research-funding effort is not required. Investigators should compete for funding through traditional research-funding mechanisms. If future research on this subject is funded through such mechanisms, it should be limited to tests of well-defined mechanistic hypotheses or replications of reported positive effects. If carefully performed, such experiments will have value even if their results are negative. Special efforts should be made to communicate the conclusions of this effort to the general public effectively.

The following specific recommendations are made by the committee:

1. The committee recommends that no further special research program focused on possible health effects of power-frequency magnetic fields be funded. Basic research on the effects of power-frequency magnetic fields on cells and animals should continue but investigators should compete for funding through traditional research funding mechanisms.
2. If, however, Congress determines that another time-limited, focused research program on the health effects of power-frequency magnetic fields is warranted, the committee recommends that emphasis be placed on replications of studies that have yielded scientifically promising claims of effects and that have been reported in peer-reviewed journals. Such a program would benefit from the use of a contract-funding mechanism with a requirement for complete reports and/or peer-reviewed publications at program's end.
3. The engineering studies were initiated without the guidance of a clearly established biologic effect. The committee recommends that no further engineering studies be funded unless a biologic effect that can be used to plan the engineering studies has been determined.
4. Much of the information from the EMF-RAPID biology program has not been published in peer-reviewed journals. NIEHS should collect all future peer-reviewed information resulting from the EMF-RAPID biology projects and publish a summary report of such information periodically on the NIEHS Web site.
5. The communication effort initiated by EMF-RAPID is reasonable. The two booklets and the telephone information line are useful, as is the EMF-RAPID Internet site. There are two limitations to the effort. First, it is largely passive, responding to inquiries and providing information, rather than being active. Second, much of the information

produced is in a scientific format not readily understandable by the public. The committee recommends that further material produced to disseminate information on power-frequency magnetic fields be written for the general public in a clear fashion. The Web site should be made more user-friendly. The booklet *Questions and Answers about EMF* should be updated periodically and made available to the public.

World Health Organization

The World Health Organization (WHO) established the International EMF Project in 1996 to investigate potential health risks associated with exposure to electric and magnetic fields (EMF). A WHO Task Group recently concluded a review of the health implications of extremely low frequency (ELF) EMF.

A Task Group of scientific experts was convened in 2005 to assess any risks to health that might exist from exposure to ELF electric and magnetic fields. Previously in 2002, the International Agency for Research on Cancer (IARC) examined the evidence regarding cancer; this Task Group reviewed evidence for a number of health effects, and updated the evidence regarding cancer. The conclusions and recommendations of the Task Group are presented in a WHO report titled: "Extremely Low Frequency Fields Environmental Health Criteria Monograph No.238" and Factsheet No 322.

> "New human, animal and in vitro studies, published since the 2002 IARC monograph, do not change the overall classification of ELF magnetic fields as a possible human carcinogen."
>
> "A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in both children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukaemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease."
>
> "the epidemiological evidence is weakened by methodological problems, such as potential selection bias. In addition, there are no accepted biophysical mechanisms that would suggest that low-level exposures are involved in cancer development. Thus, if there were any effects from exposures to these low-level fields, it would have to be through a biological mechanism that is as yet unknown. Additionally, animal studies have been largely negative. Thus, on balance, the evidence related to childhood leukaemia is not strong enough to be considered causal."
>
> "Policy-makers should establish an ELF EMF protection programme that includes measurements of fields from all sources to ensure that the exposure limits are not exceeded either for the general public or workers."

> "Government and industry should monitor science and promote research programmes to further reduce the uncertainty of the scientific evidence on the health effects of ELF field exposure."
>
> "Policy-makers, community planners and manufacturers should implement very low-cost measures when constructing new facilities and designing new equipment including appliances."
>
> "Changes to engineering practice to reduce ELF exposure from equipment or devices should be considered, provided that they yield other additional benefits, such as greater safety, or little or no cost."
>
> "When changes to existing ELF sources are contemplated, ELF field reduction should be considered alongside safety, reliability and economic aspects."

International Agency for Research on Cancer

In June of 2001, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization (WHO), evaluated the carcinogenic risk to humans of static and extremely low-frequency EMF. In October of 2001, the WHO published a Fact Sheet that summarized the IARC findings. Below is an excerpt from the fact sheet:

> In June 2001, an expert scientific working group of IARC reviewed studies related to the carcinogenicity of static and ELF electric and magnetic fields. Using the standard IARC classification that weighs human, animal and laboratory evidence, ELF magnetic fields were classified as possibly carcinogenic to humans based on epidemiological studies of childhood leukaemia. Evidence for all other cancers in children and adults, as well as other types of exposures (i.e. static fields and ELF electric fields) was considered not classifiable either due to insufficient or inconsistent scientific information.
>
> "Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals.
>
> This classification is the weakest of three categories ("is carcinogenic to humans", "probably carcinogenic to humans" and "possibly carcinogenic to humans") used by IARC to classify potential carcinogens based on published scientific evidence. Some examples of well-known agents that have been classified by IARC are listed below:

Classification	Examples of Agents
Carcinogenic to humans (usually based on strong evidence of carcinogenicity in humans)	Asbestos Mustard gas Tobacco (smoked and smokeless) Gamma radiation
Probably carcinogenic to humans (usually based on strong evidence of carcinogenicity in animals)	Diesel engine exhaust Sun lamps UV radiation Formaldehyde
Possibly carcinogenic to humans (usually based on evidence in humans which is considered credible, but for which other explanations could not be ruled out)	Coffee Styrene Gasoline engine exhaust Pickled Vegetables ELF magnetic fields

DO ELF FIELDS CAUSE CANCER?

ELF fields are known to interact with tissues by inducing electric fields and currents in them. This is the only established mechanism of action of these fields. However, the electric currents induced by ELF fields commonly found in our environment are normally much lower than the strongest electric currents naturally occurring in the body such as those that control the beating of the heart.

Since 1979 when epidemiological studies first raised a concern about exposures to power line frequency magnetic fields and childhood cancer, a large number of studies have been conducted to determine if measured ELF exposure can influence cancer development, especially leukaemia in children.

There is no consistent evidence that exposure to ELF fields experienced in our living environment causes direct damage to biological molecules, including DNA. Since it seems unlikely that ELF fields could initiate cancer, a large number of investigations have been conducted to determine if ELF exposure can influence cancer promotion or co-promotion. Results from animal studies conducted so far suggest that ELF fields do not initiate or promote cancer.

However, two recent pooled analyses of epidemiological studies provide insight into the epidemiological evidence that played a pivotal role in the IARC evaluation. These studies suggest that, in a population exposed to average magnetic fields in excess of 0.3 to 0.4 μT, twice as many children might develop leukaemia compared to a population with lower exposures. In spite of the large number data base, some uncertainty remains as to whether magnetic field exposure or some other factor(s) might have accounted for the increased leukaemia incidence.

Childhood leukaemia is a rare disease with 4 out of 100,000 children between the age of 0 to 14 diagnosed every year. Also average magnetic field exposures above 0.3 or

0.4 μT in residences are rare. It can be estimated from the epidemiological study results that less than 1% of populations using 240 volt power supplies are exposed to these levels, although this may be higher in countries using 120 volt supplies.

The IARC review addresses the issue of whether it is feasible that ELF-EMF pose a cancer risk. The next step in the process is to estimate the likelihood of cancers in the general population from the usual exposures and to evaluate evidence for other (non-cancer) diseases. This part of the risk assessment should be finished by WHO in the next 18 months.

American Cancer Society

In the journal, *A Cancer Journal for Clinicians*, the American Cancer Society (ACS) reviewed EMF residential and occupational epidemiologic research in an article written by Dr. Clark W. Heath, Jr., ACS's vice president of epidemiology and surveillance research. Dr. Heath reviews 13 residential epidemiologic studies of adult and childhood cancer. Dr. Heath wrote:

> Evidence suggesting that exposure to EMF may or may not promote human carcinogenesis is mostly based on...epidemiologic observations.... While those observations may suggest such a relationship for leukemia and brain cancer in particular, the findings are weak, inconsistent, and inconclusive.... The weakness and inconsistent nature of epidemiologic data, combined with the continued dearth of coherent and reproducible findings from experimental laboratory research, leave one uncertain and rather doubtful that any real biologic link exists between EMF exposure and carcinogenicity.

American Medical Association

The AMA adopted recommendations of its Council on Scientific Affairs (CSA) regarding EMF health effects. The report was prepared as a result of a resolution passed by AMA's membership at its 1993 annual meeting. The following recommendations are based on the CSA's review of EMF epidemiologic and laboratory studies to date, as well as on several major literature reviews:

- Although no scientifically documented health risk has been associated with the usually occurring levels of electromagnetic fields, the AMA should continue to monitor developments and issues related to the subject.

- The AMA should encourage research efforts sponsored by agencies such as the National Institutes of Health, the U.S. Department of Energy, and the National Science Foundation. Continuing research should include study of exposures to EMF and its effects, average public exposures, occupational exposures, and the effects of field surges and harmonics.

- The AMA should support the meeting of an authoritative, multidisciplinary committee under the auspices of the National Academy of Sciences or the

National Council on Radiation Protection and Measurements to make recommendations about exposure levels of the public and workers to EMF and radiation.

References

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