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water use, including dry cooling, parallel dry-wet cooling, hybrid cooling, and zero liquid discharge systems.

- Assisted unions, cities, and neighborhood associations in challenging an EIR issued for the proposed expansion of the Oakland Airport. Reviewed two draft EIRs and prepared a health risk assessment and extensive technical comments on air quality and public health impacts. The California Court of Appeals, First Appellate District, ruled in favor of appellants and plaintiffs, concluding that the EIR "2) erred in using outdated information in assessing the emission of toxic air contaminants (TACs) from jet aircraft; 3) failed to support its decision not to evaluate the health risks associated with the emission of TACs with meaningful analysis," thus accepting my technical arguments and requiring the Port to prepare a new EIR. See *Berkeley Keep Jets Over the Bay Committee, City of San Leandro, and City of Alameda et al. v. Board of Port Commissioners* (August 30, 2001) 111 Cal.Rptr.2d 598.
- Assisted lessor of former gas station with leaking underground storage tanks and TCE contamination from adjacent property. Lessor held option to purchase, which was forfeited based on misrepresentation by remediation contractor as to nature and extent of contamination. Remediation contractor purchased property. Reviewed regulatory agency files and advised counsel on merits of case. Case not filed.
- Advised counsel on merits of several pending actions, including a Proposition 65 case involving groundwater contamination at an explosives manufacturing firm and two former gas stations with leaking underground storage tanks.
- Assisted defendant foundry in Oakland in a lawsuit brought by neighbors alleging property contamination, nuisance, trespass, smoke, and health effects from foundry operation. Inspected and sampled plaintiff's property. Advised counsel on merits of case. Case settled.
- Assisted business owner facing eminent domain eviction. Prepared technical comments on a negative declaration for soil contamination and public health risks from air emissions from a proposed redevelopment project in San Francisco in support of a CEQA lawsuit. Case settled.
- Assisted neighborhood association representing residents living downwind of a Berkeley asphalt plant in separate nuisance and CEQA lawsuits. Prepared technical comments on air quality, odor, and noise impacts, presented testimony at commission and council meetings, participated in community workshops, and participated in settlement discussions. Cases settled. Asphalt plant was upgraded to include air emission and noise controls, including vapor collection system at truck loading station, enclosures for noisy equipment, and improved housekeeping.
- Assisted a Fortune 500 residential home builder in claims alleging health effects from faulty installation of gas appliances. Conducted indoor air quality study, advised counsel on merits of case, and participated in discussions with plaintiffs. Case settled.

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- Assisted property owners in Silicon Valley in lawsuit to recover remediation costs from insurer for large TCE plume originating from a manufacturing facility. Conducted investigations to demonstrate sudden and accidental release of TCE, including groundwater modeling, development of method to date spill, preparation of chemical inventory, investigation of historical waste disposal practices and standards, and on-site sewer and storm drainage inspections and sampling. Prepared declaration in opposition to motion for summary judgment. Case settled.
- Assisted residents in east Oakland downwind of a former battery plant in class action lawsuit alleging property contamination from lead emissions. Conducted historical research and dry deposition modeling that substantiated claim. Participated in mediation at JAMS. Case settled.
- Assisted property owners in West Oakland who purchased a former gas station that had leaking underground storage tanks and groundwater contamination. Reviewed agency files and advised counsel on merits of case. Prepared declaration in opposition to summary judgment. Prepared cost estimate to remediate site. Participated in settlement discussions. Case settled.
- Consultant to counsel representing plaintiffs in two Clean Water Act lawsuits involving selenium discharges into San Francisco Bay from refineries. Reviewed files and advised counsel on merits of case. Prepared interrogatory and discovery questions, assisted in deposing opposing experts, and reviewed and interpreted treatability and other technical studies. Judge ruled in favor of plaintiffs.
- Assisted oil company in a complaint filed by a resident of a small California beach community alleging that discharges of tank farm rinse water into the sanitary sewer system caused hydrogen sulfide gas to infiltrate residence, sending occupants to hospital. Inspected accident site, interviewed parties to the event, and reviewed extensive agency files related to incident. Used chemical analysis, field simulations, mass balance calculations, sewer hydraulic simulations with SWMM44, atmospheric dispersion modeling with SCREEN3, odor analyses, and risk assessment calculations to demonstrate that the incident was caused by a faulty drain trap and inadequate slope of sewer lateral on resident's property. Prepared a detailed technical report summarizing these studies. Case settled.
- Assisted large West Coast city in suit alleging that leaking underground storage tanks on city property had damaged the waterproofing on downgradient building, causing leaks in an underground parking structure. Reviewed subsurface hydrogeologic investigations and evaluated studies conducted by others documenting leakage from underground diesel and gasoline tanks. Inspected, tested, and evaluated waterproofing on subsurface parking structure. Waterproofing was substandard. Case settled.
- Assisted residents downwind of gravel mine and asphalt plant in Siskiyou County, California, in suit to obtain CEQA review of air permitting action. Prepared two declarations analyzing

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air quality and public health impacts. Judge ruled in favor of plaintiffs, closing mine and asphalt plant.

- Assisted defendant oil company on the California Central Coast in class action lawsuit alleging property damage and health effects from subsurface petroleum contamination. Reviewed documents, prepared risk calculations, and advised counsel on merits of case. Participated in settlement discussions. Case settled.
- Assisted defendant oil company in class action lawsuit alleging health impacts from remediation of petroleum contaminated site on California Central Coast. Reviewed documents, designed and conducted monitoring program, and participated in settlement discussions. Case settled.
- Consultant to attorneys representing irrigation districts and municipal water districts to evaluate a potential challenge of USFWS actions under CVPIA section 3406(b)(2). Reviewed agency files and collected and analyzed hydrology, water quality, and fishery data. Advised counsel on merits of case. Case not filed.
- Assisted residents downwind of a Carson refinery in class action lawsuit involving soil and groundwater contamination, nuisance, property damage, and health effects from air emissions. Reviewed files and provided advice on contaminated soil and groundwater, toxic emissions, and health risks. Prepared declaration on refinery fugitive emissions. Prepared deposition questions and reviewed deposition transcripts on air quality, soil contamination, odors, and health impacts. Case settled.
- Assisted residents downwind of a Contra Costa refinery who were affected by an accidental release of naphtha. Characterized spilled naphtha, estimated emissions, and modeled ambient concentrations of hydrocarbons and sulfur compounds. Deposed. Presented testimony in binding arbitration at JAMS. Judge found in favor of plaintiffs.
- Assisted residents downwind of Contra Costa County refinery in class action lawsuit alleging property damage, nuisance, and health effects from several large accidents as well as routine operations. Reviewed files and prepared analyses of environmental impacts. Prepared declarations, deposed, and presented testimony before jury in one trial and judge in second. Case settled.
- Assisted business owner claiming damages from dust, noise, and vibration during a sewer construction project in San Francisco. Reviewed agency files and PM10 monitoring data and advised counsel on merits of case. Case settled.
- Assisted residents downwind of Contra Costa County refinery in class action lawsuit alleging property damage, nuisance, and health effects. Prepared declaration in opposition to summary judgment, deposed, and presented expert testimony on accidental releases, odor, and nuisance before jury. Case thrown out by judge, but reversed on appeal and not retried.

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- Presented testimony in small claims court on behalf of residents claiming health effects from hydrogen sulfide from flaring emissions triggered by a power outage at a Contra Costa County refinery. Analyzed meteorological and air quality data and evaluated potential health risks of exposure to low concentrations of hydrogen sulfide. Judge awarded damages to plaintiffs.
- Assisted construction unions in challenging PSD permit for an Indiana steel mill. Prepared technical comments on draft PSD permit, drafted 70-page appeal of agency permit action to the Environmental Appeals Board challenging permit based on faulty BACT analysis for electric arc furnace and reheat furnace and faulty permit conditions, among others, and drafted briefs responding to four parties. EPA Region V and the EPA General Counsel intervened as amici, supporting petitioners. EAB ruled in favor of petitioners, remanding permit to IDEM on three key issues, including BACT for the reheat furnace and lead emissions from the EAF. Drafted motion to reconsider three issues. Prepared 69 pages of technical comments on revised draft PSD permit. Drafted second EAB appeal addressing lead emissions from the EAF and BACT for reheat furnace based on European experience with SCR/SNCR. Case settled. Permit was substantially improved. See *In re: Steel Dynamics, Inc.*, PSD Appeal Nos. 99-4 & 99-5 (EAB June 22, 2000).
- Assisted defendant urea manufacturer in Alaska in negotiations with USEPA to seek relief from penalties for alleged violations of the Clean Air Act. Reviewed and evaluated regulatory files and monitoring data, prepared technical analysis demonstrating that permit limits were not violated, and participated in negotiations with EPA to dismiss action. Fines were substantially reduced and case closed.
- Assisted construction unions in challenging PSD permitting action for an Indiana grain mill. Prepared technical comments on draft PSD permit and assisted counsel draft appeal of agency permit action to the Environmental Appeals Board challenging permit based on faulty BACT analyses for heaters and boilers and faulty permit conditions, among others. Case settled.
- As part of a consent decree settling a CEQA lawsuit, assisted neighbors of a large west coast port in negotiations with port authority to secure mitigation for air quality impacts. Prepared technical comments on mobile source air quality impacts and mitigation and negotiated a \$9 million CEQA mitigation package. Represented neighbors on technical advisory committee established by port to implement the air quality mitigation program. Program successfully implemented.
- Assisted construction unions in challenging permitting action for a California hazardous waste incinerator. Prepared technical comments on draft permit, assisted counsel prepare appeal of EPA permit to the Environmental Appeals Board. Participated in settlement discussions on technical issues with applicant and EPA Region 9. Case settled.

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- Assisted environmental group in challenging DTSC Negative Declaration on a hazardous waste treatment facility. Prepared technical comments on risk of upset, water, and health risks. Writ of mandamus issued.
- Assisted several neighborhood associations and cities impacted by quarries, asphalt plants, and cement plants in Alameda, Shasta, Sonoma, and Mendocino counties in obtaining mitigations for dust, air quality, public health, traffic, and noise impacts from facility operations and proposed expansions.
- For over 100 industrial facilities, commercial/campus, and redevelopment projects, developed the record in preparation for CEQA and NEPA lawsuits. Prepared technical comments on hazardous materials, solid wastes, public utilities, noise, worker safety, air quality, public health, water resources, water quality, traffic, and risk of upset sections of EIRs, EISs, FONSI, initial studies, and negative declarations. Assisted counsel in drafting petitions and briefs and prepared declarations.
- For several large commercial development projects and airports, assisted applicant and counsel prepare defensible CEQA documents, respond to comments, and identify and evaluate "all feasible" mitigation to avoid CEQA challenges. This work included developing mitigation programs to reduce traffic-related air quality impacts based on energy conservation programs, solar, low-emission vehicles, alternative fuels, exhaust treatments, and transportation management associations.

SITE INVESTIGATION/REMEDIATION/CLOSURE

- Technical manager and principal engineer for characterization, remediation, and closure of waste management units at former Colorado oil shale plant. Constituents of concern included BTEX, As, 1,1,1-TCA, and TPH. Completed groundwater monitoring programs, site assessments, work plans, and closure plans for seven process water holding ponds, a refinery sewer system, and processed shale disposal area. Managed design and construction of groundwater treatment system and removal actions and obtained clean closure.
- Principal engineer for characterization, remediation, and closure of process water ponds at a former lanthanide processing plant in Colorado. Designed and implemented groundwater monitoring program and site assessments and prepared closure plan.
- Advised the city of Sacramento on redevelopment of two former railyards. Reviewed work plans, site investigations, risk assessment, RAPS, RI/FSSs, and CEQA documents. Participated in the development of mitigation strategies to protect construction and utility workers and the public during remediation, redevelopment, and use of the site, including buffer zones, subslab venting, rail berm containment structure, and an environmental oversight plan.

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- Provided technical support for the investigation of a former sanitary landfill that was redeveloped as single family homes. Reviewed and/or prepared portions of numerous documents, including health risk assessments, preliminary endangerment assessments, site investigation reports, work plans, and RI/FSs. Historical research to identify historic waste disposal practices to prepare a preliminary endangerment assessment. Acquired, reviewed, and analyzed the files of 18 federal, state, and local agencies, three sets of construction field notes, analyzed 21 aerial photographs and interviewed 14 individuals associated with operation of former landfill. Assisted counsel in defending lawsuit brought by residents alleging health impacts and diminution of property value due to residual contamination. Prepared summary reports.
- Technical oversight of characterization and remediation of a nitrate plume at an explosives manufacturing facility in Lincoln, CA. Provided interface between owners and consultants. Reviewed site assessments, work plans, closure plans, and RI/FSs.
- Consultant to owner of large western molybdenum mine proposed for NPL listing. Participated in negotiations to scope out consent order and develop scope of work. Participated in studies to determine premining groundwater background to evaluate applicability of water quality standards. Served on technical committees to develop alternatives to mitigate impacts and close the facility, including resloping and grading, various thickness and types of covers, and reclamation. This work included developing and evaluating methods to control surface runoff and erosion, mitigate impacts of acid rock drainage on surface and ground waters, and stabilize nine waste rock piles containing 328 million tons of pyrite-rich, mixed volcanic waste rock (andesites, rhyolite, tuff). Evaluated stability of waste rock piles. Represented client in hearings and meetings with state and federal oversight agencies.

REGULATORY (PARTIAL LIST)

- In December 2020, researched and wrote 23 pages of comments on the Draft Supplemental Recirculated Environmental Impact Report for Revisions to the Kern County Zoning Ordinance – 2020 A, Focused on Oil and Gas Local Permitting on: (a) significant and unmitigated construction emissions; (b) significant and unmitigated operational emissions; (c) public health and biological impacts of criteria pollutants emissions and ozone; (d) offsets not valid CEQA mitigation.
- In October and December 2020, researched and wrote 46 pages of comments on underestimated and unsupported construction emissions, omitted construction emission sources, failure to consider unique site geotechnical conditions; revised construction emissions; significant construction and operational GHG emissions; GHG mitigation; construction and operational health risks; risk of upset; and cumulative impacts for a facility proposed to upgrade landfill gas to pipeline quality natural gas.

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- In October and November 2020, researched and wrote 37 pages of comments on significant construction impacts, significant operational VOC emissions, and significant public health impacts of new internal floating roof storage tanks at a marine terminal at the Port of Long Beach.
- In September to November 2020, review proposed permit amendment to add HCN emissions from the FCCU to Title V permit for a Houston Refinery and research and write report on methods to measure HCN from FCCUs in situ and remotely.
- In September and October 2020, researched and wrote 14 pages of comments on proposed Leak Detection and Repair (LDAR) program for controlling VOC emissions from a geothermal power plant.
- In August to October 2020, researched and wrote comments on grid-based impacts of San Francisco's proposed building code mandating that new construction be all electric.
- In July and August 2020, researched and wrote comments on groundwater impacts of sea level rise for Final SEIR on crude oil trucking proposal.
- In June to August 2020, researched and wrote 69 pages of comments on inadequate project description, construction impacts, operational air quality impacts, cumulative air quality impacts, public health impacts, valley fever, hazards, geologic impacts, water use, CEC licensing, and extended lifetime impacts for the repower of a geothermal power plant in Imperial County.
- In June 2020, review revised quarry reclamation plan and draft 27 pages of comments on proposed modification.
- In June and July 2020, researched and wrote 23 pages of comments on cement terminal at Port of Stockton on construction impacts, emission baseline, operational emissions, and greenhouse gas mitigation.
- In May to June 2020, review reclamation plan amendment for quarry and research and write 17 page report on hydrology and water quality impacts of proposed amendment.
- In May 2020, researched and wrote 10 pages of comments on FEIR for a new apartment project in Contra Costa County on GHG emissions from vegetation removal, mobile sources, and water use and mitigation for same.
- In March/April 2020, researched and wrote 50 pages of comments on IS/MND for battery energy storage project in San Jose (Hummingbird) on inadequate project description, criteria pollutant and GHG emissions, significant and unmitigated energy impacts, cumulative impacts, construction impacts, public health impacts from BESS accidents, and battery handling and transportation accidents. Wrote 15 pages of responses to comments on vendor specifications, battery composition, cumulative impacts, construction impacts, fire control methods, and battery accidents.

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- In April 2020, researched and wrote 47 pages of comments on IS/MND for data center in Santa Clara (SV1) on operational NOx emissions; out-of-district emissions; interbasin pollutant transport; omitted emission sources; GHG compliance with plans, policies and regulations; indirect GHG emissions; air quality impacts; construction emissions; cumulative impacts; and risk of upset from battery accidents.
- In March 2020, researched and wrote 30 pages of comments on IS/MND for data center in San Jose (Hummingbird) on operational GHG and criteria pollutant emissions, cumulative impacts, and public health risks. Research and write responses to comments.
- In February-March 2020, researched and wrote 30 pages on an IS/MND for a data center in San Jose (Stack) on operational NOx and GHG emissions, cumulative impacts, health risks, and odor.
- In February 2020, researched and wrote 33 pages of comments on Initial Study for a battery storage facility in Ventura County (Orni) on criteria pollutant and GHG emissions, worker and public health impacts, cumulative impacts, valley fever, and consistency with general plan.
- In February 2020, researched and wrote 20 pages of comments on valley fever in response to applicant's global response to comments on Valley Fever for a wind project in San Diego County.
- In January 2020, researched and wrote 32 pages of comments on the Orni battery storage facility (BESS) on incomplete project description, cumulative GHG and NOx impacts, BESS accidents, and health impacts, including soil contamination and valley fever.
- In January 2020, research and wrote 41 pages of comments on the DEIR for the NuStar Port of Stockton Liquid Bulk Terminal on operational emission calculations, significant NOx emissions, significant GHG emissions. GHG mitigation, and cumulative impacts.
- In December 2019, researched and wrote 3 pages of comments on the Silverstrand Grid battery storage facility on greenhouse gas emissions.
- In December 2019, researched and wrote 15 pages of comments on the Initial Study for the K2 Pure – Chlorine Rail Transportation Curtailment Project, including on air quality baseline, project description, emissions, cancer risks, risk of upset.
- In November 2019, reviewed agency files and researched and wrote 42 pages of comments on the Belridge Solar Project on compliance with local zoning ordinances, water quality impacts, air quality impacts, and worker and public health impacts due to soil contamination and valley fever.
- In October 2019, researched and wrote 49 pages of comments on IS/MND for data center in Santa Clara, CA on operational criteria pollutants (mobile sources, off-site electricity

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generation, emergency generators), ambient air quality impacts, greenhouse gas emissions and mitigation, and cumulative impacts.

- In October 2019, researched and wrote 9 pages of comments on the Application, Statement of Basis and draft Permit to Construct and Temporary Permit to Operate for proposed changes at the Paramount Refinery to facilitate refining of biomass-based feedstock to produce renewable fuels.
- In September 2019, reviewed City of Sunnyvale's file on Google's proposed Central Utility Plant and researched and wrote 34 pages of comments on construction and operational air quality impacts, cumulative impacts, and battery fire and explosion impacts. In October 2019, researched and wrote 15 pages of responses to comments.
- In August 2019, research and wrote 37 pages of comments on the DSEIR for the Le Conte Battery Energy Storage System on GHG emissions, hazards and hazardous material impacts, and health impacts.
- In August 2019, researched and wrote 38 pages of comments on IS/MND for the Hanford-Lakeside Dairy digester Project, Kings County, on project description (piecemealing), cumulative impacts, construction impacts, air quality impacts, valley fever and risk of upset.
- In July 2019, researched and wrote 48 pages of comments on IS/MND for the Five Points Pipeline Dairy Digester Cluster Project, including on air quality, cumulative impacts, worker and public health impacts (including on pesticide-contaminated soils), Valley Fever, construction air quality impacts, and risk of upset.
- In June 2019, researched and wrote 15 pages of responses to comments on IS/MND for SV1 Data Center, including operational NOx emissions, air quality analyses, construction emissions, battery hazards, and mitigation plans for noise, vibration, risk management, storm water pollution, and emergency response and evacuation plans.
- In June 2019, researched and wrote 30 pages of comments on DEIR for the Humboldt Wind Energy Project on fire and aesthetic impacts of transmission line, construction air quality impacts and mitigation, and greenhouse gas emissions.
- In May 2019, researched and wrote 25 pages of comments on the DEIR for the ExxonMobil Interim Trucking for Santa Ynez Phased Restart Project on project description, baseline, and mitigation.
- In April 2019, researched and wrote a 16 page letter critiquing the adequacy of the FEIR for CalAm Desalination Project to support a Monterey County Combined Development Permit, consisting of a Use Permit, an Administrative Permit, and Design Approval for the Desalination Plant and Carmel Valley Pump Station.

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- In April 2019, researched and wrote 22 pages of comments on DEIR for the Eco-Energy Liquid Bulk Terminal at the Port of Stockton on emissions, air quality impact mitigation, and health risk assessment.
- In March 2019, researched and wrote 43 pages of comments on DEIR for Contanda Renewable Diesel Bulk Liquid Terminal at the Port of Stockton on operational emissions, air quality impacts and mitigation and health risks.
- In February 2019, researched and wrote 36 pages of comments on general cumulative impacts, air quality, accidents, and valley fever for IS/MND for biogas cluster project in Kings County.
- In January 2019, researched and wrote 30 pages of comments on air quality and valley fever for IS/MND for energy storage facility in Kings County.
- In December 2018, researched and wrote 11 pages of comments on air quality for IS/MND for biomass gasification facility in Madera County.
- In December 2018, researched and wrote 10 pages of responses to comments on IS/MND for a wind energy project in Riverside County.
- In December 2018, researched and wrote 12 pages of responses to comments on IS/MND for a large Safeway fueling station in Petaluma. The Planning Commission voted unanimously to require an EIR.
- In November 2018, researched and wrote 30 pages of comments on IS/MND on wind energy project in Riverside County on construction health risks, odor impacts, waste disposal, transportation, construction emissions and mitigation and Valley Fever.
- In November 2018, researched and wrote 32 pages of comments on the DEIR for a solar energy generation and storage project in San Bernardino County on hazards, health risks, odor, construction emissions and mitigation, and Valley Fever.
- In September 2018, researched and wrote 36 pages of comments on the FEIR for the Newland Sierra Project including on greenhouse gas emissions, construction emissions, and cumulative impacts.
- In August 2018, researched and wrote 20 pages of comments on the health risk assessment in the IS/MND for a large Safeway fueling station in Petaluma.
- In August 2018, researched and wrote responses to comments on DEIR for the Newland Sierra Project, San Diego County on greenhouse gas emissions, construction emissions, odor, and Valley Fever.
- In July/August 2018, researched and wrote 12 pages of comments on DEIR for proposed Doheny Desal Project, on GHG, criteria pollutant, and TAC emissions and public health impacts during construction and indirect emissions during operation.

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- In June 2018, researched and wrote 12 pages of technical comments rebutting NDDH responses to comments on Meridian Davis Refinery.
- In April 2018, researched and wrote 26 pages of comments on greenhouse gas emissions and mitigation as proposed in the San Diego County Climate Action Plan.
- In April 2018, researched and wrote 24 pages of comments on the FEIR for Monterey County water supply project, including GHG mitigation, air quality impacts and mitigation, and Valley Fever.
- In March-June 2018, researched and wrote 37 pages of comments on the IS/MND for the 2305 Mission College Boulevard Data Center, Santa Clara, California and responded to responses to comments.
- In March 2018, researched and wrote 40 pages of comments on the IS/MND for the Diablo Energy Storage Facility in Pittsburg, California.
- In March 2018, researched and wrote 19 pages of comments on Infill Checklist/Mitigated Negative Declaration for the Legacy@Livermore Project on CalEEMod emission calculations, including NOx and PM10 and construction health risk assessment, including Valley Fever.
- In January 2018, researched and wrote 28 pages of comments on draft Permit to Construct for the Davis Refinery Project, North Dakota, as a minor source of criteria pollutants and HAPs.
- In December 2017, researched and wrote 19 pages of comments on DEIR for the Rialto Bioenergy Facility, Rialto, California.
- In November and December 2017, researched and wrote 6 pages of comments on the Ventura County Air Pollution Control District's Preliminary Determination of Compliance (PDOC) for Mission Rock Energy Center.
- In November 2017, researched and wrote 11 pages of comments on control technology evaluation for the National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry Residual Risk and Technology Review.
- In September and November 2017, prepared comments on revised Negative Declaration for Delicato Winery in San Joaquin County, California.
- In October and November 2017, researched and wrote comments on North City Project Pure Water San Diego Program DEIR/DEIS to reclaim wastewater for municipal use.
- In August 2017, reviewed DEIR on a new residential community in eastern San Diego County (Newland Sierra) and research and wrote 60 pages of comments on air quality, greenhouse gas emissions and health impacts, including Valley Fever.

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- In August 2017, reviewed responses to comments on Part 70 operating permit for IGP Methanol's Gulf Coast Methanol Complex, near Myrtle Grove, Louisiana, and researched and wrote comments on metallic HAP issues.
- In July 2017, reviewed the FEIS for an expansion of the Port of Gulfport and researched and wrote 10 pages of comments on air quality and public health.
- In June 2017, reviewed and prepared technical report on an Application for a synthetic minor source construction permit for a new Refinery in North Dakota.
- In June 2017, reviewed responses to NPCA and other comments on the BP Cherry Point Refinery modifications and assisted counsel in evaluating issues to appeal, including GHG BACT, coker heater SCR cost effectiveness analysis, and SO₂ BACT.
- In June 2017, reviewed Part 70 Operating Permit Renewal/Modification for the Noranda Alumina LC/Gramercy Holdings I, LLC alumina processing plant, St. James, Louisiana, and prepared comments on HAP emissions from bauxite feedstock.
- In May and June 2017, reviewed FEIR on Tesoro Integration Project and prepared responses to comments on the DEIR.
- In May 2017, prepared comments on tank VOC and HAP emissions from Tesoro Integration Project, based on real time monitoring at the Tesoro and other refineries in the SCAQMD.
- In April 2017, prepared comments on Negative Declaration for Delicato Winery in San Joaquin County, California.
- In March 2017, reviewed Negative Declaration for Ellmore geothermal facility in Imperial County, California and prepared summary of issues.
- In March 2017, prepared response to Phillips 66 Company's Appeal of the San Luis Obispo County Planning Commission's Decision Denying the Rail Spur Extension Project Proposed for the Santa Maria Refinery.
- In February 2017, researched and wrote comments on Kalama draft Title V permit for 10,000 MT/day methanol production and marine export facility in Kalama, Washington.
- In January 2017, researched and wrote 51 pages of comments on proposed Title V and PSD permits for the St. James Methanol Plant, St. James Louisiana, on BACT and enforceability of permit conditions.
- In December 2016, researched and wrote comments on draft Title V Permit for Yuhuang Chemical Inc. Methanol Plant, St. James, Louisiana, responding to EPA Order addressing enforceability issues.
- In November 2016, researched and wrote comments on Initial Study/Mitigated Negative Declaration for the AES Battery Energy Storage Facility, Long Beach, CA.

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- In November 2016, researched and wrote comments on Campo Verde Battery Energy Storage System Draft Environmental Impact Report.
- In October 2016, researched and wrote comments on Title V Permit for NuStar Terminal Operations Partnership L.P, Stockton, CA.
- In October 2016, prepared expert report, Technical Assessment of Achieving the 40 CFR Part 423 Zero Discharge Standard for Bottom Ash Transport Water at the Belle River Power Plant, East China, Michigan. Reported resulted in a 2 year reduction in compliance date for elimination of bottom ash transport water. 1/30/17 DEQ Letter.
- In September 2016, researched and wrote comments on Proposed Title V Permit and Environmental Assessment Statement, Yuhuang Chemical Inc. Methanol Plant, St. James, Louisiana.
- In September 2016, researched and wrote response to “Further Rebuttal in Support of Appeal of Planning Commission Resolution No. 16-1, Denying Use Permit Application 12PLN-00063 and Declining to Certify Final Environmental Impact Report for the Valero Benicia Crude-by-Rail Project.
- In August 2016, reviewed and prepared comments on manuscript: Hutton et al., Freshwater Flows to the San Francisco Bay-Delta Estuary over Nine Decades: Trends Evaluation.
- In August/September 2016, researched and wrote comments on Mitigated Negative Declaration for the Chevron Long Wharf Maintenance and Efficiency Project.
- In July 2016, researched and wrote comments on the Ventura County APCD Preliminary Determination of Compliance and the California Energy Commission Revised Preliminary Staff Assessment for the Puente Power Project.
- In June 2016, researched and wrote comments on an Ordinance (1) Amending the Oakland Municipal Code to Prohibit the Storage and Handling of Coal and Coke at Bulk Material Facilities or Terminals Throughout the City of Oakland and (2) Adopting CEQA Exemption Findings and supporting technical reports. Council approved Ordinance on an 8 to 0 vote on June 27, 2016.
- In May 2016, researched and wrote comments on Draft Title V Permit and Draft Environmental Impact Report for the Tesoro Los Angeles Refinery Integration and Compliance Project.
- In March 2016, researched and wrote comments on Valero’s Appeal of Planning Commission’s Denial of Valero Crude-by-Rail Project.
- In February 2016, researched and wrote comments on Final Environmental Impact Report, Santa Maria Rail Spur Project.
- In February 2016, researched and wrote comments on Final Environmental Impact Report, Valero Benicia Crude by Rail Project.

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- In January 2016, researched and wrote comments on Draft Programmatic Environmental Impact Report for the Southern California Association of Government's (SCAG) 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy.
- In November 2015, researched and wrote comments on Final Environmental Impact Report for Revisions to the Kern County Zoning Ordinance – 2015(C) (Focused on Oil and Gas Local Permitting), November 2015.
- In October 2015, researched and wrote comments on Revised Draft Environmental Report, Valero Benicia Crude by Rail Project.
- In September 2015, prepared report, "Environmental, Health and Safety Impacts of the Proposed Oakland Bulk and Oversized Terminal, and presented oral testimony on September 21, 2015 before Oakland City Council on behalf of the Sierra Club.
- In September 2015, researched and wrote comments on revisions to two chapters of EPA's Air Pollution Control Cost Manual: Docket ID No. EPA-HQ-OAR-2015-0341.
- In June 2015, researched and wrote comments on DEIR for the CalAm Monterey Peninsula Water Supply Project.
- In April 2015, researched and wrote comments on proposed Title V Operating Permit Revision and Prevention of Significant Deterioration Permit for Arizona Public Service's Ocotillo Power Plant Modernization Project (5 GE LMS100 105-MW simple cycle turbines operated as peakers), in Tempe, Arizona; Final permit appealed to EAB.
- In March 2015, researched and wrote "Comments on Proposed Title V Air Permit, Yuhuang Chemical Inc. Methanol Plant, St. James, Louisiana". Client filed petition objecting to the permit. EPA granted majority of issues. In the Matter of Yuhuang Chemical Inc. Methanol Plant, St. James Parish, Louisiana, Permit No. 2560-00295-V0, Issued by the Louisiana Department of Environmental Quality, Petition No. VI-2015-03, Order Responding to the Petitioners' Request for Objection to the Issuance of a Title V Operating Permit, September 1, 2016.
- In February 2015, prepared compilation of BACT cost effectiveness values in support of comments on draft PSD Permit for Bonanza Power Project.
- In January 2015, prepared cost effectiveness analysis for SCR for a 500-MW coal fire power plant, to address unpermitted upgrades in 2000.
- In January 2015, researched and wrote comments on Revised Final Environmental Impact Report for the Phillips 66 Propane Recovery Project. *Communities for a Better Environment et al. v. Contra Costa County et al. Contra Costa County (Superior Court, Contra Costa County, Case No. MSN15-0301, December 1, 2016).*
- In December 2014, researched and wrote "Report on Bakersfield Crude Terminal Permits to Operate." In response, the U.S. EPA cited the Terminal for 10 violations of the Clean Air

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Act. The Fifth Appellate District Court upheld the finding in this report in CBE et al v. San Joaquin Valley Unified Air Pollution Control District and Bakersfield Crude Terminal LLC et al, Super. Ct. No. 284013, June 23, 2017.

- In December 2014, researched and wrote comments on Revised Draft Environmental Impact Report for the Phillips 66 Propane Recovery Project.
- In November 2014, researched and wrote comments on Revised Draft Environmental Impact Report for Phillips 66 Rail Spur Extension Project and Crude Unloading Project, Santa Maria, CA to allow the import of tar sands crudes.
- In November 2014, researched and wrote comments on Draft Environmental Impact Report for Phillips 66 Ultra Low Sulfur Diesel Project, responding to the California Supreme Court Decision, *Communities for a Better Environment v. South Coast Air Quality Management Dist. (2010) 48 Cal.4th 310*.
- In November 2014, researched and wrote comments on Draft Environmental Impact Report for the Tesoro Avon Marine Oil Terminal Lease Consideration.
- In October 2014, prepared: "Report on Hydrogen Cyanide Emissions from Fluid Catalytic Cracking Units", pursuant to the Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards, 79 FR 36880.
- In October 2014, researched and wrote technical comments on Final Environmental Impact Reports for Alon Bakersfield Crude Flexibility Project to build a rail terminal to allow the import/export of tar sands and Bakken crude oils and to upgrade an existing refinery to allow it to process a wide range of crudes.
- In October 2014, researched and wrote technical comments on the Title V Permit Renewal and three De Minimus Significant Revisions for the Tesoro Logistics Marine Terminal in the SCAQMD.
- In September 2014, researched and wrote technical comments on the Draft Environmental Impact Report for the Valero Crude by Rail Project.
- In August 2014, for EPA Region 6, prepared technical report on costing methods for upgrades to existing scrubbers at coal-fired power plants.
- In July 2014, researched and wrote technical comments on Draft Final Environmental Impact Reports for Alon Bakersfield Crude Flexibility Project to build a rail terminal to allow the import/export of tar sands and Bakken crude oils and to upgrade an existing refinery to allow it to process a wide range of crudes.
- In June 2014, researched and wrote technical report on Initial Study and Draft Negative Declaration for the Tesoro Logistics Storage Tank Replacement and Modification Project.
- In May 2014, researched and wrote technical comments on Intent to Approve a new refinery and petroleum transloading operation in Utah.

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- In March and April 2014, prepared declarations on air permits issued for two crude-by-rail terminals in California, modified to switch from importing ethanol to importing Bakken crude oils by rail and transferring to tanker cars. Permits were issued without undergoing CEQA review. One permit was upheld by the San Francisco Superior Court as statute of limitations had run. The Sacramento Air Quality Management District withdrew the second one due to failure to require BACT and conduct CEQA review.
- In March 2014, researched and wrote technical report on Negative Declaration for a proposed modification of the air permit for a bulk petroleum and storage terminal to allow the import of tar sands and Bakken crude oil by rail and its export by barge, under the New York State Environmental Quality Review Act (SEQRA).
- In February 2014, researched and wrote technical report on proposed modification of air permit for midwest refinery upgrade/expansion to process tar sands crudes.
- In January 2014, prepared cost estimates to capture, transport, and use CO₂ in enhanced oil recovery, from the Freeport LNG project based on both Selexol and Amine systems.
- In January 2014, researched and wrote technical report on Draft Environmental Impact Report for Phillips 66 Rail Spur Extension Project, Santa Maria, CA. Comments addressed project description (piecemealing, crude slate), risk of upset analyses, mitigation measures, alternative analyses and cumulative impacts.
- In November 2013, researched and wrote technical report on the Phillips 66 Propane Recovery Project, Rodeo, CA. Comments addressed project description (piecemealing, crude slate) and air quality impacts.
- In September 2013, researched and wrote technical report on the Draft Authority to Construct Permit for the Casa Diablo IV Geothermal Development Project Environmental Impact Report and Declaration in Support of Appeal and Petition for Stay, U.S. Department of the Interior, Board of Land Appeals, Appeal of Decision Record for the Casa Diablo IV Geothermal Development Project.
- In September 2013, researched and wrote technical report on Effluent Limitation Guidelines for Best Available Technology Economically Available (BAT) for Bottom Ash Transport Waters from Coal-Fired Power Plants in the Steam Electric Power Generating Point Source Category.
- In July 2013, researched and wrote technical report on Initial Study/Mitigated Negative Declaration for the Valero Crude by Rail Project, Benicia, California, Use Permit Application 12PLN-00063.
- In July 2013, researched and wrote technical report on fugitive particulate matter emissions from coal train staging at the proposed Coyote Island Terminal, Oregon, for draft Permit No. 25-0015-ST-01.

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- In July 2013, researched and wrote technical comments on air quality impacts of the Finger Lakes LPG Storage Facility as reported in various Environmental Impact Statements.
- In July 2013, researched and wrote technical comments on proposed Greenhouse Gas PSD Permit for the Celanese Clear Lake Plant, including cost analysis of CO2 capture, transport, and sequestration.
- In June/July 2013, researched and wrote technical comments on proposed Draft PSD Preconstruction Permit for Greenhouse Gas Emission for the ExxonMobil Chemical Company Baytown Olefins Plant, including cost analysis of CO2 capture, transport, and sequestration.
- In June 2013, researched and wrote technical report on a Mitigated Negative Declaration for a new rail terminal at the Valero Benicia Refinery to import increased amounts of "North American" crudes. Comments addressed air quality impacts of refining increased amounts of tar sands crudes.
- In June 2013, researched and wrote technical report on Draft Environmental Impact Report for the California Ethanol and Power Imperial Valley 1 Project.
- In May 2013, researched and wrote comments on draft PSD permit for major expansion of midwest refinery to process 100% tar sands crudes, including a complex netting analysis involving debottlenecking, piecemealing, and BACT analyses.
- In April 2013, researched and wrote technical report on the Draft Supplemental Environmental Impact Statement (DSEIS) for the Keystone XL Pipeline on air quality impacts from refining increased amount of tar sands crudes at Refineries in PADD 3.
- In October 2012, researched and wrote technical report on the Environmental Review for the Coyote Island Terminal Dock at the Port of Morrow on fugitive particulate matter emissions.
- In October 2012-October 2014, review and evaluate Flint Hills West Application for an expansion/modification for increased (Texas, Eagle Ford Shale) crude processing and related modification, including netting and BACT analysis. Assist in settlement discussions.
- In February 2012, researched and wrote comments on BART analysis in PA Regional Haze SIP, 77 FR 3984 (Jan. 26, 2012). On Sept. 29, 2015, a federal appeals court overturned the U.S. EPA's approval of this plan, based in part on my comments, concluding "...we will vacate the 2014 Final Rule to the extent it approved Pennsylvania's source-specific BART analysis and remand to the EPA for further proceedings consistent with this Opinion." Nat'l Parks Conservation Assoc. v. EPA, 3d Cir., No. 14-3147, 9/19/15.
- Prepared cost analyses and comments on New York's proposed BART determinations for NOx, SO2, and PM and EPA's proposed approval of BART determinations for Danskammer Generating Station under New York Regional Haze State Implementation Plan and Federal Implementation Plan, 77 FR 51915 (August 28, 2012).

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- Prepared cost analyses and comments on NO_x BART determinations for Regional Haze State Implementation Plan for State of Nevada, 77 FR 23191 (April 18, 2012) and 77 FR 25660 (May 1, 2012).
- Prepared analyses of and comments on New Source Performance Standards for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, 77 FR 22392 (April 13, 2012).
- Researched and wrote comments on CASPR-BART emission equivalency and NO_x and PM BART determinations in EPA proposed approval of State Implementation Plan for Pennsylvania Regional Haze Implementation Plan, 77 FR 3984 (January 26, 2012).
- Researched and wrote comments and statistical analyses on hazardous air pollutants (HAPs) emission controls, monitoring, compliance methods, and the use of surrogates for acid gases, organic HAPs, and metallic HAPs for proposed National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units, 76 FR 24976 (May 3, 2011).
- Prepared cost analyses and comments on NO_x BART determinations and emission reductions for proposed Federal Implementation Plan for Four Corners Power Plant, 75 FR 64221 (October 19, 2010).
- Prepared cost analyses and comments on NO_x BART determinations for Colstrip Units 1- 4 for Montana State Implementation Plan and Regional Haze Federal Implementation Plan, 77 FR 23988 (April 20, 2010).
- For EPA Region 8, prepared report: Revised BART Cost Effectiveness Analysis for Tail-End Selective Catalytic Reduction at the Basin Electric Power Cooperative Leland Olds Station Unit 2 Final Report, March 2011, in support of 76 FR 58570 (Sept. 21, 2011).
- For EPA Region 6, prepared report: Revised BART Cost-Effectiveness Analysis for Selective Catalytic Reduction at the Public Service Company of New Mexico San Juan Generating Station, November 2010, in support of 76 FR 52388 (Aug. 22, 2011).
- For EPA Region 6, prepared report: Revised BART Cost-Effectiveness Analysis for Flue Gas Desulfurization at Coal-Fired Electric Generating Units in Oklahoma: Sooner Units 1 & 2, Muskogee Units 4 & 5, Northeastern Units 3 & 4, October 2010, in support of 76 FR 16168 (March 26, 2011). My work was upheld in: *State of Oklahoma v. EPA*, App. Case 12-9526 (10th Cir. July 19, 2013).
- Identified errors in N₂O emission factors in the Mandatory Greenhouse Gas Reporting Rule, 40 CFR 98, and prepared technical analysis to support Petition for Rulemaking to Correct Emissions Factors in the Mandatory Greenhouse Gas Reporting Rule, filed with EPA on 10/28/10.

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- Assisted interested parties develop input for and prepare comments on the Information Collection Request for Petroleum Refinery Sector NSPS and NESHAP Residual Risk and Technology Review, 75 FR 60107 (9/29/10).
- Technical reviewer of EPA's "Emission Estimation Protocol for Petroleum Refineries," posted for public comments on CHIEF on 12/23/09, prepared in response to the City of Houston's petition under the Data Quality Act (March 2010).
- Researched and wrote comments on SCR cost effectiveness for EPA's Advanced Notice of Proposed Rulemaking, Assessment of Anticipated Visibility Improvements at Surrounding Class I Areas and Cost Effectiveness of Best Available Retrofit Technology for Four Corners Power Plant and Navajo Generating Station, 74 FR 44313 (August 28, 2009).
- Researched and wrote comments on Proposed Rule for Standards of Performance for Coal Preparation and Processing Plants, 74 FR 25304 (May 27, 2009).
- Prepared comments on draft PSD permit for major expansion of midwest refinery to process up to 100% tar sands crudes. Participated in development of monitoring and controls to mitigate impacts and in negotiating a Consent Decree to settle claims in 2008.
- Reviewed and assisted interested parties prepare comments on proposed Kentucky air toxic regulations at 401 KAR 64:005, 64:010, 64:020, and 64:030 (June 2007).
- Prepared comments on proposed Standards of Performance for Electric Utility Steam Generating Units and Small Industrial-Commercial-Industrial Steam Generating Units, 70 FR 9706 (February 28, 2005).
- Prepared comments on Louisville Air Pollution Control District proposed Strategic Toxic Air Reduction regulations.
- Prepared comments and analysis of BAAQMD Regulation, Rule 11, Flare Monitoring at Petroleum Refineries.
- Prepared comments on Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electricity Utility Steam Generating Units (MACT standards for coal-fired power plants).
- Prepared Authority to Construct Permit for remediation of a large petroleum-contaminated site on the California Central Coast. Negotiated conditions with agencies and secured permits.
- Prepared Authority to Construct Permit for remediation of a former oil field on the California Central Coast. Participated in negotiations with agencies and secured permits.
- Prepared and/or reviewed hundreds of environmental permits, including NPDES, UIC, Stormwater, Authority to Construct, Prevention of Significant Deterioration, Nonattainment New Source Review, Title V, and RCRA, among others.

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- Participated in the development of the CARB document, *Guidance for Power Plant Siting and Best Available Control Technology*, including attending public workshops and filing technical comments.
- Performed data analyses in support of adoption of emergency power restoration standards by the California Public Utilities Commission for “major” power outages, where major is an outage that simultaneously affects 10% of the customer base.
- Drafted portions of the Good Neighbor Ordinance to grant Contra Costa County greater authority over safety of local industry, particularly chemical plants and refineries.
- Participated in drafting BAAQMD Regulation 8, Rule 28, Pressure Relief Devices, including participation in public workshops, review of staff reports, draft rules and other technical materials, preparation of technical comments on staff proposals, research on availability and costs of methods to control PRV releases, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 18, Valves and Connectors, including participation in public workshops, review of staff reports, proposed rules and other supporting technical material, preparation of technical comments on staff proposals, research on availability and cost of low-leak technology, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 25, Pumps and Compressors, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak and seal-less technology, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 5, Storage of Organic Liquids, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of controlling tank emissions, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 18, Valves and Connectors at Petroleum Refinery Complexes, including participation in public workshops, review of staff reports, proposed rules and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak technology, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 22, Valves and Flanges at Chemical Plants, etc, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak technology, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 25, Pump and Compressor Seals, including participation in public workshops, review of staff reports, proposed rules, and other

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supporting technical material, preparation of technical comments on staff proposals, research on availability of low-leak technology, and presentation of testimony before the Board.

- Participated in the development of the BAAQMD Regulation 2, Rule 5, Toxics, including participation in public workshops, review of staff proposals, and preparation of technical comments.
- Participated in the development of SCAQMD Rule 1402, Control of Toxic Air Contaminants from Existing Sources, and proposed amendments to Rule 1401, New Source Review of Toxic Air Contaminants, in 1993, including review of staff proposals and preparation of technical comments on same.
- Participated in the development of the Sunnyvale Ordinance to Regulate the Storage, Use and Handling of Toxic Gas, which was designed to provide engineering controls for gases that are not otherwise regulated by the Uniform Fire Code.
- Participated in the drafting of the Statewide Water Quality Control Plans for Inland Surface Waters and Enclosed Bays and Estuaries, including participation in workshops, review of draft plans, preparation of technical comments on draft plans, and presentation of testimony before the SWRCB.
- Participated in developing Se permit effluent limitations for the five Bay Area refineries, including review of staff proposals, statistical analyses of Se effluent data, review of literature on aquatic toxicity of Se, preparation of technical comments on several staff proposals, and presentation of testimony before the Bay Area RWQCB.
- Represented the California Department of Water Resources in the 1991 Bay-Delta Hearings before the State Water Resources Control Board, presenting sworn expert testimony with cross examination and rebuttal on a striped bass model developed by the California Department of Fish and Game.
- Represented the State Water Contractors in the 1987 Bay-Delta Hearings before the State Water Resources Control Board, presenting sworn expert testimony with cross examination and rebuttal on natural flows, historical salinity trends in San Francisco Bay, Delta outflow, and hydrodynamics of the South Bay.
- Represented interveners in the licensing of over 20 natural-gas-fired power plants and one coal gasification plant at the California Energy Commission and elsewhere. Reviewed and prepared technical comments on applications for certification, preliminary staff assessments, final staff assessments, preliminary determinations of compliance, final determinations of compliance, and prevention of significant deterioration permits in the areas of air quality, water supply, water quality, biology, public health, worker safety, transportation, site contamination, cooling systems, and hazardous materials. Presented written and oral testimony in evidentiary hearings with cross examination and rebuttal. Participated in technical workshops.

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- Represented several parties in the proposed merger of San Diego Gas & Electric and Southern California Edison. Prepared independent technical analyses on health risks, air quality, and water quality. Presented written and oral testimony before the Public Utilities Commission administrative law judge with cross examination and rebuttal.
- Represented a PRP in negotiations with local health and other agencies to establish impact of subsurface contamination on overlying residential properties. Reviewed health studies prepared by agency consultants and worked with agencies and their consultants to evaluate health risks.

WATER QUALITY/RESOURCES

- Directed and participated in research on environmental impacts of energy development in the Colorado River Basin, including contamination of surface and subsurface waters and modeling of flow and chemical transport through fractured aquifers.
- Played a major role in Northern California water resource planning studies since the early 1970s. Prepared portions of the Basin Plans for the Sacramento, San Joaquin, and Delta basins including sections on water supply, water quality, beneficial uses, waste load allocation, and agricultural drainage. Developed water quality models for the Sacramento and San Joaquin Rivers.
- Conducted hundreds of studies over the past 40 years on Delta water supplies and the impacts of exports from the Delta on water quality and biological resources of the Central Valley, Sacramento-San Joaquin Delta, and San Francisco Bay. Typical examples include:
 1. Evaluate historical trends in salinity, temperature, and flow in San Francisco Bay and upstream rivers to determine impacts of water exports on the estuary;
 2. Evaluate the role of exports and natural factors on the food web by exploring the relationship between salinity and primary productivity in San Francisco Bay, upstream rivers, and ocean;
 3. Evaluate the effects of exports, other in-Delta, and upstream factors on the abundance of salmon and striped bass;
 4. Review and critique agency fishery models that link water exports with the abundance of striped bass and salmon;
 5. Develop a model based on GLMs to estimate the relative impact of exports, water facility operating variables, tidal phase, salinity, temperature, and other variables on the survival of salmon smolts as they migrate through the Delta;
 6. Reconstruct the natural hydrology of the Central Valley using water balances, vegetation mapping, reservoir operation models to simulate flood basins, precipitation records, tree ring research, and historical research;

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7. Evaluate the relationship between biological indicators of estuary health and down-estuary position of a salinity surrogate (X2);
 8. Use real-time fisheries monitoring data to quantify impact of exports on fish migration;
 9. Refine/develop statistical theory of autocorrelation and use to assess strength of relationships between biological and flow variables;
 10. Collect, compile, and analyze water quality and toxicity data for surface waters in the Central Valley to assess the role of water quality in fishery declines;
 11. Assess mitigation measures, including habitat restoration and changes in water project operation, to minimize fishery impacts;
 12. Evaluate the impact of unscreened agricultural water diversions on abundance of larval fish;
 13. Prepare and present testimony on the impacts of water resources development on Bay hydrodynamics, salinity, and temperature in water rights hearings;
 14. Evaluate the impact of boat wakes on shallow water habitat, including interpretation of historical aerial photographs;
 15. Evaluate the hydrodynamic and water quality impacts of converting Delta islands into reservoirs;
 16. Use a hydrodynamic model to simulate the distribution of larval fish in a tidally influenced estuary;
 17. Identify and evaluate non-export factors that may have contributed to fishery declines, including predation, shifts in oceanic conditions, aquatic toxicity from pesticides and mining wastes, salinity intrusion from channel dredging, loss of riparian and marsh habitat, sedimentation from upstream land alterations, and changes in dissolved oxygen, flow, and temperature below dams.
- Developed, directed, and participated in a broad-based research program on environmental issues and control technology for energy industries including petroleum, oil shale, coal mining, and coal slurry transport. Research included evaluation of air and water pollution, development of novel, low-cost technology to treat and dispose of wastes, and development and application of geohydrologic models to evaluate subsurface contamination from in-situ retorting. The program consisted of government and industry contracts and employed 45 technical and administrative personnel.
 - Coordinated an industry task force established to investigate the occurrence, causes, and solutions for corrosion/erosion and mechanical/engineering failures in the waterside systems (e.g., condensers, steam generation equipment) of power plants. Corrosion/erosion failures

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caused by water and steam contamination that were investigated included waterside corrosion caused by poor microbiological treatment of cooling water, steam-side corrosion caused by ammonia-oxygen attack of copper alloys, stress-corrosion cracking of copper alloys in the air cooling sections of condensers, tube sheet leaks, oxygen in-leakage through condensers, volatilization of silica in boilers and carry over and deposition on turbine blades, and iron corrosion on boiler tube walls. Mechanical/engineering failures investigated included: steam impingement attack on the steam side of condenser tubes, tube-to-tube-sheet joint leakage, flow-induced vibration, structural design problems, and mechanical failures due to stresses induced by shutdown, startup and cycling duty, among others. Worked with electric utility plant owners/operators, condenser and boiler vendors, and architect/engineers to collect data to document the occurrence of and causes for these problems, prepared reports summarizing the investigations, and presented the results and participated on a committee of industry experts tasked with identifying solutions to prevent condenser failures.

- Evaluated the cost effectiveness and technical feasibility of using dry cooling and parallel dry-wet cooling to reduce water demands of several large natural-gas fired power plants in California and Arizona.
- Designed and prepared cost estimates for several dry cooling systems (e.g., fin fan heat exchangers) used in chemical plants and refineries.
- Designed, evaluated, and costed several zero liquid discharge systems for power plants.
- Evaluated the impact of agricultural and mining practices on surface water quality of Central Valley streams. Represented municipal water agencies on several federal and state advisory committees tasked with gathering and assessing relevant technical information, developing work plans, and providing oversight of technical work to investigate toxicity issues in the watershed.

AIR QUALITY/PUBLIC HEALTH

- Prepared or reviewed the air quality and public health sections of hundreds of EIRs and EISs on a wide range of industrial, commercial and residential projects.
- Prepared or reviewed hundreds of NSR and PSD permits for a wide range of industrial facilities.
- Designed, implemented, and directed a 2-year-long community air quality monitoring program to assure that residents downwind of a petroleum-contaminated site were not impacted during remediation of petroleum-contaminated soils. The program included real-time monitoring of particulates, diesel exhaust, and BTEX and time integrated monitoring for over 100 chemicals.
- Designed, implemented, and directed a 5-year long source, industrial hygiene, and ambient monitoring program to characterize air emissions, employee exposure, and downwind environmental impacts of a first-generation shale oil plant. The program included stack

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monitoring of heaters, boilers, incinerators, sulfur recovery units, rock crushers, API separator vents, and wastewater pond fugitives for arsenic, cadmium, chlorine, chromium, mercury, 15 organic indicators (e.g., quinoline, pyrrole, benzo(a)pyrene, thiophene, benzene), sulfur gases, hydrogen cyanide, and ammonia. In many cases, new methods had to be developed or existing methods modified to accommodate the complex matrices of shale plant gases.

- Conducted investigations on the impact of diesel exhaust from truck traffic from a wide range of facilities including mines, large retail centers, light industrial uses, and sports facilities. Conducted traffic surveys, continuously monitored diesel exhaust using an aethalometer, and prepared health risk assessments using resulting data.
- Conducted indoor air quality investigations to assess exposure to natural gas leaks, pesticides, molds and fungi, soil gas from subsurface contamination, and outgassing of carpets, drapes, furniture and construction materials. Prepared health risk assessments using collected data.
- Prepared health risk assessments, emission inventories, air quality analyses, and assisted in the permitting of over 70 1 to 2 MW emergency diesel generators.
- Prepare over 100 health risk assessments, endangerment assessments, and other health-based studies for a wide range of industrial facilities.
- Developed methods to monitor trace elements in gas streams, including a continuous real-time monitor based on the Zeeman atomic absorption spectrometer, to continuously measure mercury and other elements.
- Performed nuisance investigations (odor, noise, dust, smoke, indoor air quality, soil contamination) for businesses, industrial facilities, and residences located proximate to and downwind of pollution sources.

PUBLICATIONS AND PRESENTATIONS (Partial List - Representative Publications)

J.P. Fox, P.H. Hutton, D.J. Howes, A.J. Draper, and L. Sears, Reconstructing the Natural Hydrology of the San Francisco Bay-Delta Watershed, *Hydrology and Earth System Sciences, Special Issue: Predictions under Change: Water, Earth, and Biota in the Anthropocene*, v. 19, pp. 4257-4274, 2015. <http://www.hydrol-earth-syst-sci.net/19/4257/2015/hess-19-4257-2015.pdf>. See also: Estimates of Natural and Unimpaired Flows for the Central Valley of California: Water Years 1922-2014 at: <https://msb.water.ca.gov/documents/86728/a702a57f-ae7a-41a3-8bff-722e144059d6>.

D. Howes, P. Fox, and P. Hutton, Evapotranspiration from Natural Vegetation in the Central Valley of California: Monthly Grass Reference Based Vegetation Coefficients and the Dual Crop Coefficient Approach, *Journal of Hydrologic Engineering*, v.20, no. 10, October 2015.

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Phyllis Fox and Lindsey Sears, *Natural Vegetation in the Central Valley of California*, June 2014, Prepared for State Water Contractors and San Luis & Delta-Mendota Water Authority, 311 pg.

J.P. Fox, T.P. Rose, and T.L. Sawyer, *Isotope Hydrology of a Spring-fed Waterfall in Fractured Volcanic Rock*, 2007.

C.E. Lambert, E.D. Winegar, and Phyllis Fox, *Ambient and Human Sources of Hydrogen Sulfide: An Explosive Topic*, Air & Waste Management Association, June 2000, Salt Lake City, UT.

San Luis Obispo County Air Pollution Control District and San Luis Obispo County Public Health Department, *Community Monitoring Program*, February 8, 1999.

The Bay Institute, *From the Sierra to the Sea. The Ecological History of the San Francisco Bay-Delta Watershed*, 1998.

J. Phyllis Fox, *Well Interference Effects of HDPP's Proposed Wellfield in the Victor Valley Water District*, Prepared for the California Unions for Reliable Energy (CURE), October 12, 1998.

J. Phyllis Fox, *Air Quality Impacts of Using CPVC Pipe in Indoor Residential Potable Water Systems*, Report Prepared for California Pipe Trades Council, California Firefighters Association, and other trade associations, August 29, 1998.

J. Phyllis Fox and others, *Authority to Construct Avila Beach Remediation Project*, Prepared for Unocal Corporation and submitted to San Luis Obispo Air Pollution Control District, June 1998.

J. Phyllis Fox and others, *Authority to Construct Former Guadalupe Oil Field Remediation Project*, Prepared for Unocal Corporation and submitted to San Luis Obispo Air Pollution Control District, May 1998.

J. Phyllis Fox and Robert Sears, *Health Risk Assessment for the Metropolitan Oakland International Airport Proposed Airport Development Program*, Prepared for Plumbers & Steamfitters U.A. Local 342, December 15, 1997.

Levine-Fricke-Recon (Phyllis Fox and others), *Preliminary Endangerment Assessment Work Plan for the Study Area Operable Unit, Former Solano County Sanitary Landfill, Benicia, California*, Prepared for Granite Management Co. for submittal to DTSC, September 26, 1997.

Phyllis Fox and Jeff Miller, "Fathead Minnow Mortality in the Sacramento River," *IEP Newsletter*, v. 9, n. 3, 1996.

Jud Monroe, Phyllis Fox, Karen Levy, Robert Nuzum, Randy Bailey, Rod Fujita, and Charles Hanson, *Habitat Restoration in Aquatic Ecosystems. A Review of the Scientific Literature Related to the Principles of Habitat Restoration*, Part Two, Metropolitan Water District of Southern California (MWD) Report, 1996.

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- Phyllis Fox and Elaine Archibald, *Aquatic Toxicity and Pesticides in Surface Waters of the Central Valley*, California Urban Water Agencies (CUWA) Report, September 1997.
- Phyllis Fox and Alison Britton, *Evaluation of the Relationship Between Biological Indicators and the Position of X2*, CUWA Report, 1994.
- Phyllis Fox and Alison Britton, *Predictive Ability of the Striped Bass Model*, WRINT DWR-206, 1992.
- J. Phyllis Fox, *An Historical Overview of Environmental Conditions at the North Canyon Area of the Former Solano County Sanitary Landfill*, Report Prepared for Solano County Department of Environmental Management, 1991.
- J. Phyllis Fox, *An Historical Overview of Environmental Conditions at the East Canyon Area of the Former Solano County Sanitary Landfill*, Report Prepared for Solano County Department of Environmental Management, 1991.
- Phyllis Fox, *Trip 2 Report, Environmental Monitoring Plan, Parachute Creek Shale Oil Program*, Unocal Report, 1991.
- J. P. Fox and others, "Long-Term Annual and Seasonal Trends in Surface Salinity of San Francisco Bay," *Journal of Hydrology*, v. 122, p. 93-117, 1991.
- J. P. Fox and others, "Reply to Discussion by D.R. Helsel and E.D. Andrews on Trends in Freshwater Inflow to San Francisco Bay from the Sacramento-San Joaquin Delta," *Water Resources Bulletin*, v. 27, no. 2, 1991.
- J. P. Fox and others, "Reply to Discussion by Philip B. Williams on Trends in Freshwater Inflow to San Francisco Bay from the Sacramento-San Joaquin Delta," *Water Resources Bulletin*, v. 27, no. 2, 1991.
- J. P. Fox and others, "Trends in Freshwater Inflow to San Francisco Bay from the Sacramento-San Joaquin Delta," *Water Resources Bulletin*, v. 26, no. 1, 1990.
- J. P. Fox, "Water Development Increases Freshwater Flow to San Francisco Bay," *SCWC Update*, v. 4, no. 2, 1988.
- J. P. Fox, *Freshwater Inflow to San Francisco Bay Under Natural Conditions*, State Water Contractors, Exhibit 262, 58 pp., 1987;
http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/ccwd/spprt_docs/ccwd_fox_1987a.pdf.
- J. P. Fox, "The Distribution of Mercury During Simulated In-Situ Oil Shale Retorting," *Environmental Science and Technology*, v. 19, no. 4, pp. 316-322, 1985.
- J. P. Fox, "El Mercurio en el Medio Ambiente: Aspectos Referentes al Peru," (Mercury in the Environment: Factors Relevant to Peru) Proceedings of Simposio Los Pesticidas y el Medio

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- Ambiente," ONERN-CONCYTEC, Lima, Peru, April 25-27, 1984. (Also presented at Instituto Tecnológico Pesquero and Instituto del Mar del Peru.)
- J. P. Fox, "Mercury, Fish, and the Peruvian Diet," *Boletín de Investigación*, Instituto Tecnológico Pesquero, Lima, Peru, v. 2, no. 1, pp. 97-116, 1984.
- J. P. Fox, P. Persoff, A. Newton, and R. N. Heistand, "The Mobility of Organic Compounds in a Codisposal System," *Proceedings of the Seventeenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1984.
- P. Persoff and J. P. Fox, "Evaluation of Control Technology for Modified In-Situ Oil Shale Retorts," *Proceedings of the Sixteenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1983.
- J. P. Fox, *Leaching of Oil Shale Solid Wastes: A Critical Review*, University of Colorado Report, 245 pp., July 1983.
- J. P. Fox, *Source Monitoring for Unregulated Pollutants from the White River Oil Shale Project*, VTN Consolidated Report, June 1983.
- A. S. Newton, J. P. Fox, H. Villarreal, R. Raval, and W. Walker II, *Organic Compounds in Coal Slurry Pipeline Waters*, Lawrence Berkeley Laboratory Report LBL-15121, 46 pp., Sept. 1982.
- M. Goldstein et al., *High Level Nuclear Waste Standards Analysis, Regulatory Framework Comparison*, Battelle Memorial Institute Report No. BPMD/82/E515-06600/3, Sept. 1982.
- J. P. Fox et al., *Literature and Data Search of Water Resource Information of the Colorado, Utah, and Wyoming Oil Shale Basins*, Vols. 1-12, Bureau of Land Management, 1982.
- A. T. Hodgson, M. J. Pollard, G. J. Harris, D. C. Girvin, J. P. Fox, and N. J. Brown, *Mercury Mass Distribution During Laboratory and Simulated In-Situ Retorting*, Lawrence Berkeley Laboratory Report LBL-12908, 39 pp., Feb. 1982.
- E. J. Peterson, A. V. Henicksman, J. P. Fox, J. A. O'Rourke, and P. Wagner, *Assessment and Control of Water Contamination Associated with Shale Oil Extraction and Processing*, Los Alamos National Laboratory Report LA-9084-PR, 54 pp., April 1982.
- P. Persoff and J. P. Fox, *Control Technology for In-Situ Oil Shale Retorts*, Lawrence Berkeley Laboratory Report LBL-14468, 118 pp., Dec. 1982.
- J. P. Fox, *Codisposal Evaluation: Environmental Significance of Organic Compounds*, Development Engineering Report, 104 pp., April 1982.
- J. P. Fox, *A Proposed Strategy for Developing an Environmental Water Monitoring Plan for the Paraho-Ute Project*, VTN Consolidated Report, Sept. 1982.
- J. P. Fox, D. C. Girvin, and A. T. Hodgson, "Trace Elements in Oil Shale Materials," *Energy and Environmental Chemistry, Fossil Fuels*, v.1, pp. 69-101, 1982.

PHYLLIS FOX, PH.D., PAGE 41

M. Mehran, T. N. Narasimhan, and J. P. Fox, "Hydrogeologic Consequences of Modified In-situ Retorting Process, Piceance Creek Basin, Colorado," *Proceedings of the Fourteenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1981 (LBL-12063).

U. S. DOE (J. P. Fox and others), *Western Oil Shale Development: A Technology Assessment*, v. 1-9, Pacific Northwest Laboratory Report PNL-3830, 1981.

J. P. Fox (ed), "Oil Shale Research," Chapter from the *Energy and Environment Division Annual Report 1980*, Lawrence Berkeley Laboratory Report LBL-11989, 82 pp., 1981 (author or co-author of four articles in report).

D.C. Girvin and J.P. Fox, On-Line Zeeman Atomic Absorption Spectroscopy for Mercury Analysis in Oil Shale Gases, U.S. EPA Report EPA-600/7-80-130, June 1980.

J. P. Fox, *The Partitioning of Major, Minor, and Trace Elements during In-Situ Oil Shale Retorting*, Ph.D. Dissertation, U. of Ca., Berkeley, also Report LBL-9062, 441 pp., 1980 (*Diss. Abst. Internat.*, v. 41, no. 7, 1981).

J.P. Fox, "Elemental Composition of Simulated *In Situ* Oil Shale Retort Water," *Analysis of Waters Associated with Alternative Fuel Production, ASTM STP 720*, L.P. Jackson and C.C. Wright, Eds., American Society for Testing and Materials, pp. 101-128, 1981.

J. P. Fox, P. Persoff, P. Wagner, and E. J. Peterson, "Retort Abandonment -- Issues and Research Needs," in *Oil Shale: the Environmental Challenges*, K. K. Petersen (ed.), p. 133, 1980 (Lawrence Berkeley Laboratory Report LBL-11197).

J. P. Fox and T. E. Phillips, "Wastewater Treatment in the Oil Shale Industry," in *Oil Shale: the Environmental Challenges*, K. K. Petersen (ed.), p. 253, 1980 (Lawrence Berkeley Laboratory Report LBL-11214).

R. D. Giaque, J. P. Fox, J. W. Smith, and W. A. Robb, "Geochemical Studies of Two Cores from the Green River Oil Shale Formation," *Transactions*, American Geophysical Union, v. 61, no. 17, 1980.

J. P. Fox, "The Elemental Composition of Shale Oils," Abstracts of Papers, 179th National Meeting, ISBN 0-8412-0542-6, Abstract No. FUEL 17, 1980.

J. P. Fox and P. Persoff, "Spent Shale Grouting of Abandoned In-Situ Oil Shale Retorts," *Proceedings of Second U.S. DOE Environmental Control Symposium*, CONF-800334/1, 1980 (Lawrence Berkeley Laboratory Report LBL-10744).

P. K. Mehta, P. Persoff, and J. P. Fox, "Hydraulic Cement Preparation from Lurgi Spent Shale," *Proceedings of the Thirteenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1980 (Lawrence Berkeley Laboratory Report LBL-11071).

F. E. Brinckman, K. L. Jewett, R. H. Fish, and J. P. Fox, "Speciation of Inorganic and Organoarsenic Compounds in Oil Shale Process Waters by HPLC Coupled with Graphite Furnace Atomic Absorption (GFAA) Detectors," Abstracts of Papers, Div. of Geochemistry,

PHYLLIS FOX, PH.D., PAGE 42

Paper No. 20, Second Chemical Congress of the North American Continent, August 25-28, 1980, Las Vegas (1980).

J. P. Fox, D. E. Jackson, and R. H. Sakaji, "Potential Uses of Spent Shale in the Treatment of Oil Shale Retort Waters," *Proceedings of the Thirteenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1980 (Lawrence Berkeley Laboratory Report LBL-11072).

J. P. Fox, *The Elemental Composition of Shale Oils*, Lawrence Berkeley Laboratory Report LBL-10745, 1980.

R. H. Fish, J. P. Fox, F. E. Brinckman, and K. L. Jewett, *Fingerprinting Inorganic and Organoarsenic Compounds in Oil Shale Process Waters Using a Liquid Chromatograph Coupled with an Atomic Absorption Detector*, Lawrence Berkeley Laboratory Report LBL-11476, 1980.

National Academy of Sciences (J. P. Fox and others), *Surface Mining of Non-Coal Minerals, Appendix II: Mining and Processing of Oil Shale and Tar Sands*, 222 pp., 1980.

J. P. Fox, "Elemental Composition of Simulated In-Situ Oil Shale Retort Water," in *Analysis of Waters Associated with Alternative Fuel Production*, ASTM STP 720, L. P. Jackson and C. C. Wright (eds.), American Society for Testing and Materials, pp. 101-128, 1980.

R. D. Giaouque, J. P. Fox, and J. W. Smith, *Characterization of Two Core Holes from the Naval Oil Shale Reserve Number 1*, Lawrence Berkeley Laboratory Report LBL-10809, 176 pp., December 1980.

B. M. Jones, R. H. Sakaji, J. P. Fox, and C. G. Daughton, "Removal of Contaminative Constituents from Retort Water: Difficulties with Biotreatment and Potential Applicability of Raw and Processed Shales," *EPA/DOE Oil Shale Wastewater Treatability Workshop*, December 1980 (Lawrence Berkeley Laboratory Report LBL-12124).

J. P. Fox, *Water-Related Impacts of In-Situ Oil Shale Processing*, Lawrence Berkeley Laboratory Report LBL-6300, 327 p., December 1980.

M. Mehran, T. N. Narasimhan, and J. P. Fox, *An Investigation of Dewatering for the Modified In-Situ Retorting Process, Piceance Creek Basin, Colorado*, Lawrence Berkeley Laboratory Report LBL-11819, 105 p., October 1980.

J. P. Fox (ed.) "Oil Shale Research," Chapter from the *Energy and Environment Division Annual Report 1979*, Lawrence Berkeley Laboratory Report LBL-10486, 1980 (author or coauthor of eight articles).

E. Ossio and J. P. Fox, *Anaerobic Biological Treatment of In-Situ Oil Shale Retort Water*, Lawrence Berkeley Laboratory Report LBL-10481, March 1980.

J. P. Fox, F. H. Pearson, M. J. Kland, and P. Persoff, *Hydrologic and Water Quality Effects and Controls for Surface and Underground Coal Mining -- State of Knowledge, Issues, and Research Needs*, Lawrence Berkeley Laboratory Report LBL-11775, 1980.

PHYLLIS FOX, PH.D., PAGE 43

- D. C. Girvin, T. Hadeishi, and J. P. Fox, "Use of Zeeman Atomic Absorption Spectroscopy for the Measurement of Mercury in Oil Shale Offgas," *Proceedings of the Oil Shale Symposium: Sampling, Analysis and Quality Assurance*, U.S. EPA Report EPA-600/9-80-022, March 1979 (Lawrence Berkeley Laboratory Report LBL-8888).
- D. S. Farrier, J. P. Fox, and R. E. Poulson, "Interlaboratory, Multimethod Study of an In-Situ Produced Oil Shale Process Water," *Proceedings of the Oil Shale Symposium: Sampling, Analysis and Quality Assurance*, U.S. EPA Report EPA-600/9-80-022, March 1979 (Lawrence Berkeley Laboratory Report LBL-9002).
- J. P. Fox, J. C. Evans, J. S. Fruchter, and T. R. Wildeman, "Interlaboratory Study of Elemental Abundances in Raw and Spent Oil Shales," *Proceedings of the Oil Shale Symposium: Sampling, Analysis and Quality Assurance*, U.S. EPA Report EPA-600/9-80-022, March 1979 (Lawrence Berkeley Laboratory Report LBL-8901).
- J. P. Fox, "Retort Water Particulates," *Proceedings of the Oil Shale Symposium: Sampling, Analysis and Quality Assurance*, U.S. EPA Report EPA-600/9-80-022, March 1979 (Lawrence Berkeley Laboratory Report LBL-8829).
- P. Persoff and J. P. Fox, "Control Strategies for In-Situ Oil Shale Retorts," *Proceedings of the Twelfth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1979 (Lawrence Berkeley Laboratory Report LBL-9040).
- J. P. Fox and D. L. Jackson, "Potential Uses of Spent Shale in the Treatment of Oil Shale Retort Waters," *Proceedings of the DOE Wastewater Workshop*, Washington, D. C., June 14-15, 1979 (Lawrence Berkeley Laboratory Report LBL-9716).
- J. P. Fox, K. K. Mason, and J. J. Duvall, "Partitioning of Major, Minor, and Trace Elements during Simulated In-Situ Oil Shale Retorting," *Proceedings of the Twelfth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1979 (Lawrence Berkeley Laboratory Report LBL-9030).
- P. Persoff and J. P. Fox, *Control Strategies for Abandoned In-Situ Oil Shale Retorts*, Lawrence Berkeley Laboratory Report LBL-8780, 106 pp., October 1979.
- D. C. Girvin and J. P. Fox, *On-Line Zeeman Atomic Absorption Spectroscopy for Mercury Analysis in Oil Shale Gases*, Environmental Protection Agency Report EPA-600/7-80-130, 95 p., August 1979 (Lawrence Berkeley Laboratory Report LBL-9702).
- J. P. Fox, *Water Quality Effects of Leachates from an In-Situ Oil Shale Industry*, Lawrence Berkeley Laboratory Report LBL-8997, 37 pp., April 1979.
- J. P. Fox (ed.), "Oil Shale Research," Chapter from the *Energy and Environment Division Annual Report 1978*, Lawrence Berkeley Laboratory Report LBL-9857 August 1979 (author or coauthor of seven articles).

PHYLLIS FOX, PH.D., PAGE 44

J. P. Fox, P. Persoff, M. M. Moody, and C. J. Sisemore, "A Strategy for the Abandonment of Modified In-Situ Oil Shale Retorts," *Proceedings of the First U.S. DOE Environmental Control Symposium*, CONF-781109, 1978 (Lawrence Berkeley Laboratory Report LBL-6855).

E. Ossio, J. P. Fox, J. F. Thomas, and R. E. Poulson, "Anaerobic Fermentation of Simulated In-Situ Oil Shale Retort Water," *Division of Fuel Chemistry Preprints*, v. 23, no. 2, p. 202-213, 1978 (Lawrence Berkeley Laboratory Report LBL-6855).

J. P. Fox, J. J. Duvall, R. D. McLaughlin, and R. E. Poulson, "Mercury Emissions from a Simulated In-Situ Oil Shale Retort," *Proceedings of the Eleventh Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1978 (Lawrence Berkeley Laboratory Report LBL-7823).

J. P. Fox, R. D. McLaughlin, J. F. Thomas, and R. E. Poulson, "The Partitioning of As, Cd, Cu, Hg, Pb, and Zn during Simulated In-Situ Oil Shale Retorting," *Proceedings of the Tenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1977.

Bechtel, Inc., *Treatment and Disposal of Toxic Wastes*, Report Prepared for Santa Ana Watershed Planning Agency, 1975.

Bay Valley Consultants, *Water Quality Control Plan for Sacramento, Sacramento-San Joaquin and San Joaquin Basins*, Parts I and II and Appendices A-E, 750 pp., 1974.

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POST GRADUATE COURSES

(Partial)

S-Plus Data Analysis, MathSoft, 6/94.
 Air Pollutant Emission Calculations, UC Berkeley Extension, 6-7/94
 Assessment, Control and Remediation of LNAPL Contaminated Sites, API and USEPA, 9/94
 Pesticides in the TIE Process, SETAC, 6/96
 Sulfate Minerals: Geochemistry, Crystallography, and Environmental Significance,
 Mineralogical Society of America/Geochemical Society, 11/00.
 Design of Gas Turbine Combined Cycle and Cogeneration Systems, Thermoflow, 12/00
 Air-Cooled Steam Condensers and Dry- and Hybrid-Cooling Towers, Power-Gen, 12/01
 Combustion Turbine Power Augmentation with Inlet Cooling and Wet Compression,
 Power-Gen, 12/01
 CEQA Update, UC Berkeley Extension, 3/02
 The Health Effects of Chemicals, Drugs, and Pollutants, UC Berkeley Extension, 4-5/02
 Noise Exposure Assessment: Sampling Strategy and Data Acquisition, AIHA PDC 205, 6/02
 Noise Exposure Measurement Instruments and Techniques, AIHA PDC 302, 6/02
 Noise Control Engineering, AIHA PDC 432, 6/02
 Optimizing Generation and Air Emissions, Power-Gen, 12/02
 Utility Industry Issues, Power-Gen, 12/02
 Multipollutant Emission Control, Coal-Gen, 8/03
 Community Noise, AIHA PDC 104, 5/04
 Cutting-Edge Topics in Noise and Hearing Conservation, AIHA 5/04
 Selective Catalytic Reduction: From Planning to Operation, Power-Gen, 12/05
 Improving the FGD Decision Process, Power-Gen, 12/05
 E-Discovery, CEB, 6/06
 McIlvaine Hot Topic Hour, FGD Project Delay Factors, 8/10/06
 McIlvaine Hot Topic Hour, What Mercury Technologies Are Available, 9/14/06
 McIlvaine Hot Topic Hour, SCR Catalyst Choices, 10/12/06
 McIlvaine Hot Topic Hour, Particulate Choices for Low Sulfur Coal, 10/19/06
 McIlvaine Hot Topic Hour, Impact of PM2.5 on Power Plant Choices, 11/2/06
 McIlvaine Hot Topic Hour, Dry Scrubbers, 11/9/06
 Cost Estimating and Tricks of the Trade – A Practical Approach, PDH P159, 11/19/06
 Process Equipment Cost Estimating by Ratio & Proportion, PDH G127 11/19/06
 Power Plant Air Quality Decisions, Power-Gen 11/06
 McIlvaine Hot Topic Hour, WE Energies Hg Control Update, 1/12/07
 Negotiating Permit Conditions, EEUC, 1/21/07
 BACT for Utilities, EEUC, 1/21/07
 McIlvaine Hot Topic Hour, Chinese FGD/SCR Program & Impact on World, 2/1/07
 McIlvaine Hot Topic Hour, Mercury Control Cost & Performance, 2/15/07
 McIlvaine Hot Topic Hour, Mercury CEMS, 4/12/07

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Coal-to-Liquids – A Timely Revival, 9th Electric Power, 4/30/07
 Advances in Multi-Pollutant and CO₂ Control Technologies, 9th Electric Power, 4/30/07
 McIlvaine Hot Topic Hour, Measurement & Control of PM_{2.5}, 5/17/07
 McIlvaine Hot Topic Hour, Co-firing and Gasifying Biomass, 5/31/07
 McIlvaine Hot Topic Hour, Mercury Cost and Performance, 6/14/07
 Ethanol 101: Points to Consider When Building an Ethanol Plant, BBI International, 6/26/07
 Low Cost Optimization of Flue Gas Desulfurization Equipment, Fluent, Inc., 7/6/07.
 McIlvaine Hot Topic Hour, CEMS for Measurement of NH₃, SO₃, Low NO_x, 7/12/07
 McIlvaine Hot Topic Hour, Mercury Removal Status & Cost, 8/9/07
 McIlvaine Hot Topic Hour, Filter Media Selection for Coal-Fired Boilers, 9/13/07
 McIlvaine Hot Topic Hour, Catalyst Performance on NO_x, SO₃, Mercury, 10/11/07
 PRB Coal Users Group, PRB 101, 12/4/07
 McIlvaine Hot Topic Hour, Mercury Control Update, 10/25/07
 Circulating Fluidized Bed Boilers, Their Operation, Control and Optimization, Power-Gen, 12/8/07
 Renewable Energy Credits & Greenhouse Gas Offsets, Power-Gen, 12/9/07
 Petroleum Engineering & Petroleum Downstream Marketing, PDH K117, 1/5/08
 Estimating Greenhouse Gas Emissions from Manufacturing, PDH C191, 1/6/08
 McIlvaine Hot Topic Hour, NO_x Reagents, 1/17/08
 McIlvaine Hot Topic Hour, Mercury Control, 1/31/08
 McIlvaine Hot Topic Hour, Mercury Monitoring, 3/6/08
 McIlvaine Hot Topic Hour, SCR Catalysts, 3/13/08
 Argus 2008 Climate Policy Outlook, 3/26/08
 Argus Pet Coke Supply and Demand 2008, 3/27/08
 McIlvaine Hot Topic Hour, SO₃ Issues and Answers, 3/27/08
 McIlvaine Hot Topic Hour, Mercury Control, 4/24/08
 McIlvaine Hot Topic Hour, Co-Firing Biomass, 5/1/08
 McIlvaine Hot Topic Hour, Coal Gasification, 6/5/08
 McIlvaine Hot Topic Hour, Spray Driers vs. CFBs, 7/3/08
 McIlvaine Hot Topic Hour, Air Pollution Control Cost Escalation, 9/25/08
 McIlvaine Hot Topic Hour, Greenhouse Gas Strategies for Coal Fired Power Plant Operators, 10/2/08
 McIlvaine Hot Topic Hour, Mercury and Toxics Monitoring, 2/5/09
 McIlvaine Hot Topic Hour, Dry Precipitator Efficiency Improvements, 2/12/09
 McIlvaine Hot Topic Hour, Coal Selection & Impact on Emissions, 2/26/09
 McIlvaine Hot Topic Hour, 98% Limestone Scrubber Efficiency, 7/9/09
 McIlvaine Hot Topic Hour, Carbon Management Strategies and Technologies, 6/24/10
 McIlvaine Hot Topic Hour, Gas Turbine O&M, 7/22/10
 McIlvaine Hot Topic Hour, Industrial Boiler MACT – Impact and Control Options, March 10, 2011
 McIlvaine Hot Topic Hour, Fuel Impacts on SCR Catalysts, June 30, 2011.
 Interest Rates, PDH P204, 3/9/12

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Mechanics Liens, PDHOnline, 2/24/13.

Understanding Concerns with Dry Sorbent Injection as a Coal Plant Pollution Control, Webinar #874-567-839 by Cleanenergy.Org, March 4, 2013

Webinar: Coal-to-Gas Switching: What You Need to Know to Make the Investment, sponsored by PennWell Power Engineering Magazine, March 14, 2013. Available at: <https://event.webcasts.com/viewer/event.jsp?ei=1013472>.

EXHIBIT B

Scott Cashen, M.S.—Independent Biological Resources Consultant

February 11, 2021

Ms. Kelilah D. Federman
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Subject: Comments on the Draft Environmental Impact Report for the Estrella Substation and Paso Robles Area Reinforcement Project

Dear Ms. Federman:

D-298

This letter contains my comments on the Draft Environmental Impact Report (“DEIR”) prepared by the California Public Utilities Commission (“CPUC”) for the Estrella Substation and Paso Robles Area Reinforcement Project (“Project” or “Proposed Project”). Horizon West Transmission, LLC and Pacific Gas and Electric Company (collectively referred to as the “Applicants”) have proposed a project that involves construction and operation of a new 230 kilovolt (kV)/70 kV substation, a new 7-mile-long 70 kV power line, and replacement and reconductoring of approximately 3 miles of an existing 70 kV power line. The Proposed Project also would provide for the future establishment of three new distribution feeders from the proposed Estrella Substation, including construction of roughly 1.7 miles of new distribution line and additional reconductoring activities. All of these facilities would be located within the City of Paso Robles or immediately adjacent areas within unincorporated portions of San Luis Obispo County.

I am an environmental biologist with 28 years of professional experience in wildlife biology and natural resources management. I have served as a biological resources expert for over 125 projects in California. My experience and scope of work in this regard has included assisting various clients with evaluations of biological resource issues, reviewing environmental compliance documents prepared pursuant to the California Environmental Quality Act (“CEQA”) and the National Environmental Policy Act (“NEPA”), and submitting written comments in response to CEQA and NEPA documents. My work has included the preparation of written and oral testimony for the California Energy Commission, CPUC, and Federal courts. My educational background includes a B.S. in Resource Management from the University of California at Berkeley, and a M.S. in Wildlife and Fisheries Science from the Pennsylvania State University. A copy of my curriculum vitae is attached hereto.

The comments herein are based on my review of the environmental documents prepared for the Project, a review of scientific literature pertaining to biological resources known to occur in the Project area, consultations with other biological resource experts, and the knowledge and experience I have acquired during my 28-year career in the field of natural resources management.

3264 Hudson Avenue, Walnut Creek, CA 94597

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PROJECT DESCRIPTION

D-299 The DEIR fails to provide a clear description of the vegetation management activities that would be implemented to comply with: (a) CPUC General Order (“G.O.”) 95, and (b) PG&E and HWT wildfire mitigation plans (required under CPUC Code, Chapter 6, Section 8386). For example, the Project Description states:

An approximately 10-foot radius (approximately 314 square feet) may be maintained around new 70 kV power poles depending on location and equipment installed as required by applicable law, including CPUC G.O. 95. Project proponents may, therefore, keep these areas clear of natural vegetation. Vegetation growing too close to conductors within the easement would be trimmed or removed for safety. Herbicides may be used for some vegetation maintenance activities.¹

This description is too vague to understand the environmental impacts of the Project. The EIR needs to clearly articulate: (1) the vegetation management activities that would be conducted between power poles and the distance those activities would extend from the power lines (conductors); (2) the methods that would be used to remove, trim, or otherwise manipulate vegetation (e.g., masticators, chainsaws, loppers, etc.); (3) the herbicide products that may be used; (4) the frequency (return interval) of vegetation management activities (by vegetation community, if applicable); (5) the vegetation communities that may be manipulated to comply with G.O. 95; (6) whether the 10-foot radius would be limited to vegetation that grows within 10 horizontal feet of any conductor (as indicated on DEIR p. 4.4-53), or whether it also would include vegetation within 10 vertical feet; and (7) why numerous oak trees along the 70 kV route, but not within a 10-foot radius of the power poles, would be trimmed or removed.²

D-300 PGE’s Wildfire Mitigation Plan states:

In 2018, PG&E began a fuel reduction program, performing ground-to-conductor vegetative fuel reduction work (i.e. under and adjacent to power lines) in select locations. The goal of the fuel reduction work is to create “fire defense zones” which enhance defensible space for communities, properties, and buildings. These “fire defense zones” can also mitigate the spread of an ignition if one were to occur under or adjacent to PG&E powerlines. As such PG&E will continue to conduct fuel reduction work when appropriate, in select locations.³

Fuel reduction programs can cause significant environmental impacts that were not analyzed in the DEIR. For example, fuels reduction treatments in coastal scrub communities promote invasion by non-native plants and may cause type conversion (i.e., one vegetation type is converted into another vegetation type), especially if the treatments exceed the historical disturbance regime frequency.⁴ Therefore, the CPUC and Applicants need to clarify whether a

¹ DEIR, p. 2-87.

² See DEIR, Figure 3-7.

³ PG&E. 2020 Feb 28. 2020 Wildfire Mitigation Plan Report. p. 5-187.

⁴ Keeley JE. 2006. Fire management impacts on invasive plants in the Western United States. *Conservation Biology* 20(2):375-384.

D-300 ↑
cont. | fuel reduction program would (or might) be implemented as part of the Project. If a fuel reduction program might be implemented as part of the Project, the EIR must disclose and analyze the environmental impacts of that program.

ENVIRONMENTAL SETTING

Golden Eagle

D-301 | Project impacts have the potential to be especially severe on golden eagles due to the species': (a) intolerance of anthropogenic forms of disturbance, and (b) susceptibility to collision with, and electrocution from, power lines.⁵ As result, robust information on golden eagle nest territories and important eagle-use areas⁶ is critical to assessing impacts of the Proposed Project and various Project alternatives. According to the DEIR:

Multiple active and inactive nests have been identified in the vicinity, including one near the Cava Robles RV Resort and several in the vicinity of the Alternative SE-PLR-2 alignment. Known golden eagle nests are shown in Figure 4.4-5. Expansive grasslands and open oak woodlands within and around the Proposed Project, reasonably foreseeable distribution components, and alternatives areas provide suitable hunting and nesting habitat for this species. Multiple sightings of golden eagles have been recorded within Paso Robles city limits between 1982 and 2015, with the closest observation to the project site being at Cuesta College North Campus just north of SR 46 (eBird 2020b). Horizon biologists also observed golden eagle individuals during March and July 2019 surveys (Horizon 2019a, 2019c).⁷

D-302 | As described below, additional information is needed to evaluate the sufficiency of the DEIR's description of the environmental setting, and thus, the DEIR's impact assessment and proposed mitigation:

- D-303 |
1. It appears the Applicants' biological resource consultant did not conduct protocol-level surveys for eagle nests.⁸ Therefore, please identify the methods that were used to obtain information on golden eagle nests in the vicinity of the Proposed Project and Project alternatives.
 2. DEIR Figure 4.4-5 does not distinguish between active and inactive nests. Therefore, please clarify whether Figure 4.4-5 depicts all active and inactive nests, or only the active nests.

⁵ U.S. Fish and Wildlife Service, Division of Migratory Bird Management. 2009. Final Environmental Assessment, Proposal to Permit Take as Provided Under the Bald and Golden Eagle Protection Act. Washington: Dept. of Interior. *See also* U.S. Fish and Wildlife Service. 2013 Apr. Eagle Conservation Plan Guidance: Module 1—Land-based Wind Energy, Ver 2. pp. ii and iii.

⁶ Important eagle-use area is defined as: "an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles" (as defined at 50 CFR 22.3).

⁷ DEIR, Table 4.4-1.

⁸ *See* Pagel JE, Whittington DM, Allen GT. 2010 Feb. Interim Golden Eagle inventory and monitoring protocols; and other recommendations. Division of Migratory Birds, United States Fish and Wildlife Service.

- D-304 3. It can be very difficult to classify the status of an eagle nest. In addition, many inactive nests become active nests in subsequent years. Therefore, please: (a) explain the methods that were used to confirm a nest was inactive, and (b) identify the year(s) each nest was last surveyed to determine its status.
- D-305 4. California Natural Diversity Database (“CNDDDB”) staff often have a backlog of occurrence data that have not been entered into the database. This appears to be the case for golden eagle nest records. Therefore, please clarify whether the information provided in the DEIR includes unprocessed data that can be obtained by contacting CNDDDB staff and the USFWS.
- D-306 5. The eBird database has multiple records of golden eagles within the Paso Robles city limits between 2016 and 2020. Therefore, please clarify why the DEIR suggests there have not been sightings of golden eagles within the Paso Robles city limits since 2015.
- D-307 6. The USFWS recommends surveys for occupied nesting territories within two miles of the area where take may occur.⁹ Therefore, please provide information on any protocol-level eagle nest surveys that have been conducted within two miles of the Proposed Project and various Project alternatives.

PROJECT IMPACTS

Sensitive Natural Communities

D-308 The DEIR provides the following analysis of impacts to sensitive natural communities:

The proposed Estrella Substation site is currently in agricultural production and there are no riparian habitats or sensitive natural communities within the site. The Proposed Project’s 70 kV power line route, by contrast, would span several riparian corridors, including those along Huer Huero Creek and other unnamed ephemeral drainages in the area (see Figure 4.4-1). Additionally, three vegetation communities observed in the vicinity of the Proposed Project power line route (blue oak woodland, Central Coast cottonwood-willow riparian forest, and coastal and valley freshwater marsh) are considered sensitive communities under the City of Paso Robles General Plan (2011). Five vegetation communities (blue oak woodlands, central [Lucian] coastal scrub, Central Coast cottonwood-willow riparian forest, coastal and valley freshwater marsh, and sandy wash) are considered sensitive natural communities by CDFW.

As described in Impact BIO-1, the Proposed Project has been designed to avoid all riparian habitats. APM HYDRO-1 requires that permanent structures, staging and work areas, and access roads be sited/routed through uplands and outside of existing drainage features to the extent feasible. Prior to construction, sensitive aquatic features slated for avoidance would be identified in the field and clearly marked. As a result, riparian areas would be avoided and no direct impacts to riparian areas would occur as a result of Proposed Project construction. Similarly, the Proposed Project has been designed to avoid central coastal scrub, Central Coast cottonwood-willow riparian forest, coastal and valley freshwater marsh, and sandy wash vegetation communities; however, up to 0.13

⁹ U.S. Fish and Wildlife Service. 2020. Updated Eagle Nest Survey Protocol. Available at: <<https://www.fws.gov/migratorybirds/pdf/management/EagleNestSurveyGuidanceUpdated.pdf>>

D-308
cont.

acre of direct permanent impacts to blue oak woodlands would occur as a result of pole and tower installation, vegetation removal, and clearing activities. This would include up to three oak trees that would need to be removed for Proposed Project construction. Further, approximately 6.41 acres of blue oak woodlands would be temporarily affected from construction activities. As described in Chapter 2, Project Description, all areas temporarily disturbed by the Proposed Project would be restored to the extent practicable, following construction.¹⁰

The 70 kV power line would cross a number of drainage features¹¹ that qualify as “riparian areas.”¹² The DEIR points to APM HYDRO-1 to justify the statement that: “riparian areas would be avoided and no direct impacts to riparian areas would occur as a result of Proposed Project construction.”¹³ However, APM HYDRO-1 only requires that permanent structures, staging and work areas, and access roads be sited outside of existing drainage features *to the extent feasible*. The DEIR does not discuss factors that would make it infeasible to avoid impacts to riparian areas, nor does it explain why it was impractical for the CPUC to conduct the feasibility analysis prior to publication of the DEIR. Because avoidance of riparian areas is contingent on an undefined level of feasibility, it is impossible for the public to understand the likelihood that Project impacts to riparian areas would indeed be avoided. Similarly, because the DEIR does not discuss factors that would make restoration impracticable, it is impossible for the public to understand the likelihood that ecological functions within temporary impact areas would indeed be restored. This issue is compounded by the lack of ecological performance standards for restoration of habitats in temporary impact areas (except those containing blue oak woodland).

Blue Oak Woodland

D-309

The DEIR states: “up to 0.13 acre of direct permanent impacts to blue oak woodlands would occur as a result of pole and tower installation, vegetation removal, and clearing activities. This would include up to three oak trees that would need to be removed for Proposed Project construction. Further, approximately 6.41 acres of blue oak woodlands would be temporarily affected from construction activities.”¹⁴ The DEIR’s statement that permanent impacts to oak trees would be limited to removal of “up to three oak trees” does not appear to be accurate for several reasons. First, it is inconsistent with DEIR Figure 3-7, which depicts numerous locations along the reconductoring segment that would require “oak tree trimming/removal.”¹⁵ This suggests the Applicants have yet to determine how many oak trees require removal. Second, it does not appear to account for tree removal activities associated with implementation of G.O. 95.

D-310

D-311

D-312

Third, it does not appear to account for tree removal or mortality in the Project’s “temporary” impact areas. According to DEIR:

¹⁰ DEIR, p. 4.4-51.
¹¹ DEIR, p. 4.4-53.
¹² Riparian areas in the Project area are not limited to the Central Coast cottonwood-willow riparian forest vegetation community discussed in the DEIR. *See definition in* National Research Council 2002. Riparian Areas: Functions and Strategies for Management. Washington, DC: The National Academies Press. p. 3.
¹³ DEIR, p. 4.4-51.
¹⁴ *Ibid.*
¹⁵ It is unclear if the proposed alignment (and MRV) for the 70-kV route between the Estrella Substation and North River Road would require additional trimming/removal of oak trees because unlike the detailed maps of the Project alternatives, the detailed map of the Proposed Project does not depict locations requiring oak tree trimming/removal.

D-312 cont. ↑ Proposed Project construction would require establishment of temporary staging areas, structure work areas, conductor pull and tension sites, and helicopter landing areas. Construction of temporary access roads also would be required. The range of site preparation for these areas would include site leveling and grading, fencing, placement of gravel, vegetation removal, tree trimming/removal and/or vine removal, and placement of temporary rock bedding.¹⁶

D-313 ↓ The DEIR fails to analyze how these construction activities would affect oak trees and the long-term viability of the blue oak woodland. Oak trees are extremely sensitive to disturbance activities within the root zone, which is approximately one third greater than the distance between the tree and the outermost edge of the tree’s foliage (e.g., if the tree’s foliage extends 30 feet, the root zone extends 40 feet).¹⁷ Any construction activities that occur in the root zone have the potential to kill the oak tree.¹⁸ This includes grading, trenching, soil compaction, deposition of gravel or rock, and potentially other construction activities in the “temporary” work areas.¹⁹ In addition, any construction activities that causes changes in soil moisture levels or drainage around an oak can kill the tree.²⁰ The temporary construction activities described in the DEIR are likely to cause permanent impacts to oak trees and the associated oak woodland community, especially in absence of: (a) mitigation to protect the root zone and existing soil properties, and (b) performance standards for survival of oak trees within temporary impact areas.

D-314 ↓ To facilitate proper understanding of the Project’s impacts, the CPUC needs to: (1) provide maps that depict the oaks and oak woodland habitat that would be permanently impacted by the Project; (2) identify and map the specific Project activities that would temporarily impact 6.41 acres of blue oak woodlands; (3) explain the rationale for classifying the impacts as temporary; (4) clarify the maximum number of oak trees that might be removed as a result of the Project; and (5) clarify the extent of impacts associated with implementation of G.O. 95 (and any other vegetation management activities designed to reduce the wildfire risk).

D-315 ↓

D-316 ↓

D-317 ↓

D-318 ↓

Special-Status Wildlife Habitat

D-319 ↓ The DEIR states:
 Construction of the proposed Estrella Substation and the 70 kV power line would involve vegetation clearing, excavation, grading, and related ground-disturbing activities. Additionally, access roads would be improved and/or established to allow for access to work areas. Helicopters would be used for a variety of tasks during the construction period and approximately 6 helicopter landing zones would be established and utilized in the Proposed Project area. These activities would have potential to impact special-status species both directly (e.g., crushing from mechanical equipment) and indirectly (e.g., habitat degradation, water quality impacts, etc.).²¹

¹⁶ DEIR, p. ES-6.

¹⁷ University of California Integrated Hardwood Range Management Program. 2010. Living Among the Oaks: A Management Guide for Landowners. Division of Agriculture and Natural Resources Publication #21538.

¹⁸ *Ibid.*

¹⁹ *Ibid.*

²⁰ *Ibid.*

²¹ DEIR, p. 4.4-40.

D-319
cont. ↑ The DEIR provides an estimate of the Project's impacts to blue oak woodlands and it states that impacts to other sensitive natural communities would be avoided. However, the DEIR fails to quantify the extent of Project impacts to other habitat types in the Project area (e.g., grassland, agricultural, ruderal). This precludes the ability to understand the severity of the Project's direct and indirect impacts on special-status species associated with those habitat types.

Crotch's Bumble Bee

D-320 The DEIR provides the following rationale for the CPUC's conclusion that Project impacts to the Crotch's bumble bee would be less than significant:

Pre-construction surveys required under APM BIO-1 and Mitigation Measure BIO-1 would identify Crotch's bumble bee individuals or nests that could be present within the Proposed Project footprint. Additionally, implementation of APMs BIO-3 and GEN-1 would further reduce potential for any impacts to Crotch's bumble bee during construction. As a State candidate endangered species, the Applicants would be required to notify and coordinate with CDFW regarding any Crotch's bumble bee nests or individuals identified during pre-construction surveys or during the course of construction activities. If necessary, the Applicants may be required to obtain regulatory approval to relocate the nest. Given implementation of these measures, impacts to special-status invertebrates during construction would be less than significant with mitigation.²²

Crotch's bumble bees typically construct nests underground.²³ The DEIR fails to provide evidence that Crotch's bumble bee nests can be successfully relocated. It also fails to explain how notifying and coordinating with CDFW would reduce impacts to less than significant levels. As a result, potentially significant impacts to the Crotch's bumble bee remain unmitigated.

Golden Eagle (and other Special-Status Birds)

D-321 The DEIR recognizes the Project poses an electrocution and collision hazard to birds, and that bird injuries and fatalities are a potentially significant impact.²⁴ The DEIR then states that the impact would be mitigated to a less than significant level because:

1. The conductors would be specular (i.e., shiny) and more visible to birds upon initial installation, allowing them time to adjust to the new facilities.
2. The Applicants would implement the avian protection measures outlined in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), which include solutions such as spacing phase conductors (e.g., greater than the width of birds' wingspans) such that electrocution hazards are minimized.
3. Mitigation Measure BIO-3 also would be implemented, which would require that the Applicants incorporate guidance in *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012) and develop an Avian Protection Plan.

²² DEIR, p. 4.4-42.

²³ DEIR, Table 4.4-1.

²⁴ DEIR, pp. 4.4-49 and -50.

D-321 cont. ↑ 4. The Applicants would implement a minor route variation (“MRV”) prior to construction to avoid a potential golden eagle nest along Huer Huero Creek at Union Road if this nest is determined to be occupied or is expected to be used by golden eagles in future nesting seasons (based on prior observations and the species’ nest site fidelity).²⁵

As discussed below, these measures do not ensure avian collisions and electrocutions are mitigated to less than significant levels.

D-322 Specular Conductors

The DEIR provides no evidence that specular conductors reduce avian collisions, nor could I find any evidence in the scientific literature. Even if specular conductors reduce avian collisions, their efficacy as a mitigation measure would be short-lived because the conductors become less shiny in the course of a few seasons after installation.²⁶

D-323 Avian Protection Plan

The DEIR fails to explain how the Avian Protection Plan (“APP”) would help mitigate impacts to less than significant levels. Development of an APP in itself does not reduce avian collisions and electrocutions. The only information the DEIR provides regarding the APP is that it would incorporate “relevant project-specific guidelines found in APLIC’s and USFWS’ 2005 Avian Protection Plan Guidelines.” In this case, it is impossible to assess the value of the APP in reducing avian fatalities because the DEIR does not provide a draft of the APP, nor does it identify the specific guidelines that the Applicants and CPUC consider to be “relevant” to the Project.

D-324 ↓ The DEIR states: “[a]s part of the Avian Protection Plan development, HWT and PG&E shall work with USFWS to determine the need for installation of bird diverters in areas near known golden and bald eagle nests.”²⁷ The DEIR does not discuss the efficacy of bird diverters in reducing eagle collisions with power lines. However, bird diverters do not eliminate power line collisions; a considerable amount of mortality still occurs at lines with bird diverters. Barrientos et al. (2012) conducted the largest worldwide experiment to date on the effectiveness of bird diverters.²⁸ The researchers reported: “[w]e observed a small (9.6%) but significant decrease in the number of casualties after line marking [with diverters] compared to before line marking in experimental lines. This was not observed in control lines.”²⁹ Thus, bird diverters resulted in a statistically significant reduction in avian mortalities, but the total number of avian mortalities at lines with diverters was still biologically significant.³⁰ In addition, the researchers noted that bird diverters were ineffective for many species, especially species that have high collision risks.

²⁵ DEIR, p. 4.4-50.

²⁶ DEIR, p. 2-54.

²⁷ DEIR, pp. 4.4-50 and -51.

²⁸ Barrientos R, Ponce C, Palacin C, Martin CA, Martin B, Alonso JC. 2012. Wire Marking Results in a Small but Significant Reduction in Avian Mortality at Power Lines: A BACI Designed Study. PLoS ONE 7(3):e32569.

²⁹ *Ibid.*

³⁰ *Ibid.* See also Savereno AJ, Savereno LA, Boettcher R, Haig SM. 1996. Avian Behavior and Mortality at Power Lines in Coastal South Carolina. Wildlife Society Bulletin 24(4):636-648.

D-324 ↑ One reason bird diverters may not be effective for golden eagles is that golden eagles are adapted to flying in open airspace clear of hazards. Because golden eagles attack prey from above, their vision during flight is usually directed at the ground where prey are located—not at the airspace ahead of them where foreign hazards (with or without bird diverters) might be located.
cont. ↓

↓
Minor Route Variation (MRV)

D-325 According to the DEIR: “the Applicants would implement an MRV prior to construction to avoid a potential golden eagle nest along Huer Huero Creek at Union Road if this nest is determined to be occupied or is expected to be used by golden eagles in future nesting seasons (based on prior observations and the species’ nest site fidelity).”³¹ The criteria that would trigger the MRV are vague. Specifically, the DEIR fails to explain how “prior observations and the species’ nest site fidelity” would be evaluated to determine whether the nest “is expected to be used by golden eagles in future nesting seasons,” and thus, whether an MRV is needed. Furthermore, if the decision to implement an MRV would be based on “prior observations,” there is no need for the CPUC to defer decision on the MRV until after CEQA review of the Project.

Most golden eagle territories have up to six nests, although eggs are laid in only one of the nests during a given year (unless the initial nesting attempt fails).³² The territorial pair is likely to alternate nest sites among years, and they may add new material to alternative nests they do not use during a given nesting season.³³ Scientific literature indicates alternative nests are biologically significant, and that it is very likely the nest along Huer Huero Creek will be re-used for nesting at some time in the future.³⁴ Therefore, reducing the potential for significant impacts to golden eagles requires an MRV, regardless of whether eagles occupy the nest prior to Project construction.³⁵

↓ The DEIR does not explain how the proposed MRV would reduce impacts on golden eagles. The MRV involves shifting a portion of the 70-kV route slightly north, such that it would be located adjacent to a relatively isolated and dense strip of oak woodland (Figure 1). The trees in the woodland provide perches for golden eagles, and they may contain alternative nests. Whereas the MRV may reduce the potential for construction related impacts (e.g., due to noise and human activity near the nest site), installing the power lines immediately adjacent to the woodland is likely to increase the potential for operations related impacts because it would place power lines in close proximity to an attractive habitat feature, thus increasing the risk of collisions (e.g., as eagles approach or depart perches or nests in the woodland).

³¹ DEIR, p. 4.4-50.

³² Pagel JE, Whittington DM, Allen GT. 2010 Feb. Interim Golden Eagle inventory and monitoring protocols; and other recommendations. Division of Migratory Birds, United States Fish and Wildlife Service.

³³ Millsap BA, Grubb TG, Murphy RK, Swem T, Watson JW. 2015. Conservation significance of alternative nests of golden eagles. *Global Ecology and Conservation* 3:234-241.

³⁴ *Ibid.*

³⁵ See DEIR, p. 2-16: “[t]his MRV would only be implemented if a possible golden eagle nest along Huer Huero Creek in this location is confirmed to have eagles present prior to Project construction.”

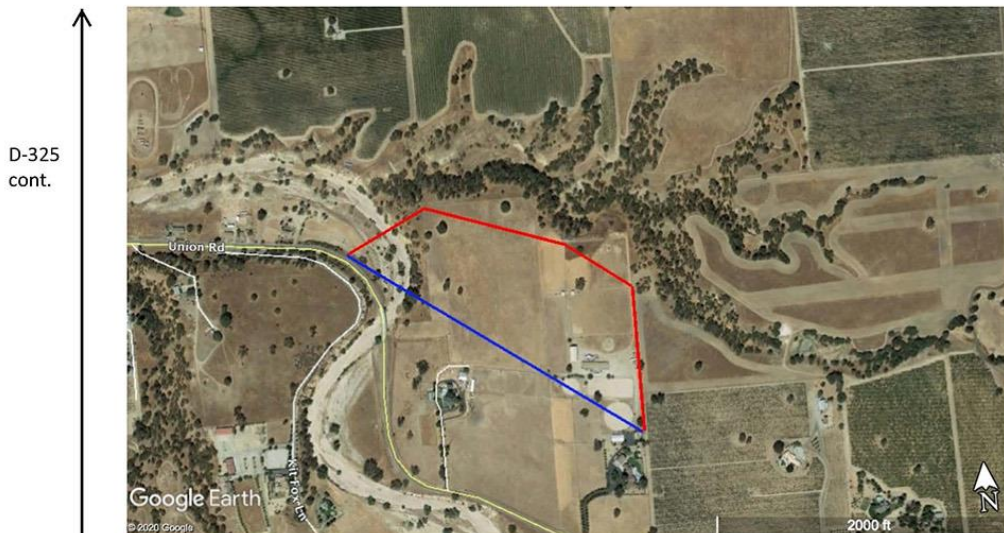


Figure 1. Approximate location of proposed MRV (red line) in relation to the proposed route (blue line). Although the MRV would increase the distance between the power line and the golden eagle nest along Huer Huero Creek, it would place the power line in close proximity to perch (and potentially nest) sites in the oak woodland.

D-326

APLIC Guidelines

Implementation of the avian protection measures outlined in the APLIC guidelines (2006 and 2012) is a valuable mitigation measure. However, implementation of the APLIC guidelines would not eliminate the potential for avian collisions and electrocutions.³⁶ This is especially true for the Project's steel structures, because utility structures made of steel are self-grounded and require just one contact with an energized conductor to be lethal.³⁷

Electrocution from, and collision with, power lines is one of the leading causes of golden eagle mortality.³⁸ The golden eagle population is extremely sensitive to additive mortality because: (a) golden eagles occur at very low densities, (b) a relatively high percentage of juveniles do not survive to breeding age (typically the 4th or 5th year of life), and (c) the population is already

³⁶ Lehman RN, Savage JA, Kennedy PL, Harness RE. 2010. Raptor Electrocution Rates for a Utility in the Intermountain Western United States. *Journal of Wildlife Management* 74(3):459-470. See also APLIC 2006 and APLIC 2012.

³⁷ *Ibid.* See also Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute and APLIC. Washington, D.C. pp. 81 and 82.

³⁸ U.S. Fish and Wildlife Service, Division of Migratory Bird Management. 2009. Final Environmental Assessment, Proposal to Permit Take as Provided Under the Bald and Golden Eagle Protection Act. Washington: Dept. of Interior. See also Avian Power Line Interaction Committee (APLIC). 2018. Eagle Risk Framework: A Practical Approach for Power Lines. Edison Electric Institute and APLIC. Washington, DC. p. 4.

- D-326 cont. declining.³⁹ For these reasons, the USFWS has determined that the golden eagle population cannot withstand *any* additional level of take.⁴⁰ Consequently, death (or injury) of even one golden eagle due to the Project would constitute a significant impact under CEQA. In addition, any Project-related take of a golden eagle would violate the Bald and Golden Eagle Protection Act if the Applicants do not first obtain an eagle take permit from the U.S. Fish and Wildlife Service. The DEIR does not require the Applicants to obtain an eagle take permit, nor does it suggest the Applicants intend to apply for one.
- D-327 The DEIR fails to disclose or analyze how many eagles the Project might kill (or injure) even after implementation of the MRV, APLIC guidelines, and other mitigation measures proposed in the DEIR. In addition, the DEIR does not require fatality monitoring, nor does it require remedial actions (e.g., compensatory mitigation) if eagle fatalities are incidentally discovered. For these reasons, Project impacts on the golden eagle remain potentially significant.
- D-328 The DEIR indicates undergrounding the Project’s power lines would reduce impacts to special-status birds by reducing the potential for avian collision and electrocutions.⁴¹ In addition, the DEIR indicates undergrounding would substantially reduce the wildfire risk and associated ecological consequences.⁴² Nevertheless, the DEIR’s analysis of undergrounding is limited to Alternative PLR-3, which would involve undergrounding a relatively short segment of the power line route in the Golden Hill Road area north of SR 46. The DEIR provides the following rationale for Alternative PLR-3:
- Alternative PLR-3: Strategic Undergrounding would involve undergrounding the portion of the Proposed Project’s new 70 kV power line which has the greatest potential for aesthetic and other environmental impacts. During scoping for the Proposed Project, and based on CPUC staff and consultant’s preliminary analysis of the Proposed Project’s potential impacts, it was determined that the portion of the line that passes through the Golden Hill Road area north of SR 46 had the greatest potential for impacts because this area does not have existing aboveground transmission or distribution electrical infrastructure and is an up-and-coming area with new commercial development, recreational uses, and existing single-family residential development.⁴³
- The benefits of Alternative PLR-3 in reducing the risks of wildfire and avian impacts would be relatively limited because the majority of the Proposed Project’s 70-kV route would be above ground, including in areas that currently do not have existing aboveground transmission or distribution electrical infrastructure. The DEIR provides no evidence that the risks of wildfire and avian impacts are greater in the Golden Hill Road area north of SR 46 relative to other portions of the Proposed Project’s 70-kV route. Therefore, if the objective of undergrounding is to reduce “aesthetic and other environmental impacts,” the CPUC needs to analyze a Project alternative that involves undergrounding the 70-kV power line along its entire route.

³⁹ *Ibid.*

⁴⁰ U.S. Fish and Wildlife Service. 2016. Bald and Golden Eagles: Population demographics and estimation of sustainable take in the United States, 2016 update. Division of Migratory Bird Management, Washington D.C., USA.

⁴¹ DEIR, Table 5-1.

⁴² DEIR, p. 4.20-18.

⁴³ DEIR, p. 3-74.

Amphibians

D-329 The DEIR provides the following analysis of Project impacts to the California red-legged frog (“CRLF”) and western spadefoot toad:

As discussed above, the Proposed Project has been designed to avoid sensitive aquatic features, which would include any features that would provide suitable aquatic breeding and aquatic non-breeding habitat for these species. Nevertheless, there would be potential for direct significant impacts to CRLF and western spadefoot toad if individuals were present in upland areas where Proposed Project construction activities would occur... Implementation of APM BIO-1 and Mitigation Measure BIO-1 would reduce potential for undetected western spadefoot toad or CRLF individuals in Proposed Project areas to be directly impacted at the start of construction. Likewise, monitoring of initial ground-disturbing activities under APM BIO-3 and Mitigation Measure BIO-1 (through pre-construction surveys, biological monitoring, the monitor’s stop-work authority, and exclusion fencing) would ensure that CRLF and western spadefoot toad individuals are not present during these activities, such that they could be directly impacted. Implementation of the WEAP under APM GEN-1 also would minimize potential for adverse direct impacts to special-status amphibians. Further, APM BIO-4 and Mitigation Measure BIO-1 would require that all trenches and excavations in excess of 2 feet deep have a sloped escape ramp or be covered at the end of the day, which would minimize potential for CRLF or western spadefoot toad individuals to become entrapped in Proposed Project construction areas.⁴⁴

Western spadefoot toads spend the majority of the year below ground and are only detectable during a few weeks (or months) of the year.⁴⁵ CRLF that disperse from aquatic habitat seek shelter under objects (e.g., rocks, logs) or in small mammal burrows.⁴⁶ Terrestrial movements of both species generally occur at night.⁴⁷ As a result, detection of western spadefoot and CRLF requires special survey techniques. APM BIO-1 and Mitigation Measure BIO-1 do not require those survey techniques.⁴⁸

D-330 The biological monitoring required under APM BIO-3 assumes CRLF and western spadefoot would be visible to the biological monitor. This is not a valid assumption because terrestrial (aboveground) movements of CRLF and western spadefoot occur at night, whereas construction would occur during the day. The DEIR references exclusion fencing as one of the measures that would ensure CRLF and western spadefoot toad individuals are not present during construction activities. However, neither APM BIO-3 nor Mitigation Measure BIO-1 requires installation of an exclusion fence around construction work areas. For these reasons, there is no basis for the

⁴⁴ DEIR, p. 4.4-43.

⁴⁵ U.S. Fish and Wildlife Service. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. U.S. Fish and Wildlife Service, Portland, Oregon. pp. II-220 through -235.

⁴⁶ U.S. Fish and Wildlife Service. 2002. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, Oregon. p. 14.

⁴⁷ U.S. Fish and Wildlife Service. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. U.S. Fish and Wildlife Service, Portland, Oregon. pp. II-220 through -235. See also Fellers GM, Kleeman PM. 2006. Diurnal versus Nocturnal Surveys for California Red-Legged Frogs. *Journal of Wildlife Management* 70(6):1805-1808.

⁴⁸ The USFWS has issued a survey protocol for the CRLF. See U.S. Fish and Wildlife Service. 2005 Aug. Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog. 26 pp.

D-330 ↑ DEIR's claim that APM BIO-3 and Mitigation Measure BIO-1 "would ensure that CRLF and western spadefoot toad individuals are not present during these activities, such that they could be directly impacted."

D-331 ↓ The CRLF and western spadefoot are small animals. Therefore, the threat that trenches pose to these species (and other amphibians) is not limited to trenches in excess of 2 feet deep. Although the measures required under APM BIO-4 and Mitigation Measure BIO-1 would reduce mortality associated with trenches, mortality may still occur, especially if mitigation is limited to escape ramps (i.e., trenches are not covered) as allowed under APM BIO-4 and Mitigation Measure BIO-1.⁴⁹ Whereas inspecting the trenches at the beginning of the workday would be effective for CRLF, it would not be effective for western spadefoots, which burrow under soil during the day.⁵⁰

Invasive Plants

D-332 ↓ Invasive plants threaten native diversity, alter ecosystem processes,⁵¹ and can cause extinction of native species.⁵² Indeed, next to habitat loss, invasive species pose the greatest threat to the nation's biodiversity and natural resources.⁵³ Three things are required for an invasive plant to become established in an area:

1. A vector for transporting the plant or its propagules from one place to another. Some vectors are natural (e.g., wind, water, and wildlife); however, most are related to human activities. Tools, equipment, vehicles, livestock, clothing, and boots are potential vectors for the spread of invasive plants.
2. Suitable conditions for invasive plant colonization. Soil and vegetation disturbance create suitable conditions for the establishment of invasive plants.
3. A suitable environment for the invasive plant to survive, reproduce, and spread. Many invasive species possess a competitive advantage over native species in an area. As a result, invasive species can reproduce and spread exponentially, especially if the ecosystem lacks a mechanism for keeping them in check.⁵⁴

↓ The Project has the potential to facilitate the colonization and spread of invasive plants because construction and operation activities: (a) provide vectors for transporting invasive plant

⁴⁹ Doody JS, West P, Stapley J, et al. 2003. Fauna by-catch in pipeline trenches: conservation, animal ethics, and current practices in Australia. *Australian Zoologist* 32(3):410-419.

⁵⁰ U.S. Fish and Wildlife Service. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. U.S. Fish and Wildlife Service, Portland, Oregon. pp. II-220 through -235.

⁵¹ Vitousek P. 1990. Biological invasions and ecosystem processes: towards an integration of population biology and ecosystem studies. *Oikos* 57:7-13. See also Theoharides KA, Dukes JS. 2007. Plant invasion across space and time: factors affecting nonindigenous species success during four stages of invasion. *New Phytologist* 176:256-273.

⁵² Gurevitch J, Padilla DK. 2004. Are invasive species a major cause of extinctions? *Trends in Ecology and Evolution* 19(9):470-474.

⁵³ U.S. Department of the Interior, Office of Congressional and Legislative Affairs. 2013. Invasive Species Management. Statement for the Record: U.S. Department of the Interior Before the House Natural Resources Subcommittee on Public Lands and Environmental Regulation's oversight hearing on "Invasive Species Management on Federal Lands."

⁵⁴ California Department of Food and Agriculture, California Invasive Weed Awareness Coalition. 2005. California Noxious & Invasive Weed Action Plan. California Dept. of Food and Agriculture, Sacramento, CA.

D-332 ↑ propagules, (b) involve soil and vegetation disturbance, and (c) would be conducted in an
cont. ↓ environment susceptible to invasion.⁵⁵ The DEIR does not disclose this issue, nor does it
provide any analysis of potentially significant impacts that could occur as the result of Project
activities that facilitate the colonization or spread of invasive plants.

Cumulative Impacts

According to the DEIR:

- D-333
1. The Project would result in significant impacts on a suite of sensitive biological resources.⁵⁶
 2. Impacts from the Proposed Project (and all alternatives), in combination with impacts from other projects, would result in a significant cumulative impact on biological resources.⁵⁷
 3. There is potential for the Project to have a cumulatively considerable incremental contribution to the significant cumulative impact.⁵⁸

Despite these determinations, the DEIR concludes: “the Proposed Project, reasonably foreseeable distribution components, and alternatives would not make a cumulatively considerable contribution to this significant cumulative impact. The contribution of the Proposed Project, reasonably foreseeable distribution components, and alternatives cumulative impact would be less than significant with mitigation.”⁵⁹ The CPUC’s rationale for this conclusion is that: (a) the Project’s significant impacts would be reduced to a less-than-significant level with implementation of the APMs and mitigation measures identified in Section 4.4 of the DEIR; and (b) these measures would ensure that impacts on protected species, communities, and habitats are reduced to a level that would protect their continued existence.⁶⁰ The CPUC’s rationale is flawed because the APMs and mitigation measures are designed to reduce significant impacts, not eliminate the impacts entirely. Thus, there would be residual impacts. For example, because the DEIR’s compensatory habitat requirement is limited to impacts to blue oak woodland, there would be residual impacts to special-status species associated with grasslands and agricultural lands.⁶¹ Similarly, there could be residual impacts on the golden eagle and other special-status birds because the DEIR does not require compensatory mitigation for fatalities caused by electrocutions and collisions with the new power line facilities. Whereas these residual impacts may not rise to the level of significance at the Project level, they may be significant at the cumulative level when combined with the residual impacts of other projects. For example, the DEIR notes that the impact on avian fatalities would not be limited to the Project, but rather, that the Project would incrementally increase a fatality risk that already exists in the area.⁶² The

⁵⁵ The cumulative impacts section of the DEIR (pp. 6-6 and -7) identifies “introduction of nonnative plant and animal species” as one of the past and present actions that has most strongly influenced existing conditions in the Project area.

⁵⁶ DEIR, p. 6-22.

⁵⁷ *Ibid.*

⁵⁸ DEIR, Table 6-3.

⁵⁹ DEIR, p. 6-22.

⁶⁰ *Ibid.*

⁶¹ See DEIR, Table 4.4-1.

⁶² DEIR, p. 4.4-50.

D-333
cont.

Project's contribution to this potentially significant cumulative impact is cumulatively considerable because it would place seven miles of new power lines in an area that supports foraging raptors, and that has multiple golden eagle nests.⁶³

According to CEQA Guidelines § 15130(a)(3):

An EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The lead agency shall identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable.

In this case, none of the DEIR's biological resource mitigation measures are designed to alleviate the cumulative impact; they are all specific to the Proposed Project and Project alternatives. Therefore, they do not address potentially significant cumulative impacts, and the CPUC has no basis for its conclusion that the Project's contribution to those cumulative impacts would be less than cumulatively considerable.

MITIGATION ISSUES

APM BIO-1 and MM BIO-1 (Special-Status Animal Species)

D-334

The mitigation strategy proposed in Mitigation Measure ("MM") BIO-1 and APM BIO-1 consists of: (a) pre-construction surveys prior to initial vegetation clearance, grubbing, and ground-disturbing activities; (b) a pre-construction survey report that is submitted to the CPUC for review and approval; and (c) delineation of habitat that must be avoided. These measures do not mitigate potentially significant impacts to special-status animals for the following reasons:

First, the DEIR fails to establish standards for the pre-construction survey methods to ensure they are adequate for detection of special-status animals. Many of the special-status species that have the potential to occur in the Project area require special survey techniques (e.g., live-trapping for Salinas pocket mouse, raking the substrate for legless lizards, aerial surveys for eagle nests). In addition, some species are generally only detected at night (e.g., bats, western spadefoot), or require multiple, protocol-level surveys to acquire reliable information on their presence.⁶⁴ MM BIO-1 fails to require the survey methods necessary for detection of special-status animal species; the only standards it establishes are that the surveys be conducted by an approved biologist no earlier than 30 days prior to surface disturbance. This issue is exacerbated by the DEIR's failure to establish standards for the survey area. For example, although the DEIR states that the standard buffer distance for golden eagle nests is 2,640 feet, MM BIO-1 does not require pre-construction surveys that extend 2,640 feet from Project work areas.

⁶³ DEIR, Table 4.4-1.

⁶⁴ The USFWS and CDFW have issued survey protocols for the following species that may occur in the Project area: vernal pool fairy shrimp, California red-legged frog, golden eagle, burrowing owl, Swainson's hawk, and San Joaquin kit fox. Scientific organizations have issued survey protocols for legless lizards, bats, American badger, tricolored blackbird, and other bird species.

D-335 Second, some of the special-status species that have the potential to occur in the Project area are only detectable during certain times of year (e.g., Crotch’s bumble bee, western spadefoot, Swainson’s hawk). Surveys that are limited to “no earlier than 30 days prior to surface disturbance” fail to account for these species and could cause false-negative survey results, which in turn could result in significant impacts. For example, western spadefoots are only detectable at night shortly after rains in the winter and spring; at all other times they are completely surrounded by soil in underground burrows (which are undetectable to humans).⁶⁵ As a result, pre-construction surveys in August (for example) would fail to reveal any evidence of the species, when in fact there might be hundreds of spadefoots buried in the soil. Because spadefoots burrow in sandy or gravelly soils, they would be susceptible to being crushed or entombed by soil compaction caused by Project vehicles or machinery.⁶⁶

D-336 Third, the DEIR fails to ensure adequate mitigation for special-status that are detected during the pre-construction survey. According to the DEIR, buffers would be installed around bird nests. However, mitigation for all other terrestrial wildlife species has been deferred to the pre-construction survey report, which would identify the “anticipated impacts and proposed mitigation.”⁶⁷ This approach does not comply with CEQA, which prohibits deferral of: (a) the impact assessment; and (b) the mitigation (unless the lead agency establishes specific performance criteria for the mitigation and explains why it was impractical for the lead agency to identify the mitigation in the EIR).

D-337 MM BIO-1 states: “[s]ensitive habitat areas, plus a minimum 5-foot buffer for wetlands and waters of the U.S., that will be avoided by construction shall be fenced with orange safety fencing.”⁶⁸ There are two problems with this measure. First, the DEIR identifies wetlands and blue oak woodlands as sensitive habitats.⁶⁹ However, it fails to identify the criteria that would be used to define “sensitive habitat areas.” Many of the special-status species that have the potential to occur in the Project area are associated with grasslands or special habitat elements (e.g., burrows). As a result, sensitive habitat areas are not equivalent to sensitive natural communities.

D-338 Second, a 5-foot buffer around wetlands waters of the U.S. would not be sufficient to avoid impacts to species associated with wetlands and other aquatic habitat types. Special-status species associated with wetlands (and other aquatic habitat types) in the Project area include the California red-legged frog, western spadefoot, western pond turtle, tricolored blackbird, and yellow warbler. These species use terrestrial habitats that extend well beyond the 5-foot buffer proposed in MM BIO-1. For example, western pond turtles use terrestrial habitat for nesting, resting, refuge, and overland dispersal.⁷⁰ Rathbun et al. (2002) examined the distances pond turtles moved away from aquatic habitat for refuge, nesting, and resting. Mean maximum travel

⁶⁵ U.S. Fish and Wildlife Service. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. U.S. Fish and Wildlife Service, Portland, Oregon. pp. II-220 through -235.

⁶⁶ *Ibid.*

⁶⁷ DEIR, p. 4.4-47.

⁶⁸ *Ibid.*

⁶⁹ *Ibid.*

⁷⁰ Rathbun GB, Scott NJ Jr, Murphey TG. 2002. Terrestrial Habitat Use by Pacific Pond Turtles in a Mediterranean Climate. *Southwestern Naturalist* 47(2): 225-235. See also Jennings MR, Hayes MP. 1994. Amphibian and Reptile Species of Special Concern in California. Final Report to the California Department of Fish and Game.

D-338 cont. ↑ distances were 49.7 meters, 93.7 meters, and 12.0 meters, respectively.⁷¹ However, western pond turtles have been reported ranging as far as 500 meters (1,640 feet) from a watercourse to find suitable nesting habitat.⁷² Nests are typically located in open, grassy areas,⁷³ such as those that occur in the Project area.

Mitigation for Impacts to Habitat

D-339 The DEIR requires compensatory mitigation for the Project's permanent impacts on blue oak woodland. However, it does not require compensatory mitigation for the Project's permanent impacts on other habitat types that support special-status species.

The DEIR states:

All areas temporarily disturbed by the Project would be restored to the extent practicable, following construction. These disturbed areas include staging areas and access roads, work areas around each tower/pole, and the areas used for conductor stringing and staging. Postconstruction restoration activities would include returning areas to their original contours and drainage patterns in accordance with stormwater pollution prevention plan best management practices and as prearranged through landowner agreements, where applicable.⁷⁴

The DEIR fails to incorporate restoration of temporarily disturbed areas as an enforceable mitigation measure. Furthermore, the DEIR fails to establish performance standards or monitoring requirements for the restoration efforts. For these reasons, the Project's impacts on habitat for special-status animals remain potentially significant.

APM BIO-4 (Special-Status Species Protection)

D-340 ↓ Open pipes pose a mortality hazard to wildlife. Birds, small mammals, and reptiles enter the pipes to nest or find shelter, but the smooth interior and tight confines of the pipes prevent individuals from escaping, leading to death. The DEIR identifies open pipes (or conduit) as a potentially significant mortality hazard to birds.⁷⁵ APM BIO-4 is designed to mitigate the potentially significant impact. APM BIO-4 states: "open-ended project-related pipes 4 inches or greater in diameter will be capped if left overnight or inspected for wildlife prior to being moved." The mortality hazard associated with open pipes is not limited to pipes 4 inches or

⁷¹ *Ibid.*

⁷² Reese DA, Welsh HH Jr. 1997. Use of Terrestrial Habitat by Western Pond Turtles, *Clemmys marmorata*: Implications for Management. Pp. 352-357. In J. Van Abbema (ed.), Conservation, Restoration, and Management of Tortoises and Turtles, An International Conference WCS Turtle Recovery Program and the New York Turtle and Tortoise Society, New York.

⁷³ Holland DC. 1994. The Western Pond Turtle: Habitat and History. Final Report. Portland, OR: U.S. Department of Energy, Bonneville Power Administration. See also Ernst CH, Lovich JE. 2009. Turtles of the United States and Canada. Second edition. Johns Hopkins University Press. 827 pp.

⁷⁴ DEIR, p. 2-86.

⁷⁵ DEIR, p. 4.4-44.

D-340 ↑
cont. | greater in diameter.⁷⁶ As a result, APM BIO-4 does not ensure avoidance of potentially significant levels of mortality associated with open pipes.

MM BIO-2 (Special-Status Plants)

MM BIO-2 states:

D-341 | If avoidance of special-status plants is not feasible, HWT and PG&E shall implement measures to compensate for impacts to special-status plants. Compensation may be provided by purchasing credits at a CDFW-approved mitigation bank (provided at a minimum 1:1 ratio [mitigation to impact]), or through transplanting perennial species and collecting and dispersing seed of annual species (i.e., salvage and relocation) under the direction of CDFW. Where salvage and relocation is demonstrated to be feasible and biologically preferred by the CDFW, it shall be conducted pursuant to a CPUC- and CDFW-approved salvage and relocation plan that details the methods for salvage, stockpiling, and replanting, as well as the characteristics of the receiver sites.

There do not appear to be any CDFW-approved mitigation banks in San Luis Obispo County (or surrounding counties) that sell credits for special-status plants.⁷⁷ Therefore, compensation for impacts to special-status plants would require the “salvage and relocation” option. MM BIO-2 does not provide any information on potential mitigation (receiver) sites, nor does it establish criteria for their selection (e.g., geographic location, history of land use, management scheme). This is important because relocating plants to a non-local ecotype may cause significant ecological impacts (e.g., genetic contamination) at the receptor site.⁷⁸ Even if plants are relocated to a local ecotype, their long-term viability will depend on the specific characteristics (e.g., soils, topography, adjacent land uses) of the receptor site. In addition to failing to establish selection criteria for the mitigation site, the DEIR fails to establish: (a) a mechanism (e.g., conservation easement) that would ensure the mitigation site is protected in perpetuity after the 5-year monitoring period terminates, (b) a funding mechanism (e.g., endowment), and (c) a management mechanism (e.g., management plan and authority) that ensures the mitigation site is appropriately managed in perpetuity to maintain viability of the special-status plants.

D-342 ↓ | It is unclear whether the 1:1 mitigation ratio proposed in MM BIO-2 would be based on acreage impacted or number of plants impacted. While the DEIR’s initial reference to the 1:1 ratio suggests it would be based on acreage, the DEIR’s proposed success criteria suggest it would be based on the number of plants.

⁷⁶ Harris M, Clucas B, Stanek J, Whitfield M. 2019. Wildlife Mortalities in Open-Topped Pipes in Central California. *Western Wildlife* 6:50–60. *See also* American Bird Conservancy. 2014. More Evidence That Open Pipes Kill Birds in the West. *Bluebird* 37(1):12.

⁷⁷ California Department of Fish and Wildlife. 2021. Conservation and Mitigation Banks Established in California by CDFW [webpage]. Available at: <<https://wildlife.ca.gov/conservation/planning/banking/approved-banks#r4>>. (Accessed 2021 Jan 17).

⁷⁸ Longcore T, Mattoni R, Pratt G, Rich C. 2000. On the perils of ecological restoration: Lessons from the El Segundo blue butterfly. Pages 281-286 in Keeley JE, Baer-Keeley M, Fotheringham CJ, editors. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-file Report 00-62. U.S. Geological Survey, Sacramento, CA.

D-342
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↑ The DEIR proposes two success criteria, the first of which is: “[a] surveyed plant population size count roughly equal to or greater than the number of individuals transplanted (this total may include both transplanted individuals that have survived, as well as any additional supplemental plantings following the initial transplantation that have survived at least two growing seasons).” This success criterion is inappropriate because it does not address annual plants (which would entail dispersal of seed), and the criterion for perennial plants is contingent on the number of individuals transplanted, for which there is no standard (i.e., would all perennial plants within impact areas be transplanted?). Although the success criterion suggests supplemental plantings may be required, the DEIR does not identify where the supplemental plantings (or seeds of annual species) would come from. As stated above, the introduction of non-local genes into an area can have negative impacts on the ecological community at the receptor site.⁷⁹

The second success criterion is: “[l]ess than 5 percent cover of invasive weeds within the restoration area.” This criterion is confusing because restoration involves returning an ecosystem to a close approximation of its condition prior to disturbance.⁸⁰ However, MM BIO-2 entails translocation or relocation of plants, not restoration. Therefore, it is unclear whether MM BIO-2 applies to off-site mitigation for the Project’s permanent impacts, on-site mitigation for the Project’s temporary impacts, or both. Nevertheless, the adequacy of the proposed success criterion cannot be evaluated without corresponding information on invasive plant cover prior to the restoration efforts. For example, the success criterion would be appropriate if invasive plants currently cover 50 percent of the mitigation site; however, it would be inappropriate if invasive plants are currently absent from the mitigation site.⁸¹

D-343

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MM BIO-4 (Blue Oak Woodland)

The DEIR concludes that Mitigation Measure BIO-4 would reduce Project impacts on blue oak woodland to less than significant levels because: (a) the Applicants would develop and implement a Habitat Restoration Plan, which would include replacement of permanently impacted blue oak woodland at a ratio of 1.1:1; and (b) oak trees that are removed would be replaced in accordance with provisions of the City of Paso Robles’ Oak Tree Ordinance.

The 1.1:1 mitigation ratio proposed in the DEIR would not mitigate the Project’s significant impacts on blue oak woodland because it does not account for: (a) uncertainty in the ability to fully replace habitat functions that are impacted, (b) temporal loss (i.e., the lag time between habitat functions lost at the impact site and habitat functions gained at the mitigation site),⁸² and

⁷⁹ *Ibid.* See also California Native Plant Society. 2001. CNPS Guidelines for Landscaping to Protect Native Vegetation from Genetic Degradation. Available at: <<https://www.cnps.org/wpcontent/uploads/2018/04/landscaping.pdf>>. (Accessed 2021 Jan 17).

⁸⁰ See Longcore T, Mattoni R, Pratt G, Rich C. 2000. On the perils of ecological restoration: Lessons from the El Segundo blue butterfly. Pages 281-286 in Keeley JE, Baer-Keeley M, Fotheringham CJ, editors. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-file Report 00-62. U.S. Geological Survey, Sacramento, CA.

⁸¹ Only some nonnative plants are invasive. Lists of invasive plants in California are maintained by the California Invasive Plant Council (<https://www.cal-ipc.org/plants/inventory/>) and the California Department of Food and Agriculture (https://www.cdffa.ca.gov/plant/IPC/encycloweedia/weediinfo/winfo_table-sciname.html).

⁸² Moilanen A, van Teeffelen AJA, Ben-Haim Y, Ferrier S. 2009. How Much Compensation is Enough? A Framework for Incorporating Uncertainty and Time Discounting When Calculating Offset Ratios for Impacted Habitat. *Restoration Ecology* 17(4):470-478.

D-343
cont. ↑ (c) indirect impacts. In this case, there is considerable uncertainty in whether the habitat compensation required under MM BIO-4 would adequately replace the habitat impacted at the Project site because the only standard the DEIR establishes for the mitigation site is that 65 percent of the oak plantings survive for 5 years. In addition, the duration of temporal loss would be considerable, and the Project's indirect impacts are likely to result in at least some level of oak mortality (e.g., due to root damage caused by construction activities or pathogens caused by tree trimming). Moreover, it is unclear if MM BIO-4 requires 1.1 acres of blue oak woodland creation (or restoration) for each acre of blue oak woodland permanently impacted by the Project, or merely planting of blue oaks across 1.1 acres of existing blue oak woodland (for each acre permanently impacted by the Project).

D-344 MM BIO-4 states: “[b]lue oak woodland restoration or compensation may be completed at the work area, in the vicinity, or at a conservation bank with a service area that covers the Proposed Project or selected alternative.” There do not appear to be any conservation banks that sell credits for impacts to blue oak woodland.⁸³ Thus, the mitigation would occur “at the work area [or] in the vicinity.” The DEIR fails to establish mechanisms that would ensure a mitigation site “at the work area [or] in the vicinity” would be protected and managed in perpetuity to maintain the blue oak woodland compensation habitat.

D-345 Compliance with the City's Oak Tree Ordinance does not mitigate the impact to oak trees because it only applies to trees that have a diameter at breast height (“DBH”) of 6 inches or greater, and it only requires replacement at a ratio of 25 percent of the diameter of trees that are removed. In addition, MM BIO-4 only requires 65 percent of the replacement trees to survive beyond 5 years. Thus, MM BIO-4 does not require replacement of small oaks (< 6 inches DBH), but it allows the Applicants to replace large oaks with small ones.⁸⁴ This would not mitigate the impacts because small oaks do not provide the same ecological values as large ones, and even if the replacement trees survive to maturity (most do not), it would take decades for them to replace the ecological values associated with the trees that are removed.

D-346 ↓ Blue oak woodlands are comprised of slow growing, long-lived trees.⁸⁵ Even at the best sites, it takes blue oaks at least 50 years to reach maturity.⁸⁶ Large, mature oak trees are especially important to wildlife because they provide key structural elements and characteristics (e.g., cavities, caching sites, and suitable substrates for raptor nests, among other habitat values) that are unavailable in smaller trees.⁸⁷ Verner and Boss (1980) provided data on wildlife use in blue oak savannahs of the western Sierra Nevada. They found that 29 species of amphibians and reptiles, 57 species of birds, and 10 species of mammals find mature stages of blue oak suitable

⁸³ California Department of Fish and Wildlife. 2021. Conservation and Mitigation Banks Established in California by CDFW [webpage]. Available at: <<https://wildlife.ca.gov/conservation/planning/banking/approved-banks#4>>. (Accessed 2021 Jan 17).

⁸⁴ Under the City's Oak Tree Ordinance, replacement trees may be as small as 1.5-inch (trunk caliper) in size.

⁸⁵ California Wildlife Habitat Relationships System. 2005 [update]. Wildlife Habitats: Blue Oak Woodland. California Department of Fish and Game. California Interagency Wildlife Task Group. Available at: <<https://www.wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>>.

⁸⁶ *Ibid.*

⁸⁷ CalPIF (California Partners in Flight). 2002. Version 2.0. The oak woodland bird conservation plan: a strategy for protecting and managing oak woodland habitats and associated birds in California (S. Zack, lead author). Point Reyes Bird Observatory, Stinson Beach, CA.

D-346
cont.

or optimum for breeding, assuming that other special habitat requirements are met.⁸⁸ Most blue oak woodlands are not regenerating naturally, which means most of the mature trees will not be replaced when they die. This heightens the significance of each mature oak tree that is removed by the Project.

The success criterion proposed in MM BIO-4 (i.e., “a minimum of 65 percent survival of woody plantings after 5 years”) provides no assurances that the replacement trees are likely to survive, or that they will ever provide structural elements and characteristics comparable to the trees that are removed. Blue oak seedlings are especially vulnerable to mortality factors when they are young and small. Phillips et al. (2007) reported that blue oak seedlings died at an average age of 6.4 years.⁸⁹ Once seedlings had grown for approximately a decade and become established, the chances were good that they would remain alive. However, many grew extremely slowly or even diminished in height. Indeed, Phillips et al. (1996) concluded that blue oak seedlings that were only 6.5 inches tall could well have been older than 26 years.⁹⁰ Based on these studies, the CPUC should not assume blue oak plantings have a reasonable likelihood of replacing impacted trees until the plantings: (a) are at least 10 years old, (b) have reached the sapling stage, and (c) are protected from herbivory by cattle and deer.

Invasive Plants

D-347

The California Invasive Plant Council has published guidelines for preventing the spread of invasive plants.⁹¹ The best management practices (“BMPs”) described therein are feasible and should be incorporated as required mitigation measures. The DEIR does not incorporate any mitigation measures for invasive plants, nor does it establish performance standards for invasive plants in the “restoration” areas (unless those areas are being used for special-status plant mitigation). As a result, potentially significant impacts associated with the colonization or spread of invasive plants remains unmitigated.

⁸⁸ See California Wildlife Habitat Relationships System. 2005 [update]. Wildlife Habitats: Blue Oak Woodland. California Department of Fish and Game. California Interagency Wildlife Task Group. Available at: <<https://www.wildlife.ca.gov/Data/CWHR/Wildlife-Habitats>>.

⁸⁹ Phillips RL, McDougald NK, McCreary D, Atwill ER. 2007. Blue oak seedling age influences growth and mortality. *California Agriculture* 61(1):11-15.

⁹⁰ Phillips RL, McDougald NK, Standiford RB, Frost WE. 1996. Blue oak seedlings may be older than they look. *California Agriculture* 50(3):17-19.

⁹¹ Cal-IPC. 2012. Preventing the Spread of Invasive Plants: Best Management Practices for Land Managers (3rd ed.). Cal-IPC Publication 2012-03. California Invasive Plant Council, Berkeley, CA.

D-348

CONCLUSION

Substantial evidence demonstrates that the Project could have significant, unmitigated impacts on sensitive biological resources. The DEIR that was prepared for the Project does not adequately disclose and analyze those impacts, nor does it provide the mitigation necessary to ensure significant impacts are reduced to less than significant levels.

Sincerely,



Scott Cashen, M.S.
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