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PUBLIC REVIEW DRAFT

City of Oakland Review of Public Comments Received Regarding Potential Health and/or Safety Effects of Coal and Other Hazardous Fossil Fuel Materials Proposed at the Oakland Bulk and Oversized Terminal

Draft Approach and Preliminary Scope of Work
March 25, 2016

I. OVERVIEW

ESA is pleased to provide this proposal to review public comments that the City received regarding the potential health and/or safety effects of rail transportation and related handling of certain commodities proposed by the Oakland Bulk and Oversized Terminal (OBOT) at the former Oakland Army Base ("Project"). As articulated by the City, the purpose of this review is to assist the City in determining whether the information in its public record constitutes "substantial evidence[1]" that would support a finding of substantial endangerment, pursuant to and consistent with the requirements of the *2013 Development Agreement By and Between City of Oakland and Prologis CCIG Oakland Global, LLC Regarding the property and Project Known as "Gateway Development/Oakland Global",* (DA) sections 3.4.2 and 3.4.4. [2]

Specifically, pursuant to DA section 3.4.2**,** if the City finds, based upon substantial evidence, that **"a failure to [adopt the ordinance] would place existing or future occupants or users of the Project, adjacent neighbors, or any portion thereof, or all of them, in a condition substantially dangerous to their health or safety,"** the City may impose new regulations on the Project. In addition, under DA section 3.4.4, the City can impose new Building and/or Fire Codes on the Project.

The ESA analysis of the public record will be presented in a Report that will categorize and assess the public comments and information that was submitted in support of those comments to assist the City Council in making a determination regarding whether or not the

[1] "Substantial evidence" referred to in this document is as defined in Section 15384 of the California Environmental Quality Act (CEQA): (a) "Substantial evidence" means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached…. Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence; (b) Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts.

[2] "Public comments" and "public record" in this document refers to existing documents in the City's project record that were received by October 7, 2015, on the Army Base Redevelopment Project.

information in the public record constitutes substantial evidence that would support a finding of substantial endangerment.

The scope of this review is focused on those commodities listed in the Proponents Draft Basis on Design (BOD) dated July 21, 2015 **and** that are also directly or indirectly addressed in the 2014 Oakland City Council Resolution No. 85054 C.M.S., opposing transportation of coal and other "hazardous fossil fuel materials" through the Oakland. Specifically, these commodities are:

a) bituminous coal (washed coal, clean coal, or soft coal);
b) fuel oils (heating oil, off-road diesel fuel, high-sulfur diesel, residual fuel oils for furnaces and boilers, and fuel for low and medium speed diesel engines); and
c) gasoline (all grades)

The scope of this review is also specifically limited to the potential health and/or safety effects to people, pursuant to the required finding in DA section 3.4.2, above.[3] This is not a CEQA review, and is not limited to CEQA topics or the use of regulatory standards as significance criteria, but rather will consider the public comments as they may apply to health and/or safety effects, regardless of whether the mechanisms for these effects are fully understood or documented in peer-reviewed scientific sources.

ANALYSIS

ESA will review background information and public comments that could be useful to the City in determining whether or not there is "substantial evidence" that the rail transport and terminal activities for the export of coal (or other hazardous fossil fuel materials) would be "substantially dangerous" to workers or the nearby population.

The work product will be a focused short-term initial review that may provide adequate evidence for City determinations addressing DA sections 3.4.2 and 3.4.4.

The elements of Analysis are:

- *Task 1.1: Confirm OBOT Project Design*
- *Task 1.2: Characterize OBOT Activities for Coal and Other Hazardous Fossil Fuel Materials*
- *Task 1.3: Review Public Input to Date on Army Base Redevelopment Project*
- *Task 1.4: Summarize Existing Regulatory Setting*
- *Task 1.5: Commodities Characterization*
- *Task 1.6: Prepare Draft Report*

[3] For example, the Study Area will not encompass the potential for bulk materials to be introduced into Bay waters by settlement.

- *Task 1.7: Revise/Prepare Final Report (as needed) / Meeting Attendance*
- *Task 1.8: Detailed Scoping and Consultation*

ESA and Subconsultants[4]

The proposed ESA Team is comprised of air quality and hazardous materials and rail transportation risk experts, particularly those with expertise regarding coal. Proposed subconsultants include **Adelante Consulting (Barbara Toole O'Neil)** and **MRS**.

COST-HOURS OVERVIEW

Section IV (Table 1) provides a preliminary draft of the labor and cost effort, which is intended as an informed starting point for discussion of this scalable scope of work. As drafted, we estimate a total of approximately **494 hours ($108K)**, *including* limited engagement by the subconsultants (53 hours), as well as detailed scoping and consultation by ESA with the City necessary to prepare the draft approach and scope of work presented herein (65 hours).

SCHEDULE OVERVIEW

Section V (Table 2) summarizes a preliminary draft schedule of the proposed work, also intended as a starting point for refinement in collaboration with the City. As with the scope of work, the initial schedule makes informed assumptions and is scalable to meet the City's intended milestone of a City Council determination in summer 2016. The draft shows ESA performing work over a **four-week period**, providing a draft Report to the City in **late May, 2016**.

II. DRAFT APPROACH / SCOPE

Task 1.1: Confirm OBOT Project Design

- Confirm with the City the proponent's project design, as specified in the Draft Basis on Design (BOD) dated July 21, 2015, and subsequently specified in the project proponent's correspondence of January 20, 2016, to be used as the project description considered during the review of the public input (Task 1.3).
- Based on information provided to date, the proposed commodities that are expected to be imported to and exported from OBOT, and considered in this scope of work, are bituminous coal (washed coal, clean coal, or soft coal); fuel oils (heating oil, off-road diesel fuel, high-sulfur diesel, residual fuel oils for furnaces and boilers, and fuel for low and medium speed diesel engines); and gasoline (all grades). (the latter two being hazardous fossil fuels and having similar adverse characteristics as "crude oil" per the City's 2014 Resolution).

[4] Throughout this document, ESA proposes to conduct all tasks except where specifically noted as "[Named Subconsultant]" or "[ESA and Named Subconsultant]."

- Examine BOD and Drawings. Review the BOD Material Safety Data Sheets for the proposed commodities. Note differences in BOD, developer's reports, and City-generated documents in current City record. Provide the City a list of questions and specific requests for clarifying information from the proponent.[5]
- Describe proponent's proposed facilities and infrastructure (distinguish existing from any proposed new changes for clarity about the baseline) based on a determination of the project description to be evaluated in this analysis.
- Describe proponent's proposed operations. Describe the operations to be evaluated in this analysis, including structural and procedural measures proposed to control emissions and prevent spills of bulk commodities. Identify the characteristics of the BOD versus proponent-initiated mitigating measures that have been proposed for OBOT.
- Include consideration of the existing agreement between CCIG (on behalf of OBOT) and East Bay Municipal Utility District regarding rail traffic.
- Note any differences in throughput by commodity type, facilities design and projected operations.
- Note the proposed combination of coal, fuel oils, and gasoline and projected operations based on these specific commodities transported through the OBOT at the same time.
- Describe proponent's proposal to confirm how the proposed new rail will be classified and constructed to be adequate and appropriate for use in transporting the heavy loads associated with coal in particular.

Task 1.2: Characterize OBOT Activities for Coal and Other Hazardous Fossil Fuel Materials

- Characterize the OBOT activities to be considered within the scope of the Review, which include rail transportation of coal, fuel oils, and gasoline within the West Oakland "Study Area" (to be specified by the City); and terminal activities such as transloading of these commodities from railcar at the bulk terminal; stockpiling or other storage of these commodities pending onboarding for marine transport; and onboarding of these commodities for marine transport. These activities are collectively referred to as "terminal activities" throughout this document.
- The review will consider the *combination* of proposed bulk commodities listed above, if proposed by the proponent.

[5] ESA will promptly submit this data request to the City in order to expedite obtaining the requested information from the Proponent.

- This scope assumes that the scope of the review does not include the: (i) rail transportation of coal**,** fuel oils, or gasoline from the point of origin to the Study Area, except as the effects occur along the rail lines within the Study Area (ii) transportation of coal**,** fuel oils, or gasoline by ship from the point at which is the commodity is on-boarded in the Study Area to its ultimate destination.

Task 1.3: Review Public Input to Date on Army Base Redevelopment Project

- Thoroughly review the existing documents in the City's project record that were received by October 7, 2015 on the Army Base Redevelopment Project (indexed binder previously provided to ESA by the City), as well as other relevant documents (as determined by the City) including the 2012 Amendment to the 2002 Army Base Redevelopment Project EIR, East Bay Municipal Utility District/City Memorandum of Agreement regarding rail traffic.

- Prepare and maintain for inclusion in the Report a comprehensive list of information and sources provided in public comments that are considered appropriate for review and consideration throughout the work described in this scope. Organize/categorize information and sources from the public comments according to particular aspects of potential health and/or safety effects (what the potential effects are, and how they may occur) relevant to the consideration of substantial endangerment, pursuant to DA section 3.4.2.
- Health-related topics that public comments address and that shall be especially considered in the review include, but are not necessarily limited to, the following**.**
    - Potential levels of fugitive coal dust;
    - Estimated diesel particulate and other locomotive air emissions in the Study Area;
    - Thresholds that employ metrics that do and do not require receptor modeling to develop specific human exposure projections;
    - Various particulate and other air pollutant characteristics and quantities by commodity and by the specific design and operation of receiving, storage, and shipping facilities;
    - Incremental locomotive emissions in West Oakland resulting from the transport of coal, specifically considering that coal trains are among the heaviest and require additional fuel and produce additional elevated emissions; and
    - Methodology to quantify comparative effects of hauling coal versus other commodities.

- Safety-related topics that public comments address and that shall be especially considered in the review include, but are not necessarily limited to, the following**:**
    - Available thresholds relevant to the potential risks and consequences of road traffic congestion (at grade crossings), derailment, fire, explosion, and upset conditions (including spillage), in the Study Area;
    - Existing studies that distinguish among the characteristics of coal fuel oils, or gasoline that contribute to or minimize safety risks.
- Greenhouse Gas Emissions and Climate Effects-related topics that public comments address and that shall be especially considered in the review include, but are not necessarily limited to, the following:
    - Off-gassing of GHGs, including carbon monoxide and methane from coal storage piles;
    - Potential for incremental increase of GHG emissions locally and globally from storing coal in the Study Area;
    - Existing information regarding how burning coal oversees and receiving, storing, and shipping coal at the OBOT could affect air pollution and global warming/sea level rise for West Oakland;
    - Quantified incremental increase in GHG emissions as CO2 equivalent;
    - Method and/or calculation of GHG contribution from coal storage piles at OBOT.
- Appropriate thresholds to be used in the determination of whether there is "substantial evidence" that the project is "substantially dangerous";
- Potential health and/or safety risks associated with the proposed rail transport through West Oakland and terminal activities for coal, fuel oils, or gasoline at OBOT for onboarding to marine vessels

Task 1.4: Summarize Existing Regulatory Setting

- Summarize screening levels set by the U.S. Environmental Protection Agency for concentrations of coal-specific trace elements that could be ingested in dust or via the consumption of surface water or produce grown in the Study Area.
- Identify existing coal dust performance requirements of relevant entities, potentially including:
    - Federal Railroad Administration, BNSF Railway (including BNSF's load profile template)[6] and/or UP;

[6] BNSF, 2015. Coal Dust Frequently Asked Questions. [http://www.bnsf.com/customers/what-can-i-ship/coal/coal-dust.html#1] Accessed November 30, 2015.

- Board of Port Commissioners of the Port of Oakland;
- BAAQMD and/or the California Air Resources Board; U.S. EPA
- State Water Resources Control Board and/or the Regional Water Quality Control Board; and
- Other City environmental requirements.
- 2012 Army Base Standard Condition of Approval / Mitigation Monitoring Reporting Program

Task 1.5: Commodities Characterization

- As needed to supplement the public information reviewed in Task 1.3, Describe and compare the characteristics of coal for export from OBOT.
  - Describe and compare U.S. coal types generally, and specifically Utah coal types by County and/or mine, as related to health and/or safety. Include a simplified description of chemical characteristics that contribute to or minimize potential human health and/or safety effects, including the coal composition and potentially harmful trace constituents like mercury, lead, arsenic, and barium as well as polycyclic aromatic hydrocarbons (PAHs) and other off-gasses including methane.[7]
  - Describe coal dust as a form of particulate matter (PM) and explain how it can be generated during rail transport, storage and transloading activities.
  - Summarize the factors affecting the total amount of fugitive coal dust generated,[8] including the factors affecting the volume of coal dust released during offloading, storage, and on-boarding to marine vessel. Estimate the volume of coal dust released during each activity per day, month and year.
  - Describe mobilization and factors influencing mobilization of coal dust to achieve exposure to humans via inhalation, ingestion and leaching into surface water and ground water.

[7] A potential reference to be evaluated regarding coal characteristics includes the coal dust analysis provided as Appendix G of the Surface Transportation Board's analysis for the Tongue River Railroad project.

[8] Section 4 (Environmental Impacts Associated with Coal Transportation) of the U.S. EPA's May 1978 Environmental Assessment of Coal Transportation (p. 59 et seq.) will be reviewed to inform this discussion. USEPA, 1978, Environmental Assessment of Coal Transportation. EPA-600/7-78-081. [http://www.scribd.com/ doc/129807057/9100T7M9] May 1978. Section 6.3.3.1 of the Surface Transportation Board's EIS (p. 6-6 et seq.) for the Tongue River Railroad Project (and references cited therein) also will be reviewed.

- Provide a brief summary review of existing studies of emission, dispersion, and deposition of coal dust from rail cars and provide a high-level overview of the methods that prior studies have used to evaluate potential effects.[9] Specific examples of conservative assumptions will be identified.[10]
- Identify potential coal dust palliatives (also referred to as surfactants or "topping agents") and distinguishing characteristics of each.[11]
- Review surfactants and their effects on reducing fugitive coal dust from open top coal trains.

- As mentioned in Task 1.2, describe the effects of handling coal, fuel oils, and gasoline through the OBOT all at once.
- Perform the same evaluation as above in this subtask, for fuel oils, and gasoline (i.e., the other specific bulk commodities most likely to be handled through OBOT and that are addressed by the 2014 Oakland Resolution). Certain commodities are excluded from this review due to their lack of health and/or safety risk issues (or low risk) and/or regulation by the fire and building codes.

[Subconsultants, Adelante Consulting (Barbara Toole-O'Neil); and MRS]

Task 1.6: Prepare Draft Report

- ESA will conduct the following tasks to prepare the Draft Report:
  - Categorize, synthesize, and summarize the information gained and reviewed through Task 1.1 through Task 1.5, detailed above; the categorization of information gained from those preceding tasks may be further refined for purposes of the Draft Report.
  - Prepare a Draft Report containing the categorization, synthesis, summary, evaluation, and references record of the public comments and other information in the City public record.

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[9] See, e.g., Chapter 6, *Coal Dust*, of the EIS being prepared by the Surface Transportation Board for the Tongue River Railroad. The Draft EIS was issued for comment on April 17, 2015 [http://www.tongueriverеis.com/draft_eis.html]. A second extension of the comment period was granted until September 23, 2015. We presume the Final EIS is in progress and may provide independent confirmation as to the appropriateness and completeness of the scope of issues to be considered in this proposed Report. See also Kotchenruther (EPA Region 10), 2013. Fugitive Dust from Coal Trains: Factors Effecting Emissions & Estimating PM2.5. [http://lar.wsu.edu/nw-airquest/docs/201306_meeting/20130606_Kotchenruther_coal_trains.pdf]

[10] An example of this is provided in SNC-Lavalin, 2014, on page 131 et seq., although we do not anticipate that the referenced level of detail would be needed or helpful in this project.

[11] This discussion would further develop and refine information provided in Table 3-8 (Composition of Dust Palliatives) provided in SNC-Lavalin, 2014. Human Health Risk Assessment: Fraser Surry Docks Direct Transfer Coal Facility Revised Final Report. July 18, 2014.

Task 1.7: Revise/Prepare Final Report (as needed) / Meeting Attendance

- ESA understands that the City may circulate the Report to the public and project proponent for review and comment. Under this task, ESA will revise the finalize or modify the Report, as needed or directed. Attendance at one (1) public meeting is assumed to hear public comment on the Report. Preparation of responses to comments is not assumed.

Task 1.8 Detailed Scoping and Consultation

- This task includes ESA's work and communication with City staff to understand the background and context of the OBOT proposal relative to the DA and the City's 2014 Resolution, and to assist the City in developing the technical aspects of a scope of work pertinent to the City determining whether the information in its public record constitutes substantial evidence of substantial endangerment

III. PROPOSED SUBCONSULTANTS

ESA has identified qualified subconsultants who will provide specialized expertise required for certain tasks identified in this preliminary scope, and referenced throughout the scope. ESA has previous working relationships with each of these firms and expert analysts. **Adelante Consulting (Barbara Toole O'Neil)**and **MRS** will focus on Task 1.5 (Commodities Characterization), with assistance as needed in Task 1.3 (Review Public Input to Date). However, it is anticipated that subconsultants will provide consultation as needed throughout the work and participate in other various tasks as needed.

IV. LABOR AND COST ESTIMATE

Table 1 presents a preliminary draft labor and cost estimate for the proposed work. As discussed with City staff to date, this process and the proposed deliverables are fairly unique, and the actual effort required could vary widely based on the quantity, scope and nature of public engagement and response, as well as the actual process that the City undertakes. This initial estimate factors in this uncertainty, but represents thoughtful initial estimates based on our understanding and initial review of information the City initially provided to ESA.

TABLE 1- PRELIMINARY DRAFT LABOR AND COST ESTIMATE

Task	ESA Hours	Subconsultant Hours (Estimated based on Average Hourly Bill Rate)	Total Hours	Total Approximate Cost
Task 1.1: Confirm OBOT Project Design	38		38	$8,219
Task 1.2: Characterize OBOT Activities for Coal and Other Hazardous Fossil Fuel Materials	42		42	$8,683
Task 1.3: Review Public Input to Date on Army Base Redevelopment Project	86	9	95	$20,459
Task 1.4: Summarize Existing Regulatory Setting	40		40	$8,302
Task 1.5: Commodities Characterization	58	44	102	$23,541
Task 1.6: Prepare Draft Report	64		64	$13,596
Task 1.7: Revise/Prepare Final Report (as Needed) / Meeting Attendance	48		48	$10,578
Task 1.8: Detailed Scoping and Consultation	65		65	$13,055
Subtotal	**441**	**53**	**494**	**$ 106,433**
Direct Expenses (Print/Deliveries)				**$1,380**
TOTAL HOUR/COST ESTIMATES	**441**	**53**	**494**	**$ 107,813**

V. PRELIMINARY DRAFT SCHEDULE

Table 2 presents a preliminary draft schedule of the proposed work, intended as a starting point for refinement in collaboration with the City. Key assumptions are listed as table notes and apply approaches and administrative draft review durations that the City generally applies for its review of certain environmental review processes. It is assumed that certain tasks may warrant interim review and feedback from the City.

(Table 2 presented on the following page.)

TABLE 2 - PRELIMINARY DRAFT SCHEDULE

Task	Duration (weeks)	Start	End
ESA-City Approach/Scope Review and Revision		1/11/16	3/25/16
ESA Team Work Tasks	4 wks	4/26/16	5/24/16
Task 1.1: Confirm OBOT Project Design			
Task 1.2: Characterize OBOT Activities for Coal and Other Hazardous Fossil Fuel Materials			
Task 1.3: Review Public Input to Date on Army Base Redevelopment Project			
Task 1.4: Summarize Existing Regulatory Setting			
Task 1.5: Commodities Characterization			
Task 1.6: Prepare Draft Report			
City Review / ESA Revision	2.5 wks[a]	5/25/16	6/8/16
Publish Report (17-day public review)		6/10/16	6/27/16
Task 1.7: Revise/Prepare Final Report		As needed	
Public Hearing #2 [b]		July 2016	

a Assumes one round of City review and Report clarifications by ESA.

b Public Hearing #1 assumed to have occurred in Fall 2015.

VI. QUALIFICATIONS AND KEY RESUMES

Resumes of key ESA technical staff and subconsultants for this proposed scope of work are provided to the City under separate cover.

CHARLES B. BENNETT (CHUCK)

Senior Project Manager and Technical Advisor

EDUCATION

B.S., Mechanical Engineering, Stanford University

45 YEARS EXPERIENCE

PUBLICATIONS

Published technical articles in the fields of acoustics, wind effects, particulate transport and control, quality control, probabilistic search methods, computer-graphics applications, mathematical analysis of probabilistic games, and radiation phenomena.

Chuck has more than four decades of experience in applied environmental studies and project management, including over 46 years at ESA. Chuck, one of ESA's original emplowees, serves as consultant and directs work in applied technical studies, impact analysis and environmental impact report/statement (EIR/EIS) preparation. He has directed and contributed to more than 275 CEQA/NEPA impact studies and 500 technical studies in air quality, wind effects, health and safety, noise, vibration, visual effects and electromagnetic hazard. He directed studies of major industrial and public works projects, such as San Francisco's Southwest Water Pollution Control Plant; sewage solids handling facilities at the San Jose - Santa Clara Water Pollution Control Plant; modifications to the San Pablo (earthfill) Dam; flood control works; quarries; pipelines and industrial developments. He prepared EIRs and MNDs for CPUC projects including telecommunications facilities and electric power transmission lines and substations. He also has long CEQA experience with petroleum refineries, having directed preparation of EIRs for a number of projects at the 5 SF Bay Area refineries. His technical work includes technical assistance and preparation of EIRs for hospitals, laboratories and other facilities at UC San Francisco and the Bevatron building at Lawrence Berkeley National Laboratory. Two recent projects are: preparation of the EIR for UC San Francisco's 2014 Long Range Development Plan and preparation of an IS/MND for the 2015 Silicon Valley Regional Communications Sysstem (SVRCS) Site Upgrade Project.

At ESA, Chuck serves as Project Director, Project Manager, Lead Technical Investigator, and Senior Technical Consultant.

Relevant Experience

Digital Microwave Interoperability Project (ECOMM and SVRCS). *Project Director.* From 2007 through 2015, Chuck directed and participated in four separate, sequential environmental reviews, preparing CEQA and NEPA documents and providing environmental monitoring for the proposed construction of and/or modifications to the microwave transmission towers and antennas for the Santa Clara County emergency communications system. This system allows first responders to improve local incident response times as well as allow the County to better manage regional incidents. Since the first three projects required both local and federal approvals, ESA prepared joint CEQA/NEPA Initial Studies and Environmental Assessments that covered the system as a whole and also analyzed the impacts at each individual antenna location. The main issues of the project are biological resources, cultural resources, and public health and safety. The final

system upgrade, the 2015 Silicon Valley Regional Communications Sysstem (SVRCS) Site Upgrade Project, which would facilitate implematation of the new County-wide 700 MHz Public Saftey interoperable communications system, required only CEQA review and documentation.

Port of Redwood City, Carbon Black Pilot Facility Project IS/MND. *Project Director.* Chuck served as Project Director and technical reviewer for analysis of a pilot plant industrial facility that would use a feedstock of natural gas and electric power to produce sample quantities of carbon black. Carbon black is used as a reinforcing agent in nearly all black rubber and plastic products. The proposed project would be located on approximately 0.6 acres at the Port of Redwood City. Key environmental topics analyzed in the IS/MND included hazards and hazardous materials and air quality. The Port approved the project in February 2014.

UC and Health Risk

UC San Francisco 2014 Long Range Development Plan EIR. *Project Manager.* ESA prepared the EIR for the University of California, San Francisco (UCSF) 2014 Long Range Development Plan (LRDP), adopted by the Regents in November 2014. UCSF is the only campus in the UC system devoted exclusively to health sciences, and has no undergraduate students.

The 2014 LRDP assesses overall growth potential through the year 2035 and provides guidance for individual project proposals over the next 20 years. ESA worked closely with UCSF and UOP staff to prepare the UCSF Greenhouse Gas (GHG) Reduction Strategy, which was adopted by the Regents as a part of the 2014 LRDP and will facilitate future environmental review under CEQA. UCSF is an urban institution with many campus sites in San Francisco. The 2014 LRDP could result in an additional 2.4 million gross square feet of growth in owned and leased buildings, with the most growth in new buildings at the Mission Bay campus site, where land is available and new infrastructure planned, but also at the Parnassus Heights, Mount Zion, and Mission Center campus sites. 2014 LRDP proposals for Parnassus Heights advance UCSF toward compliance with the space ceiling imposed by the Regents, and with state seismic laws for inpatient hospitals. The 2014 LRDP proposes demolishing buildings, constructing a new addition to Long Hospital, and doubling the number of on‐campus housing units at Parnassus Heights, as well as doubling on‐campus housing at Mission Bay, in order to reduce traffic impacts, enhance campus vitality, and support City of San Francisco housing goals.

The EIR considers the overall effects of each of the 2014 LRDP demolition, renovation, building construction, and infrastructure and utilities proposals, as well as their future operation. To enable the EIR to analyze each of these proposals, individual projects were assumed to occur within one of four likely time frames that cover the 20-year life of the LRDP. Although the 2014 LRDP is a long-term plan with campus-wide elements, it focuses physical growth and change at four major UCSF campus sites. The structure of the EIR responds by analyzing all potential campus-wide environmental effects of the LRDP in one chapter and then analyzing the specific effects at each campus site in four subsequent chapters. The LRDP impact chapter includes program-level mitigation measures to reduce most impacts to less than significant; these measures also apply to the specific development proposals at each campus site. This approach shortens the program-level and project-level analyses of development proposals and simplifies the presentation of those impacts and mitigation measures in the four campus site chapters of the EIR.

Although there was not enough information to evaluate all 2014 LRDP proposals at the project-level, the analyses of many of the 2014 LRDP proposals at the project-level is intended to permit project approval following certification of the 2014 LRDP EIR by the Regents of the University of California.

UCSF Medical Center at Mission Bay Subsequent EIR. *Project Manager.* Chuck is managing an EIR for a proposed integrated medical facility to serve children, women and cancer patients in Mission Bay, near its existing 43-acre biomedical campus. The project would be undertaken in two major phases. The "LRDP Phase" would construct a 979,000-gross-square-foot, 289-bed Medical Center on the east parcel of the project site and structured and surface parking on the west parcel. To ensure rapid access to UCSF's specialized level of care for critically ill children and pregnant women, a helipad on the northernmost portion of the Medical Center campus would be constructed to accommodate helicopter transport. The "Future Phase" (second phase) would provide additional 808,000 gsf of Medical Center development, replacing the surface parking on the west parcel. This Subsequent EIR tiers off of a previous EIR for UCSF's Hospital Replacement Program that was also prepared by ESA.

Lawrence Berkeley National Laboratory Building 51 and Bevatron Demolition Project EIR/EA, Alameda County, CA. *Project Manager.* Chuck managed the EIR and EA for the Building 51 and Bevatron Demolition Project at Lawrence Berkeley National Laboratory, which included evaluation of human health risks. Major environmental issues analyzed in the EIR/EA include the mitigation of significant impacts to historic resources, traffic and circulation associated with hauling of demolition materials through the city of Berkeley, handling and disposal of hazardous and radioactive materials, noise, air quality, public health and safety, visual quality and land use and planning. The proposed project would dismantle and remove the Bevatron particle accelerator, a facility listed on the National Register of Historic Places for its contribution to the development of the country's atomic energy program in the 1950s, and would demolish Building 51, which houses the Bevatron.

UC Davis Long Range Development Plan EIR Sections & Other Projects. *Project Manager*. Prepared the Health and Safety and Hazardous Materials analyses for the UC Davis LRDP. He also directed the preparation of EIRs for UC Davis on a new Environmental Service (HazMat) Facility and a new Contained Research (Biohazard Level 3) Facility on the western portion of the campus. The evaluation focused on the handling, storage and disposal of hazardous materials at the Environmental Service Facility and focused on the operation of Biohazard Level 3 laboratories and contained greenhouses at the Contained Research Facility. In the same time frame, he directed preparation of various technical studies and a Mitigated Negative Declaration for the Equine Analytical Chemistry Laboratory.

UC San Francisco Revised Laurel Heights Plan EIR. *Health Risk Analyst.* Chuck directed and served as lead technical investigator on two separate studies to assess the effects of exhaust emissions from planned University of California, San Francisco animal care and biomedical research facilities at each of the existing UCSF Parnassus and at the new UCSF Mission Bay campuses. The effort included work to characterize the dilution of toxics in the exhaust stack flows and determine the risks that would result. Both efforts involved working with

researchers to characterize the emissions and the project architects and engineers to develop effective exhaust stack designs and operating parameters.

UC San Francisco Building 24 Fume Hood Exhaust Stack Testing, Design Assistance and Health Risk Assessment. *Project Manager.* Under contract to UC San Francisco, ESA prepared a Health Risk Assessment at this first UCSF building in the new Mission Bay campus. ESA worked with the UCSF project team to identify and quantify the critical sources of toxic emissions, assess the public exposures to these toxic emissions that would result from the operation of the building, and evaluate the overall health risk to the public from the normal operation of the building. Because the building is planned to be located next to a day-care center and near a future public school site, the normal numerical screening models were considered to be too uncertain for sole use. The source term came from projected use of toxic materials, the physical data on dilution of exhaust came from the wind-tunnel tests and one year of local meteorological data was used to determine the frequency of exposure. This result was an independent empirical estimate of the potential acute and chronic health impacts that could result from the operation of the project. This empirical estimate was then compared with the standard numerical modeling results, which yielded a higher estimate of the health risk than did the empirical method. With this information in hand, the UCSF design team was able to make logical design decisions based on the known design factors, cost and overall effectiveness of the HVAC and toxic exhaust systems. ESA also conducted wind-tunnel tests to assist in the design and placement of fume hood exhaust stacks to serve the chemical laboratories, biological research laboratories and animal facilities. In addition to design assistance, ESA worked with project architects and engineers to develop rational criteria to measure the performance of the fume hood and generator exhaust system systems. ESA worked with the project team to develop effective and cost-conscious solutions to problems found.

UCSF Long-Range Development Plan Hospital Amendment EIR. *Project Manager.* Chuck managed the EIR on the Hospital Amendment to UCSF's 1996 LRDP. ESA staff analyzed air quality and noise impacts from the construction and operation of the proposed Hospital based on the criteria set-forth in the CEQA and Bay Area Air Quality Management District (BAAQMD) CEQA guidelines. ESA staff also assessed air quality effects of traffic using URBEMIS and analyzed Toxic Air Contaminant emission impacts using a risk-based approach. The LRDP Amendment addresses the inclusion and upgrading of UCSF's Hospital facilities that were addressed in the original LRDP. The 1996 LRDP did not consider the proposed facilities and functions because, at that time, they were to be under the control of the merged UCSF-Stanford clinical entity. The termination of the UCSF-Stanford Health Care entity left UCSF with a LRDP that did not address the existing clinical facilities, the changes needed to meet the growth in demand for services, or the seismic safety mandates of Senate Bill 1953 and subsequent legislation.

Chiron Corporation Master Development Plan Health Risk Assessment and Pedestrian Wind Tests. *Project Manager*. Chuck provided detailed technical studies for the Chiron project to evaluate health risk to the neighbors that could result from Chiron's nearly one million square feet of research laboratories, proposed to be located next to a residential neighborhood. Used a combination of wind tunnel and numerical modeling studies to assess potential impacts. Directed preparation of the complex biological, chemical and physical health and

safety, hazardous materials / site contamination and air toxic evaluations performed on the project.

Refinery Projects

Contra Costa County, Phillips 66 Propane Recovery Project EIR. *Project Director.* ESA prepared an EIR for a propane recovery project at Phillips 66's refinery in the community of Rodeo in Contra Costa County. The project would modify existing facilities in order to recover propane from refinery fuel gas. Propane would be stored in new storage vessels for transport via rail. A new rail loading rack and rail spurs also would be constructed as part of the project. Cory evaluated the project's potential impacts on public services and utilities, population and housing, and recreation.

Valero Benicia Refinery's Improvement Project EIR – City of Benicia, CA. *Project Manager*. This controversial $140 million, 7-year project included a number of actions to improve the overall efficiency of the refinery, to increase throughput and to enable the refinery to process lower-cost feed stocks. The study examined all aspects of the project and traced their impacts, both within the City of Benicia and over the broader Bay Area region. As the water supply in the City is limited and rationing can occur in dry years, water use by the Refinery is of great public concern. ESA developed appropriate mitigations for the significant impacts of the project. Substantive answers were prepared to all of the several hundred technical comments received from the public on the published Draft. The Final document was certified in late 2002. Project opponents appealed, but dropped the appeal after intense direct negotiations between the City, Refinery and the Appellants.

ConocoPhillips Rodeo Refinery Clean Fuels Expansion Project EIR. *Project Manager.* Chuck is managing the preparation of an EIR and assisting the Community Development Department of Contra Costa County with CEQA compliance for the proposed Clean Fuels Expansion Project (CFEP) at the ConocoPhillips Rodeo Refinery. The CFEP would add new facilities and modify existing facilities to produce additional clean fuels. The Refinery would use Heavy Gas Oil that is produced at the Refinery, but is currently being sold into the HGO and fuel markets, to produce cleaner-burning gasoline and ultra-low-sulfur diesel fuels targeted for the California market. In addition to increasing cleaner-burning gasoline production, the CFEP would increase the production of ultra-low-sulfur diesel fuels. The CFEP includes the construction of a new hydrogen plant that would produce additional hydrogen to be used in the production of additional fuel. The hydrogen plant would be constructed and operated by a third party (Air Liquide) on a designated site within the Refinery. Specific environmental project concerns are the potential impacts to air quality, noise, public safety and public health, and water quality.

ConocoPhillips Ultra Low Sulfur Diesel and Strategic Modernization Project EIR, Contra Costa County, CA. *Project Manager*. Chuck managed a study to examine the effects of a series of improvements proposed at the ConocoPhillips Refinery at Rodeo, CA. The project would give the Refinery the capability to produce Ultra Low Sulfur Diesel Fuel to meet the EPA's January 2006 deadline, increase production capacity of the refinery and improve the ability to process low-cost high sulfur crude oils. Following a review of the project's complex elements, the study traced the chain of their potential environmental impacts, including air quality,

water quality, traffic, public health and public safety effects, within the local area and throughout the broader region. The study required careful technical analysis to assess the direct and the indirect impacts that could result from constructing and operating the project. In response to the published Draft, nearly 300 comment letters were received. Although over 90% supported the project, more than 300 questions and technical comments required substantive answers. The draft of the Final document has been prepared and awaits County approval.

Ultramar Golden Eagle Refinery's Second Phase Clean Fuels Project EIR Addendum, Contra Costa County, CA. *Project Manager*. Chuck managed the preparation of an Addendum to the existing EIR. The study first involved careful and detailed technical work to correctly identify the project's many complex process unit elements and distinguish them from other on-going (cumulative) projects at the Martinez refinery. The County's approval of the project was appealed by project opponents. ESA provided substantial direct assistance to the County in preparing substantive answers and rebuttals to the several hundred technical comments, claims and assertions of the appellants. The County subsequently upheld the approval of the refinery's proposed modification program.

Richmond Refinery Chevron Reformulated Gasoline and FCC Upgrade. *Project Manager*. Directed all of the day-to-day work, for the EIR (certified in 1994) for the Chevron Reformulated Gasoline and FCC Upgrade project at the Richmond Refinery. The EIR involved extensive technical analysis to identify the impacts, including air quality, traffic, fiscal, health and safety and accident effects, that could result from the complex $750 million project to produce the new Clean Fuels and to upgrade major portions of the refinery to improve operating efficiency.

Utility & Planning Projects

Pacific Enterprises and Enova Proponents Environmental Assessment. *Project Director*. Prepared for use by Pacific Enterprises and Enova, parent companies of Southern California Gas Company and San Diego Gas and Electric Company respectively, in support of the parent companies' merger application to the California Public Utilities Commission (CPUC). The document evaluated the environmental effects that could result from the merger of the holding companies into a new parent company, now called Sempra Energy. This work was prepared on an extremely accelerated 3-week schedule that required very substantial effort by nearly 10 key ESA staff, who worked nights and weekends for the duration of the work to help the client meet their inflexible submittal deadline. After the submittal, similar efforts were required to prepare formal responses to technical comments and interrogatories by project opponents as a part of the CPUC process.

Site Selection. US Ecology Low-Level Radioactive Waste Site. Directed ESA's effort to establish and operate meteorological stations to provide data to support selection for a disposal site in Southern California. In addition to initial shorter-term efforts for meteorological site selection, planning, construction and operation to screen each of the candidate areas, it was required to conduct longer-term measurements, exceeding the minimum 1-year of continual measurements and meeting the specific operational data gathering reliability standard, for the prime site. He also prepared ESA's QA/QC Plan to meet strict NRC quality assurance requirements and served as the Quality Control Officer for the duration of the program.

California Advanced Environmental Technology Corporation's Hazardous Materials Transfer Facility Negative Declaration. *Project Director*. Work included preparation of a supporting technical study of the risk from possible accidents, and he made presentations of these technical findings at three separate meetings to neighborhood community action groups including the West County Toxics Coalition and the Toxic Cloud Task Force, and to study sessions of the City Council and Environmental Assessment Panels.

U.S. Postal Service Master Contracts. *Project Director*. He was the primary contact with the client, assigns staff, and provides oversight direction of all of the more than 120 NEPA and related studies performed over a five-year period in the western U.S. in support for siting U.S. Postal Service facilities.

Bay Point Waterfront Strategic Plan EIR. *Project Director.* Chuck directed an EIR to provide consulting assistance for the proposed Bay Point Waterfront Strategic Plan. The Redevelopment Agency proposed to revitalize the Bay Point waterfront area by developing a full-scale marina with related commercial/ support uses, medium-density housing, interconnected open space and pedestrian walkways, and natural open space. The Plan also required an amendment to the Contra Costa County General Plan to change both the urban limit line and the land use designations for some portions of the site.

Telecommunications

In over 30 years of work involving communications facilities, he commonly addresses issues of health effects, visual impact, and alternate site location and configuration. He advised the City of San Jose in evaluating potential EMF at a city park proposed within the right-of-way of a 115 kV transmission line; and, for a neighborhood advisory council, he prepared a third-party review of EMR materials presented by LA Cellular on a proposed mobile telephone cell site.

Communications Hill Technical Study, San Jose, CA. Mr. Bennett evaluated the EMR exposures that would result in residences in the Communications Hill development in San Jose, which was proposed adjacent to microwave and communications antennas on the site. The health issues related to developing housing were addressed by comparing the computed exposures for residents with the existing national exposure standards.

Skynet Earth Station Satellite Dish, Alameda County, CA. *Project Director*. Mr. Bennett prepared an environmental assessment for AT&T's 13-meter Skynet Earth Station satellite dish at Altamont Pass. The report was prepared to satisfy FCC requirements regarding the installation of antennas with a diameter greater than 30 feet. ESA staff investigated the geology and soils of the project area, and calculated microwave radiation levels. The earth station broadcasts at 6 GHz with an average power of 500 watts. The isolation of the site precluded concern for EMR exposures to the station's power of 500 watts.

Gibraltar Peak Communications Site EIR. *Technical Task Leader and Senior Technical Reviewer*. Provided the public health and safety analysis for the Gibraltar Peak Communications Site EIR, which included radiofrequency radiation modeling performed by Dr. Arthur W. Guy of the University of Washington Bioelectromagnetics Research Laboratory and on-site existing radiofrequency radiation level measurements by Dr. Bruce B. Lusignan of

Stanford University's Communication Satellite Siting Program. The Gibraltar Peak site included hundreds of antennas, with a range of transmitter powers from a few watts to thousands of watts and EMR frequencies from AM radio to FM radio, TV, cellular and microwave communications links. The principal investigator for the evaluation of the biological effects was Dr. Guy.

Microwave Interference and Health Risk Analyses. Chuck directed the microwave interference and health risk analyses for the Pacific Plaza, the Golden State Tower, and the R Street Corridor EIRs for the City of Sacramento. There was concern that the buildings would interfere with established microwave communications links as well as with long-range weather radar. ESA examined the interference and also evaluated the health-related questions for individuals working within the buildings close to the microwave link paths.

GTE Mobilnet Site Cell EIR. *Project Manager*. Project included a 35-foot tower supporting three transmitting antennas and associated receiving antennas and a pre-fabricated equipment shelter proposed adjacent to the Fisher Junior High School in Los Gatos, CA. The EIR included a detailed field test program to characterize radiofrequency radiation (RFR) levels at points of closest public access and in areas that children would occupy throughout the school day. The test program, conducted by Professor Bruce Lusignan of Stanford, erected a temporary cellular transmission facility, complete with transmitters and antennas. RFR (radio-frequency radiation) levels were measured with precision instruments at representative locations on the grounds of the school and on adjacent public areas. Simultaneously, a literature search was conducted by Professor Jerrold Bushberg of U.C. Davis, to review current knowledge about the effects of exposure to RFR and to assess existing standards for exposure to RFR. Current laboratory and epidemiological literature were reviewed, as they represent the sources for recommended exposure limits. The processes by which the standards are set and updated were reviewed and conclusions about the adequacy of the standards to address the impacts of the proposed project were presented. Finally, the efforts of the two studies were integrated: the results of the measurement of RFR levels were used to evaluate the potential for adverse health effects with the project. The measured RFR levels for the site were compared to existing standards for exposure to RFR to determine if the existing facilities present a significant adverse risk to public health and safety.

Miscelllaneous CPUC Master Contracts. Under master contracts with the CPUC, he managed the preparation of and also contributed EMF technical analyses to Initial Studies and Mitigated Negative Declarations for the following PG&E 115 kV substation and power line projects: the Vasona 230 kV-12 kV Substation in Los Gatos; the Corona 115 kV-12 kV Substation in Petaluma; the FMC 230 kV-12 kV Substation in San Jose; and the North San Jose Capacity Project in San Jose and Santa Clara, including construction of a 230 kV power line and a 230 kV-12 kV substation to provide secondary capacity to serve the rapid and substantial industrial and growth in North San Jose.

Cellular Telephone Systems Environmental Review and Permitting. He directed ESA's pioneering Cellular Telephone Systems Environmental Review and Permitting work, which including preparation of Proponent's Environmental Assessments (PEAs) for the use of the California Public Utilities Commission, as well as environmental permit support for over two dozen individual cell sites for proposed cellular radiotelephone systems in El Dorado, Sacramento, Napa,

Monterey, and Ventura Counties, as well as more than 100 cell sites in the nine Bay Area counties over a four-year period.

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VICTORIA EVANS

Principal Associate and Project Leader

EDUCATION

M.S., Natural Resource Policy and Administration, University of Michigan, Ann Arbor.

B.S., Natural Resource Management, University of Michigan, Ann Arbor.

35 YEARS EXPERIENCE

CERTIFICATIONS/ REGISTRATION

Verifier. GHG Compliance Offset Projects, California Air Resources Board, 2012.

Project Management Certification, PMI, 2012.

Lead Certifier Trained, Greenhouse Gas Inventories, California Climate Action Registry, 2006.

Mediator Certification, State of California, 2002.

PROFESSIONAL AFFILIATIONS

Board Member, Air & Waste Management Association

Golden West Section, 2008-present

Mother Lode Chapter, 2007–2008

Advisor, UC Davis Student Chapter, A&WMA, 2006-07

Victoria Evans has more than 35 years of professional experience in energy, carbon, climate, air quality, energy, environmental impact and sustainability projects. As the prior Climate and Greenhouse Gas (GHG) Services Practice Lead at two major environmental consulting firms, Victoria directed more than 150 GHG/carbon footprint and energy analyses for major companies and federal agencies as diverse as The Dow Chemical Company, U.S. Postal Service, Citgo, Chevron, Valero, Marine Corps Installations-West, and Edwards Air Force Base. She has also led the analysis of climate change impacts and adaptation for the Keystone XL Pipeline, Port of San Francisco, and the Northeast Gas Association. Her professional experience includes tenure in the public sector at the Electric Power Research Institute, UC Davis, the Department of the Interior and the National Park Service. With more than 60 technical papers and presentations to her credit, Victoria is a frequently sought after speaker, instructor and panel moderator.

Relevant Experience

Prior to Joining ESA

Environmental and Climate Change Impacts of Energy and Fuel Projects

Environmental Impact Analyses, Multiple Energy Projects, U.S. *Technical Advisor.* Early in her career Ms. Evans performed reviews to determine natural resource impacts/conflicts in federal EISs for multiple power generating projects that overall totaled over 25,000 Mw. Representative types of energy projects include coal, oil and nuclear power plants; coal processing facilities; transmission lines; LNG terminals; oil terminals; and boiler fuel conversions. Corridor-type projects included slurry and natural gas pipelines.

Climate Risk Analysis (Climate Impacts and Adaptation), Keystone XL Pipeline, Supplemental FEIS (NEPA), U.S. Department of State, US. *Task Lead.* Ms. Evans led staff to conduct a high level assessment of the impacts of climate change upon the construction and operation along the route of the proposed Keystone Pipeline in Montana, South Dakota and Nebraska. She also identified mitigation for those projected impacts and developed responses to public comments.

GHG Emissions Analysis, Federal Loan Application and Pre-EIS. Leucadia Corp. (1) Coal Gasification Plant, Indiana, (2). Petroleum Coke Gasification Plant, Mississippi. *Task Lead.* Ms. Evans developed spreadsheet models to calculate GHG emissions and evaluated impacts of each proposed solid fossil fuel to syngas facility, including sequestration by injection of CO_2 emissions into local

AWARDS

Guest Lecturer, Green MBA Program, Dominican University. 2013

Jack Horton Fellowship, SEAS-Seminars and Environmental Arts and Sciences, June 1984

Special Achievement Award, from Assistant Secretary of the Department of the Interior, December 1980, National Park Service

geological formations. Additional impact analyses from upstream activities [supply chain analyses of carbon and other emissions] were prepared and used to support loan guarantee applications to US Dept of Energy.

Controls for Coal-Fired Power Plant Emissions, Integrative Assessment of Research on Atmospheric Mercury, US-wide, Electric Policy Research Institute (EPRI). *Project Manager***.** Ms. Evans led a team of senior scientists to prepare an integrative assessment report covering the life cycle of mercury and environmental impacts. She and the team evaluated and compiled research conducted over 6 yrs on utility source characterization, mercury emissions inventories, mercury fate and transport studies, alternative control scenarios for mercury in air emissions, health exposure studies, and trends in power plant source contributions over time.

Multi-media Toxics from Coal Combustion, Johannesburg, South Africa, EPRI/Eskom. *Manager***.** In consultation with Eskom, Ms. Evans developed a work scope for a research project for application of software for mass balance of multi-media toxics in waste streams from coal-fired plants. She served as the contract representative for two years, successfully managing project delivery.

Regional Air Quality Impacts on Ozone Levels of Coal-fired Power Generation, Taipei, Taiwan, EPRI/Taiwan Power. *Manager.* Ms. Evans worked with tech staff and utility scientists to develop the work scope for a successful three-year air quality research study in Taiwan.

Analyses of Best Available Control Technology (BACT), Nitrogen Oxide (NOx) Carbon Monoxide (CO) and GHG Emissions and Costs of Control, Multiple Locations, Various Power Plants. *Task Lead***.** Ms. Evans evaluated alternative emissions controls and costs to meet BACT for NOx and CO for several power plants in Nevada, including the Tracy Power Plant Expansion (Sierra Pacific Power Company), an 80 Mw Simple Cycle Natural Gas Turbine (Nevada Power Company), and a 1,000 Mw CCGT – the Toquop Power Project (Toquop Power Energy, Inc.). She conducted BACT analyses for NOx and CO controls and quantified GHG reductions for over a dozen power plant repowering options in California and Nevada. She conducted similar analyses or performed critical reviews for more than 30 additional power projects in California fueled with LFG, biomass, natural gas and coal.

PM_{10} Receptor Modeling, Seattle-Tacoma Area, WA, Puget Sound Air Pollution Control Agency. ***Principal Investigator*****.** Ms. Evans led a study to determine the relative contribution of various source types to high levels of PM_{10} at three sites in the region. The results were used to design appropriate control strategies for the State Implementation Plan in Washington. Speciation analyses of PM_{10} samples were performed by Desert Research Institute under a subcontract.

Greenhouse Gas Reporting and Compliance

California Air Resource Board (ARB) Mandatory Reporting - GHG Monitoring Plan Preparation, Six Oil and Gas Production Facilities, Chevron, San Joaquin Valley, CA. *Technical Lead.* Over two hundred general stationary sources were covered in six facility plans.

Greenhouse Gas Emissions Inventory for USEPA, CITGO, 3 Refineries, TX and LA. *Project Manager.* Ms. Evans led a team of 20 staff from across five states to develop GHG Monitoring Plans, Inventory Management Plans, and a GHG inventory for each refinery under the EPA MRR Subparts C and Y, as well as for Subpart MM reporting of fuels. Her team also developed a customized database tool in MS ACCESS for data collection, management and calculation for each refinery.

Technical Advisor, Regulatory and Policy Analysis, California Air Resources Board Preliminary Draft Rule for Cap and Trade for GHG and ARB Compliance GHG Inventory. Marine Corps Installations – West, California. Ms. Evans provided technical advice and evaluation of the regulatory impacts upon operations at Navy bases in California (cogeneration, landfills, boilers, heaters, SF6 uses). Strategic issues were also identified and language developed for comments submitted to the ARB.

Mandatory GHG Inventory and Reporting, GHG Management Strategy. Dow Chemical Company, California Operations, Pittsburg, CA. *Project Manager.* Ms. Evans led staff in an applicability assessment and gap analysis for California's AB32 GHG Reporting/Cap and Trade Program and the US EPA's GHG Mandatory Reporting Rule. She and her staff conducted a policy and economic impact analysis and drafted public comments/testimony that were submitted to the ARB. Ms. Evans led a study of benchmarking the fuel efficiency at the plant, modeling of future allowances, and identification of alternative carbon credit offsets for purchase. She led staff efforts for the first mandatory reporting to ARB of GHG emissions (CY2010), supported successful verification by a 3rd party verifier firm and the first USEPA reporting into the eGGRT system.

National GHG Inventory, U.S. Postal Service, 50 States. *Project Manager.* Ms. Evans led a team to prepare a verifiable annual GHG inventory for reporting to The Climate Registry. In addition, her team prepared the first inventory for reporting under Executive Order 13514 for Scopes 1, 2 and 3 emissions. The team also evaluated Scope 3 GHG emissions from the supply chain and mail distribution, and made recommendations for improvements. The GHG inventory tracked fuel and energy use for over 30,000 buildings across the U.S and for 200,000 vehicles, the largest fleet in the world.

University of California Davis,Campus-wide GHG Emissions Inventory, Davis, CA. *Co-sponsor and Technical Advisor (staff).* Ms. Evans co-sponsored and provided technical advice to University operations staff conducting the first UCD campus-wide GHG emissions inventory. The voluntary inventory was certified and filed with the California Climate Action Registry. The inventory included power plants, offices, classrooms, laboratories, a hospital, livestock and dairy cattle, a bus system, a wastewater treatment plant, and a landfill (both LFG flaring/co-firing). UCD serves almost 30,000 students and 26,500 UCD staff. Also, UCD operates five major teaching and research facilities, three of which are located 100 miles or more from the main campus.

Comprehensive Greenhouse Gas Inventory, Edwards AFB, CA. *Technical Advisor.* Ms. Evans provided advice and guidance in preparation of the first comprehensive greenhouse gas (GHG) inventory (Scopes 1 and 2) for the Base.

The GHG inventory is verifiable by a third-party under protocols established by the California Air Resources Board (CARB), the US EPA, and The Climate Registry. Ms. Evans also supplied support in developing recommendations for compliance with state and federal regulations while identifying cost-saving and other streamlining measures.

Carbon Offset Projects

Sacramento Municipal Utility District, Evaluation Tool and Assessment of Greenhouse Gas Offset Project Opportunities, CA. *Technical Advisor.* Ms. Evans provided advice to develop generic GHG emission inventory profiles for 14 potential greenhouse gas offset projects to develop verifiable GHG reduction projects for the creation of credits and sale, primarily for voluntary reductions.

Carbon Offset Projects Assessment and Evaluation, MultipleLocations. *Chief Scientist and Director.* Served as Chief Scientist and Director, Emission Reduction Projects for start-up firm engaged in developing projects yielding carbon offset and other environmental benefits. For 16 clients, evaluated potential projects under 8 types of carbon offset protocols under domestic and international protocols.

Climate Change, Adaptation and Risk Analysis

Climate Change: Sea Level Rise Evaluation and Mitigation Study, Port of San Francisco, SanFrancisco, CA. *Technical Advisor.* Ms. Evans was a technical advisor to the Port of San Francisco, who is responsible for the care and maintenance of 7.5 miles of San Francisco Bay shoreline under the California Tideland Trust. Ms. Evans served on a team to evaluate the potential need to implement mitigation measures for the effects of sea water flooding and increased wave action. Ms. Evans provided reviewed a synthesis of the results of downscaled climate change modeling for the state of California along with associated state agency policy recommendations/initiatives to address climate change. Based upon these results, Ms. Evans advised hydraulic modelers in providing an estimate of SLR and storm surge run-up as it relates to the San Francisco Bay shoreline managed by the Port.

Methodology Development and Adaptation to Climate Change for Natural Gas Local Distribution Company (LDC) Consortium, NYSEARCH. Northeast U.S. *GHG Task Lead.* Ms. Evans led the team that evaluated climate change effects on eight LDCs across eight northeastern states and developed a methodology to assess impacts and risks for infrastructure, operations and business for adaptation planning. This study was an initial high-level examination of climate change effects and defined an adaptation analysis framework that encompassed identifying, evaluating, and developing strategies to adapt to these climate impacts. She developed an analytical adaptation framework model that identified the climate changes, effects and secondary impacts and how these would affect this industry's infrastructure. This model is for climate change impact evaluation for risk assessment for infrastructure, business operations and customers. Major climate impact areas were identified with risk assessment applied in setting priorities for addressing impacts and assessing adaptation options.

TIM RIMPO

Program Manager – Air Quality

EDUCATION

M.S., Economics (Natural Resource & Environmental Specialization), Colorado State University, Fort Collins

B.A., Economics, University of Virginia, Charlottesville

30 YEARS EXPERIENCE

SPECIALIZED TRAINING

Hot Spots Analysis Reporting Program (HARP) Model Training, 2006

Air Permitting, 2015

PROFESSIONAL AFFILIATIONS

Air & Waste Management Association – Mother Lode Chapter

Association of Environmental Professionals – Superior Chapter

Tim Rimpo has 30 years of experience evaluating air quality and greenhouse gas impacts for public and private clients. His areas of expertise include point-, area-, and mobile-source air quality impact studies; and air permitting. Tim's experience includes working with clients to obtain greenhouse gas (GHG) credits, renewable energy credits, and criteria pollutant emission offsets.

Relevant Experience

Health Risk Guidance for Crematories – City of Oakland, CA. *Project Manager.* Tim prepared a white paper on air quality impacts and health risks associated with crematory operations. The report was prepared for the City of Oakland's planning staff and was used by members of the City's Planning Commission to help evaluate zoning alternatives for crematories.

Phillips 66 Propane Recovery Project REIR, Contra Costa County, CA. *Air Quality and Health Risk Analyst.* The Propane Recovery Project (proposed Project) would modify existing facilities and add new facilities to recover propane from refinery fuel gas (RFG) and Hydrogen Plant feed gas and then ship it by rail for sale. The proposed Project would involve hydrotreating a portion of the RFG, a process that would reduce the amount of sulfur in the fuel gas, and because fuel gas is now burned to produce heat for Refinery processes, ultimately would reduce the Refinery's sulfur dioxide (SO_2) emissions to the atmosphere. Tim analyzed the health risk impacts of the project on the community and nearby sensitive residences.

Marine Highways Project - Port of Stockton. Stockton, CA. *Project Manager.* The Marine Highways project would replace existing truck transport of goods between the Ports of Oakland and Stockton with container-on-barge service. Tim prepared an air quality report that estimated air emissions resulting from existing truck transport, from the proposed container-on-barge system, and the net change in emissions between the two. Criteria pollutant and GHG emissions were estimated using the EMFAC and OFFROAD models, and were subdivided into those that would occur within the Bay Area Air Quality Management District (BAAQMD) and within the San Joaquin Valley Air Pollution Control District (SJVAPCD). The air quality benefits of this project were then used by the Port of Stockton to justify the payment of air pollution grant monies by SJVAPCD and BAAQMD. Those funds were used by the Port to purchase new cranes.

Santa Cruz Memorial Crematory Health Risk Assessment – City of Santa Cruz, CA. *Project Manager.* Tim managed the preparation of a health risk assessment that evaluated the potential risks from an existing crematorium to proposed condominiums proposed for the adjacent land parcel.

San José/Santa Clara Regional Wastewater Facility Capitol Improvement Project, San José, CA. *Air Permitting Lead.* The San José/Santa Clara Regional

Wastewater Facility is undergoing a capital improvement program (CIP) in excess of $1 billion dollars. Tim developed an air permitting schedule for this CIP that identified the time required to obtain new source review and Title V permits for various components of this program. Tim recently taught an air quality permitting class for the Facility's planners and engineers. This class included a detailed discussion of best available control technologies and the effective uses of emission offsets for wastewater treatment. Tim is also assisting the Facility in obtaining air permits, which includes working closely with the project engineers and the Bay Area Air Quality Management District.

AB2588 Health Risk Assessment - Port of Stockton, Stockton, CA. *Project Manager.* Tim led the preparation of a toxic air contaminant (TAC) emission inventory and health risk assessment (HRA) for emission sources operated by the Port of Stockton. This analysis focused on sources located on both the Port's East and West Complexes.

Digester Gas Feasibility Assessment. Southern California Gas Company, Los Angeles, CA. *Air Quality Analyst.* Tim evaluated several options for using digester and landfill gas generated by wastewater treatment plants, landfills, and dairy farms located in the southern San Joaquin Valley. Tim examined the feasibility of injecting gas into transmission pipelines, versus using that gas to power motor vehicles or to generate electricity.

On-Call Air Quality for the Port of Stockton, San Joaquin County, CA. *Project Manager.* Tim has managed several projects at the Port of Stockton. These have included obtaining air permits and emission offsets for the Port and the Port's tenants, conducting health risk assessments, and conducting special air quality studies for Port activities. Tim evaluated the Port's existing emission sources to determine compliance with permit conditions. Evaluated all existing air permits to determine whether a Title V permit was warranted.

Ram Power Geothermal Project at the Geysers – Sonoma County, CA. *Project Manager/Air Quality Technical Lead*. Tim evaluated several approaches to reduce, sequester, or offset GHG emissions from a proposed 35-megawatt geothermal plant. GHG reductions were required by the project's conditional use permit issued by Sonoma County. Tim also evaluated the benefits and potential markets for selling bundled and unbundled renewable energy credits associated with geothermal energy generation.

Lodi Gas Project—California Public Utilities Commission (CPUC), Lodi, CA. *Air Quality Technical Lead.* Tim prepared an air quality evaluation and air permit applications for a proposed underground natural gas storage facility located in Lodi, California. Permits from the San Joaquin Valley Air Pollution Control District were obtained for the project's natural gas compressors and the glycol dehydration system.

Granulated Slag Processing Air Permit - Lafarge North America. Stockton, CA. *Air Quality Technical Lead and Project Manager.* Tim prepared the air permit application for Lafarge's proposed slag processing facility to be constructed at the Port of Stockton, California. Tim worked closely with the San Joaquin Valley Air District to provide all required permit information.

Winery Greenhouse Gas Technical Reports – Sonoma County, CA. *Air Quality Technical Lead.* Tim prepared greenhouse gas technical reports for several

proposed new wineries and winery expansion projects in Sonoma County. These have included Paradise Vineyards Winery, Kistler Vineyards, Twin Oaks Winery, Windsor Oaks Winery, and the Best Family Winery. For several of these projects, Tim worked with emission trading companies to purchase GHG offsets to offset the increase in winery GHG emissions.

Solano County Power Plants—Panda Energy. Solano County, CA. *Project Manager.* Tim managed the preparation of environmental documents and air permits for three simple-cycle peaking power plants (49.7 megawatts [MW] each) proposed for Solano County. Tim worked closely with the local air district to ensure that the best available control technology (BACT) (selective catalytic reduction with ammonia injection) was selected, emission offsets were obtained, and that the air quality modeling was conducted correctly.

Air Permitting Support – Consolidated Oil and Transport Company Asphalt Terminal. Port of Stockton. *Project Manager.* Tim managed preparation of the air permit and CEQA documents for a proposed liquefied asphalt terminal that included a large boiler and cogeneration facility. Tim worked closely with the applicant to identify best available control technology and to purchase emission offsets required for this project. Tim also prepared a health risk assessment that evaluated project related increases in health effects to residences living near the Port of Stockton.

Kiefer Landfill Expansion Project Supplemental Draft EIR - Sacramento County Department of Environmental Review and Assessment. Sacramento, CA. *Air Quality Technical Lead.* Tim prepared an air analysis for expansion of the Sacramento Keifer Landfill designed as a Class III sanitary landfill and is located approximately 15 miles southeast of the City of Sacramento. The air analysis included an evaluation of dust and odors on nearby residents, and an estimate of the increase in vehicle and landfill gas emissions.

Bay Delta Conservation Plan Health Risk Assessment, California Department of Water Resources. Sacramento, CA. *Project Manager.* Tim managed preparation of a health risk assessment (HRA) for the Bay Delta Conservation Plan, which would involve transporting water by tunnel and canal from the Sacramento River Basin to the south Delta for export to the San Joaquin Valley and the South Coast area. The HRA, which focused on construction emissions, used the AERMOD dispersion model to estimate pollutant concentrations at sensitive receptors. Tim also used the Hotspots Analysis Reporting Program (HARP) program to calculate health risks associated with those concentrations. The analysis focused on the chronic and carcinogenic health risks resulting from diesel particulate matter (DPM) and PM2.5.

Central Valley Natural Gas Storage Project - Nicor, Inc. Princeton, CA. *Air Quality Technical Lead.* Tim prepared an air quality evaluation and air permit applications for a proposed underground natural gas storage facility located in Colusa County. The analysis included an evaluation of the project's construction and operational emissions, including greenhouse gas emissions. A health risk assessment focused on natural gas combustion by-products. The air analysis focused on emissions from well drilling, from natural gas compressors, and from the project's glycol dehydration system.

Kirby Hills Underground Natural Gas Storage Project—Lodi Gas, Solano County, CA. *Air Quality Technical Lead.* Tim prepared an air quality evaluation of a proposed underground natural gas storage facility located in Solano County. The analysis included an evaluation of the project's construction and operational emissions, including the percentage of emissions that would occur within the Yolo-Solano AQMD versus within the Bay Area AQMD. The air analysis focused on emissions from well drilling, from natural gas compressors, and from the project's glycol dehydration system.

Greencycle Project EIR - Sacramento County Department of Environmental Review and Assessment. Sacramento, CA. *Air Quality Technical Lead.* Tim prepared the air, odor, and greenhouse gas analysis of a proposed green waste composting facility. This analysis was conducted for four proposed project alternatives and included detailed air quality impact modeling.

West Contra Costa Sanitary Landfill Hazardous Waste Management Facility Closure – California Department of Toxic Substances, Sacramento, CA. *Air Quality Technical Lead.* Tim prepared an air quality assessment for the closing of the West Contra Costa sanitary landfill hazardous waste management facility. The analysis included an evaluation of reactive organic and toxic air contaminant emissions, and potential odor impacts.

Targa Resources Storage Facility - Port of Stockton. Stockton, CA. *Air Quality Technical Lead.* Tim conducted internal review of a CEQA document that evaluated a new fossil fuel handling and storage facility. Potential commodities to be handled at the proposed facility included ultra-low-sulfur diesel, jet propellant -5, ethanol, E-100, E-85, low-ethanol blends from E-5 to E-25, crude oil, and biodiesel blends from B-5 to B-99.9 B 9000 soy biodiesel. Provided guidance to the Port of Stockton on ways to strengthen the administrative draft CEQA document before going public.

Edible Oil Processing, Transloading and Storage Facility – Gavilon, Inc. Stockton, CA. *Air Quality Technical Lead.* Tim led preparation of the air quality and greenhouse gas analysis for a new edible oils processing and storage facility proposed for the Port of Stockton. Tim worked with the San Joaquin Valley Air District to ensure all permitting requirements were met in a timely manner.

CORY BARRINGHAUS

Managing Associate

EDUCATION

Master of Urban Planning, University of Illinois

B.A., Political Science & International Studies, Washington University

10 YEARS EXPERIENCE

PROFESSIONAL AFFILIATIONS

American Planning Association

Association of Environmental Professionals

Cory has more than 10 years of experience as an environmental and land use planner and is responsible for the preparation of environmental and planning documents under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). He has provided project management support and prepared technical analyses for numerous energy projects as well as residential, commercial, mixed-use, and institutional developments. Cory has technical expertise in the areas of land use, zoning and plan consistency, aesthetics, public services, and utilities. He has also prepared several technical analyses regarding the potential effects of wind and shadow.

Relevant Experience

City of Benicia, Valero Crude by Rail Project EIR. *Deputy Project Manager.* ESA prepared an EIR for Valero's Benicia oil refinery to evaluate the potential impacts of changes in crude oil importation at the refinery. The project would allow the refinery to receive crude oil shipments via rail, which would result in a corresponding reduction in crude oil deliveries by marine vessels. Approximately 70,000 barrels per day of crude oil would be delivered by up to 100 railcars. Cory served as the Deputy Project Manager and also evaluated the project's potential impacts on land use, public services and utilities, population and housing, and recreation. The Final EIR was published on January 5, 2016.

Port of Redwood City, Wharves 1 and 2 Redevelopment Project Supplemental EIR. *Project Manager.* Cory is serving as Project Manager for a Supplemental EIR that is evaluating Phase 2 of the project, which was previously analyzed on a programmatic level in 2010. Phase 2 will analyze an increase in throughput of approximately 900,000 metric tons of sand and gravel aggregates beyond what was analyzed in the 2010 EIR. The project will also expand operations to 24-hours per day.

Port of Redwood City, Carbon Black Pilot Facility Project IS/MND. *Project Manager.* Cory served as Project Manager and primary author for analysis of a pilot plant industrial facility that would utilize natural gas and electricity to produce sample quantities of carbon black. Carbon black is a material that is used as a reinforcing agent in nearly all black rubber and plastic products. The proposed project would be located on approximately 0.6 acres at the Port of Redwood City. Key environmental topics analyzed in the IS/MND included hazards and hazardous materials and air quality. The Port approved the project in February 2014.

City of Oakland, Alta Bates Summit Medical Center Seismic Upgrade and Master Plan EIR. *Deputy Project Manager.* Cory was the Deputy Project Manager for a proposed seismic upgrade and master plan of the Alta Bates Summit Medical Center campus in Oakland. The project is intended to provide a long-term vision

for the campus in order to meet hospital and community needs, as well as to comply with state seismic safety requirements of Senate Bill 1953. The project included demolition of existing buildings, followed by construction of a new 230,000 sq. ft. (11-story) acute care hospital plus a new parking garage. Future phases include longer-term campus-wide improvements such as a new medical office building, new Samuel Merritt University classroom building, fitness center, and closure of a portion of Summit Street to create a new campus plaza.

City of Oakland, Fruitvale Transit Village, Phase II Environmental Assessment. *Project Manager.* Cory served as Project Manager for the Environmental Assessment for Phase II of the project. ESA prepared a joint IS/MND and Environmental Assessment for the Fruitvale Transit Village Project at the Fruitvale BART station in Oakland for the nonprofit Spanish Speaking Unity Council. ESA also prepared a Focused EIR for the second phase of the project, which includes 275 transit-oriented multi-family residential units, a clinic and child care center, and structured parking facility.

San Joaquin County, Union Pacific Expansion and Modernization Project EIR. *Deputy Project Manager.* Cory authored sections of the EIR and served as Deputy Project Manager. ESA prepared an EIR for the expansion of the existing Union Pacific Intermodal Facility. The project site is located in unincorporated San Joaquin County, between the cities of Lathrop and Manteca. The project would expand the existing capacity of the facility from 270,000 cargo container transfers ("lifts") per year to 730,000 lifts per year. The project would include four new support railroad tracks, three new working tracks, and the lengthening of two existing working tracks. This expansion would provide enough capacity for up to 21 locomotives to be staged onsite compared to the current capacity of four locomotives.

Contra Costa County, Bay Point Waterfront Strategic Plan EIR. *Deputy Project Manager.* Cory managed the Response to Comments/Final EIR for the proposed Bay Point Waterfront Strategic Plan EIR. The Redevelopment Agency proposes to revitalize the Bay Point waterfront area by developing a full-scale marina with related commercial/support uses, medium-density housing, interconnected open space and pedestrian walkways, and natural open space. The Strategic Plan would also require an amendment to the Contra Costa County General Plan to change both the urban limit line and the land use designations for some portions of the project site.

Contra Costa County, Phillips 66 Propane Recovery Project EIR. *Technical Analyst.* ESA prepared an EIR for a propane recovery project at Phillips 66's refinery in the community of Rodeo in Contra Costa County. The project would modify existing facilities in order to recover propane from refinery fuel gas. Propane would be stored in new storage vessels for transport via rail. A new rail loading rack and rail spurs also would be constructed as part of the project. Cory evaluated the project's potential impacts on public services and utilities, population and housing, and recreation.

City of Richmond, Chevron Refinery Renewal Project EIR. *Technical Analyst.* Cory assisted in the preparation of the Responses to Comments for the Final EIR. ESA prepared an EIR for the proposed renewal project at Chevron's refinery in the City of Richmond. Principal components of the project included replacing the hydrogen plant, reformer, and power plant; improving hydrogen purity; and replacing or upgrading other ancillary equipment.

JANNA SCOTT, JD

Program Manager – NEPA/CEQA Specialist

EDUCATION

J.D. Southern Methodist University School of Law

B.A. Southern Methodist University Cum laude

20 YEARS EXPERIENCE

PROFESSIONAL AFFILIATIONS

Member, American Bar Association: Endangered Species, Forest Resources and Marine Resources Committees of the Environment, Energy and Resources Section.

Member, State Bar of California: Environmental Law and Real Property Law Sections

Member, San Francisco Bar Association: Environmental Law Section

Janna brings a keen eye to the environmental review process, blending her legal expertise and project management skills to manage large-scale, complex renewable energy and natural resource projects; coordinate preparation of Environmental Impact Reports, Environmental Impact Statements, and other documents pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) to fulfill agency requirements and applicant needs accurately and promptly. Janna is an expert on CEQA and NEPA, and also is familiar with the right-of-way requirements of the Federal Land Policy and Management Act (FLPMA), Endangered Species Act (ESA), Surface Mining and Reclamation Act (SMARA), and climate change and agricultural land conversion issues, as well as preparing for, participating in, and avoiding land use and environmental litigation. As a practicing attorney with 10 years' experience, Janna honed her expertise in these areas and now applies her knowledge to serve federal, state, and local agencies; utilities (including utility service providers and developers of electric generating plants, transmission line extensions, and wireless telecommunications infrastructure), commercial and residential developers, and mining concerns.

Relevant Experience

City of Benicia, Valero Benicia Refinery, Crude by Rail Revised Draft EIR and Final EIR, Benicia, CA. *Project Manager*. Janna coordinated closely with the City and managed ESA's environmental resource experts to prepare a Revised Draft and Final EIR primarily to consider rail-travel related CEQA effects of transporting crude oil from North American points of origin to the State border, the Roseville Rail Yard, and on into the Refinery. Key issues related to the practical application of CEQA's requirements to identify potential significant project effects and mitigation measures that could, if implemented, reduce the severity of those effects below established thresholds in a federally preempted area (i.e., regulation of the railroads) as well as beyond the State border absent a NEPA component. The Final EIR was issued January 5, 2016.

California State Coastal Conservancy, Ballona Wetlands Restoration Project Environmental Impact Statement (EIS)/Environmental Impact Report (EIR), Los Angeles, California. *Project Manager*. Janna is managing ESA's resource experts and coordinating closely with a multi-agency project management team to prepare an EIS/EIR to evaluate beneficial and other effects of restoring wetlands and related ecological functions within the Ballona Reserve. The wetlands, now reduced to 577 acres, once occupied a 2,000-acre expanse of critical coastal habitat and included some of the most diverse wetland habitat types in the Los Angeles Basin due to the presence of both freshwater and saltwater environments. The California Department of Fish and Wildlife (CDFW),

which manages the Reserve, and Los Angeles County Department of Public Works (LACDPW), which operates and maintains the improved Ballona Creek channel and levees within the Reserve, are proposing a large-scale restoration that would restore, enhance, and establish native coastal wetland and upland habitats within the Reserve and require incidental work on adjacent properties, including the relocation of natural gas wells owned and operated by the Southern California Gas Company (SoCalGas). Key issues relate to hydrology and water quality, biological resources, cultural resources and restoration-period related traffic on area roads. Publication of the Draft EIS/EIR is expected in summer 2016.

California Public Utilities Commission, California American Water Company (CalAm), Monterey Peninsula Water Supply Project EIR/EIS, Monterey, CA. *Quality Assurance/Quality Control*. Janna is serving in NEPA coordination/project management support capacity for the transition of a published Draft EIR into a joint EIS/EIR for the proposed replacement of existing CalAm water supplies that have been constrained by legal decisions affecting diversions from the Carmel River and pumping from the Seaside Groundwater Basin. Primary project elements include a seawater intake system comprised of subsurface slant wells along the coast, a desalination plant, aquifer storage and recovery facilities, and over 20 miles of conveyance pipelines and associated infrastructure. The Draft EIR was published April 30, 2015. Publication of a joint EIR/EIS is expected in 2016.

Bureau of Land Management, San Bernardino County, Bechtel Development Company, Inc., Soda Mountain Solar Project PA/EIS/EIR, San Bernardino County, CA. *Project Director*. Janna coordinated closely with ESA's Project Manager, the NEPA and CEQA lead agencies, and the Applicant team to prepare a Plan Amendment (PA)/ EIS/ EIR under the Federal Land Policy Management Act (FLPMA), NEPA, and CEQA, respectively, for a 350-megawatt (MW) photovoltaic (PV) solar power plant and related infrastructure to be constructed, operated, maintained and decommissioned within an 4,179-acre right-of-way on BLM administered public lands. County approval of well permits also will be required. Key considerations relate to coordination with the National Park Service and other stakeholders, groundwater, site drainage, biological resources, and aesthetics. The Proposed PA, Final EIS/EIR was issued June 4, 2015.

First Solar, Inc., BLM Nevada Playa Solar Project Environmental Assessment and Decision Record, Clarke County, NV. *Project Manager*. Janna managed ESA's resource experts to develop (and complete within 6 months) a project-specific Environmental Assessment (EA) analyzing the impacts of developing an up-to 200 MW solar PV project on approximately 1,710 acres within Zones 2, 3, and 4 of the Dry Lake Solar Energy Zone (SEZ) as part of the BLM's streamlined permitting process under the Western Solar Plan and related programmatic EIS. Key environmental considerations for the EA included integration of the mitigation standards set forth in the Western Solar Plan and the April 2014 Regional Mitigation Strategy for the Dry Lake Solar Energy Zone, and coordination with BLM and two other applicant teams regarding the analysis of proposals to develop the remaining area within the Dry Lake SEZ. The Decision Record for the Playa Solar Project, signed May 27, 2015, was among the first project-specific approvals granted pursuant to the Western Solar Plan.

BARBARA TOOLE O'NEIL, Q.E.P.

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EDUCATION

M.S., Chemical Engineering, University of Akron
B.S., Chemistry, Carnegie Mellon University

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

- Registered, Qualified Environmental Professional (QEP)
- Certified Hazardous Materials Manager (CHMM), Master Level
- ANSI Assessor, ISO 14065 General Requirements for Greenhouse Gas Validation and Verification Bodies

RELEVANT COAL EXPERIENCE

2013-2014	Mine Methane Capture Work Group for California Air Resources Board
2013	Sustainability Accounting Standards Board Non-Renewables Work Group as a coal expert.
2010 -P	Coal sector expert for CDM Coal Mine Methane Capture methodology under CDM, projects were in China, India, Hungary, US and Canada.
2012	Assessor/validator/verifier VM001, Interception and Destruction of Fugitive Methane from Coal Bed Methane (CBM) Seeps, v1.0
2011	Assessor/validator/verifier, VMR0002, Revisions to ACM0008 to Include Methane Capture and Destruction from Abandoned Coal Mines, v1.0
2010	Coal resource assessment for the Czech Republic and Western Europe as part of a permit review for a repowering project in Bohemia. (Prunerov)
2008	Mercury in coal assessment for western US coal basins for a major utility. The purpose was to assess the current coal mercury concentration, the compliance potential of the current equipment and the future coal mercury concentration and compliance potential.
2006-7	Coal resource assessment as part of a permit for new coal-fired power generation in the western US.
2001-2005	At EPA, coal specialist for permit reviews and negotiations for new and existing power plants in the US.
2001-2006	Ohio Coal Development Office (OCDO), Ohio Air Quality Development Authority reviewed reports and proposals on a confidential basis.
1988-2001	At B&W and EPRI, global coal specialist with a focus on pre-and post- combustion options for improving operational and environmental performance. Program manager with USGS to develop the National Coal Quality Assessment, a national resource database. Program manager of many power-plant projects including projects in South Africa with a focus on fuels and fuel quality.
1987-1988	At B&W, lead engineer on an assessment to recover coal resources from coal waste ponds in northern, and central Appalachia and Illinois, lead engineer on assessment of coal cleaning processes for North American coal resources to improve boiler performance.

PROFESSIONAL AFFILIATIONS

- Board of Directors, Pittsburgh Coal Conference (1996-2001)
- Program Review Committee for University Research, Illinois Clean Coal Institute, Illinois Department of Planning (1993-2001)
- University Research Consortium, Ohio Coal Development Office, Ohio Department of

Development, Chair (1993-1996), 1992-1998

- Coal resource specialist to the National Forum on Environmental and Natural Resources R&D, Sponsored by the White House Office of Science and Technology Policy and Agencies of the Committee on Environment and Natural Resources, National Science and Technology Council in cooperation with National Academy of Science and National Academy of Engineering, cosponsored by the Carnegie Commission on Science, Technology and Government and American Academy for Advancement of Science, 1994

Selected Coal Publications

1. Mercury Concentration in Coal - Unraveling the Puzzle, B. Toole O'Neil, S.J. Tewalt, R.B.Finkelman, D.J. Akers, Fuel, 78, 1, p. 47-54, 1999.
2. A Comparison of Carbon Dioxide Emissions Estimation Methods for Use in GHG Inventories, B. Toole O'Neil, Electric Utilities Environmental Conference, Tucson, AZ, Jan 30, 2008
3. Western Bituminous Coal – that other Fuel, B. Toole O'Neil, J. Quik, 20th Symposium on Western Fuels – International Conference on Lignite, Brown and Sub-Bituminous Coals, Denver CO. Oct. 22-24, 2006
4. Mercury in U.S. Coal and the Clean Air Mercury Rule, B. Toole O'Neil, 8th International Conference on Mercury as a Global Pollutant, Madison WI, Aug. 7, 2006.
5. Pre-Combustion Management as Part of a Long Term Mercury Compliance Plan, Barbara Toole O'Neil, Air & Waste Management Association Annual Conference and Meeting, June, 2006.
6. Mercury in US Coal and the US EPA Clean Air Mercury, B. Toole O'Neil, J. Quick, D. Akers, *Oil, Gas and Energy Law Intelligence*, Vol. 3, Issue 3, October, 2005
7. Compliance Planning for Mercury Control – An Integrated Approach, D.J. O'Connor (EPRI), B. Toole O'Neil, Geological Society of America Annual Meeting, V. 37, No. 7, Oct. 16, 2005
8. Mercury in Coal - Pre-combustion Management Options for Emission Control, B. Toole O'Neil, Geological Society of America Annual Meeting, V. 37, No. 7, Oct. 16, 2005
9. The Potential of Pre-Combustion Management as Part of a Mercury Compliance Plan, B. Toole O'Neil, D.J. O'Connor, for Society of Mining Engineering Annual Meeting, March 2, 2005.
10. Coal as an Organic Rock, B. Toole O'Neil, EPRI TRI Technical Resource Guide, http://www .epri.com, 2000.
11. Status Report: Mercury in the Environment, J. Yager, B. Toole O'Neil, G. Offen, L. Levin, P. Chu, U.S. EPA Public Meeting on Utility Air Toxics Regulatory Determination, 2000.
12. The Cost and Effectiveness of Coal Cleaning for Control of Mercury Emissions, D.J. Akers**,** B. Toole O'Neil, *Proceedings: EPRI-DOE-EPA Combined Utility Air Pollutant Control Symposium*, EPRI TR-113187, 1999.
13. Mineral Forms of Trace Elements in Coal and Coal Ash - A Summary, B. Toole O'Neil, G.A. Watkins, R. Myhre, EPRI TRI Technical Resource Guide, http://www.epri.com, 1999.
14. Sampling and Analytical Methods - A Summary, R. Wetherold, D. Orr, B. Toole O'Neil, EPRI TRI Technical Resource Guide, http://www .epri.com, 1999.
15. Wet/Dry Coal Basis for EFH Method, R. Wetherold, B. Toole O'Neil, EPRI TRI Technical Resource Guide, http://www.epri.com, 1999.
16. A Comparison of Methods for Estimating Power Plant Trace Species Emissions, B. Toole O'Neil, E.S. Rubin, R. Wetherold, EPRI TRI Technical Resource Guide, http://www.epri.com, 1999.
17. "TVA Uses EPRI's PISCES Model to Estimate Toxics Release Inventory (TRI) Releases", B. Toole O'Neil, *EPRI Innovators*, EPRI IN-1 12086, 1999.
18. PISCES: Power Plant Chemical Assessment Model - Version 2.1, Volume 1-2, B. Toole

O'Neil, EPRI AP_107036r, 1998.

19. Assessment of Coal Cleaning for Trace Element Control, B. Toole O'Neil, EPRI TR-111852, 1998.
20. Precombustion Control of Trace Metals in Coal, J. Pirkey, B. Toole O'Neil, H. Brandon, ESEERCO EP 96-07, 1998. .
21. *Dry Scrubbing Technologies for Flue Gas Desulfurization,* B. Toole O'Neil, Ed., Kluwer Academic Publishers, 1998.
22. Coal Cleaning for HAPS Control: Cost and Performance, D.J. Akers, Z. Zitron, B. Toole O'Neil, Proceedings: 23rdTechnical Conference on Coal Utilization and Fuel Systems, 1998.
23. Engineering Guidelines for Pre-Combustion Control of Air Toxics, C.E. Raleigh, D.J. Akers, G.S. Janik, B. Toole O'Neil, Pittsburgh Coal Conference, 1998.
24. Trace Element Mineral Forms in Four Major U.S. Coal Basins: A TRI-Oriented Summary of DOE/USGS Tests. B. Toole O'Neil, D. Dunster, R. Myhre, EPRI TRI Technical Resource Guide, http://www.epri.com, 1998.
25. Trace Element Mineral Forms in Four Major U.S. Coal Basins - A Summary, B. Toole O'Neil, G.A. Watkins, EPRI TRI Technical Resource Guide, http://www.epri.com, 1998.
26. Barium Compounds - A Summary of the Petition To EPA Under EPCRA S. 313, B. Toole O'Neil, D. Choudhury, EPRI TRI Technical Resource Guide, http://www.epri.com, 1998.
27. Mineral Forms of Trace Elements in Coal and Coal Ash, B. Toole O'Neil, K. Finney, R. Myhre, EPRI TRI Technical Resource Guide, http://www.epri.com, 1998.
28. The Use of Coal Cleaning for Trace Element Removal, C.E. Raleigh, D.J. Akers, B. Toole O'Neil, *EPRI-DOE-EPA Combined Utility Air Pollutant Control Symposium*, EPRI TR-108683, 1997.
29. .PISCES: Power Plant Chemical Assessment Model - Version 2.0, Volume 1-2, B. Toole O'Neil, EPRI AP-107036, 1997.
30. The Feasibility of Coal and Oil Cleaning for Reduced Air Emissions, B. Toole O'Neil, C. E. Raleigh, D.J. Akers, H.B. Lange *EFRI-DOE-EPA Combined Utility Air Pollutant Control Symposium*, EPRI TR-108683, 1997.
31. Precombustion Control of Air Toxics, D.J Akers, C. Harrison, M. Nowak, B. Toole O'Neil, PowerGen, 1997.
32. Use of the PISCES Database: Power Plant Aqueous Stream Compositions, in *Clean Water: Factors that Influence its Availability Quality and its Use,* W. Chow Ed, Kluwer Academic Publishers, 1996.
33. Coal laboratory User's Guide: An Engineers Look at Laboratory Analyses, B. Toole O'Neil, EPRI TR-106239, 1996.
34. The EPRI PISCES Database: Summary of Fuels Information, R.G. Wetherold, D.A. Orr, J.M. Leonard, B. Toole O'Neil, Proceedings: EPRI-DOE International Hazardous and Particulate Air Pollutants, EPRI TR-105749,1995.
35. Precombustion Control Options for Air Toxics Removal, D.J. Akers, B. Toole O'Neil, Proceedings: The Economic & Environmental Aspects of Coal Utilization VI, 1995.
36. PISCES: Results from Field Sampling Programs, P. Chu, B. Toole O'Neil, EPRI Environmental Control Systems Update, 1995.
37. PISCES: Power Plant Chemical Assessment Model - Version 1.0, Volume 1-2, B. Toole O'Neil, EPRI AP-103930, 1995. .
38. Coal Cleaning: A Pre-Combustion Air Toxics Control Option, D.J. Akers, R.L. Dospoy, C.E. Raleigh, B. Toole O'Neil, *American Chemical Society*, 39, 2 p. 524, 1994.
39. Pre-Combustion Control Options for Air Toxics, B. Toole O'Neil, D.J. Akers, Engineering Foundation Conference, 1994.
40. Coal Cleaning: An Effective Method of Trace Element Removal, C. Raleigh, D. Akers, B. Toole O'Neil, Proceedings: *11th Pittsburgh Coal Conference*, 1994.
41. Trace Element Reduction Through Coal Cleaning, D.J. Akers, B. Toole O'Neil, EPRI Fuel Supply Seminar, 1993.

JOHN F. PEIRSON, JR.

Mr. Peirson is a Principal of MRS. Before joining MRS, he was a Director in Arthur D. Little's Environmental Health & Safety Practice and manager of their Santa Barbara and Ventura, California, offices. For more than 30 years, Mr. Peirson has been extensively involved in preparing CEQA documents for various state and local agencies and in preparing safety and risk assessments for oil and gas operations.

Mr. Peirson has been involved CEQA permitting activities since 1983. He has participated in the preparation and CEQA permitting of over 60 major projects within California. Most of these projects have been related to oil and gas development activities.

Mr. Peirson has provided more than 700 hours of testimony to local and state decision makers which have included Planning Commissions, Boards of Supervisors, the State Lands Commission and the California Coastal Commission. He also has extensive experience in working with local and state government staff in developing permit conditions and findings associated with development projects.

For the past 20 years, Mr. Peirson also has been involve in conducting environmental, health and safety studies for refineries and other oil and gas facilities. He has conducted safety audits at a number of refineries in California.

Mr. Peirson received his B.A. (1978) in Mathematics from Hartwick College with a minor in chemistry. He also completed advanced studies in Chemical Engineering from Columbia University (1979).

PROFESSIONAL EXPERIENCE

The professional experience section covers three major topics. The first is CEQA related assignments, and the second is refinery experience, and the third is safety and risk projects.

CEQA Projects

- Mr. Peirson is currently the project manager for the Phillips 66 Rail Spur Project Environmental Impact Report (EIR) that is being prepared for the County of San Luis Obispo. This project is proposed crude by rail project that would deliver up to five trains per week of North American crude to the Phillips 66 Santa Maria Refinery. This project involves the evaluation of the impacts at both the Santa Maria Refinery as well as long the mainline rail routes. Mr. Peirson has been responsible for overseeing the development of the EIR as well as one of the principal investigators for the hazards and hazardous materials section of the EIR. This included the development of a quantitative risk assessment (QRA) for the rail operations at the refinery as well as long the mainline rail routes.

- Mr. Peirson was the project manager for the Chevron Tank Farm EIR. This was a joint project between San Luis Obispo County and City and involves the remediation and future

development of the Chevron Tank Farm property located just north of the San Luis Obispo Regional Airport. Mr. Peirson oversaw a team of CEQA experts in the development of the EIR. The project has involved working closely with various responsible agencies (RWQCB, County Environmental Health, SLOAPCD, CDFW, USFWS) to define the extent of the remediation and the possible types of developments that could occur at the site. One of the key challenges of this project has been the development of possible land use that could occur at the site for the proposed zoning. Mr. Peirson worked with the Applicant and the City and County to develop a wide range of possible land uses that would be consistent with the County General Plan, the City Airport Area Specific Plan, and the Airport Land Use Plan.

- Mr. Peirson is currently the project manager for the Guadalupe Oil Field Remediation Environmental Monitoring Project. He has been managing this ongoing project since 1998. Mr. Peirson oversees a team of biologists and engineers who have developed strong working relationships with the field personnel at the Guadalupe site, as well as with the regulatory staff who are responsible for overseeing the remediation and abandonment activities. Mr. Peirson stays in close contact with staff from the California Coastal Commission, Regional Water Quality Control Board, San Luis Obispo County Air Pollution Control District, California Department of Fish and Game, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers.

- Mr. Peirson was project manager for the Guadalupe Oil Field Remediation and Abandonment EIR. This EIR evaluated environmental impacts associated with the remediation and abandonment of the Guadalupe Oil Field by Unocal. This highly environmentally sensitive site covers approximately 3,000 acres within the Guadalupe-Nipomo Dunes system. This highly complex project assessed a number of remediation technologies and assessed their impacts and effectiveness on various spill locations with diverse characteristics. The project, which lasted over two years, involved extensive onshore and offshore field work. The project also included a six-month remedial investigation of the extent of the contamination. The site contains more than 90 petroleum plumes. The project involved over 100 staff members working in 18 different environmental issue areas.

- Mr. Peirson was the project manager for the Diablo Canyon Independent Spent Fuel Storage Facility EIR, which was prepared for San Luis Obispo County. This very controversial project involved the evaluation of the impacts associated with the long-term storage of nuclear waste at the Diablo Canyon site. This was the first EIR prepared in California for a nuclear facility. The major areas of concern in the EIR were air quality, public health, risk of upset and terrorism.

- Mr. Peirson was the permitting manager for Cook Hill Properties who was proposing the development of 1,200 homes and commercial development on a 480 oil field site. Mr. Peirson was responsible for overseeing the development of all of the EIR technical reports. This has involved working closely with various Federal, State and local agencies. The project focused on the development of a Specific Plan that would included ongoing oil

development, housing, commercial development, as well as a habitat conservation area for the protection of the California Gnatcatcher, which is a Federally listed species. The Specific Plan has focused on a number of possible development scenarios for the property.

- Mr. Peirson was project manager for the County of Los Angeles covering the development of a Community Standards District (CSD) for the Baldwin Hills Oil Field. The project involved the evaluation of a hypothetical development scenario to determine the level of impacts and associated mitigation measures. The mitigation measures were then used to develop a CSD, which has served to regulate ongoing development within the Boundaries of the CSD. Mr. Peirson was responsible for managing the preparation of the EIR and for drafting the CSD provisions. This project required working closely with the landowners, and concerned citizens in the preparation of the EIR and the CSD.

- Mr. Peirson was project manager for the City of Carpinteria's Consolidation of Pitas Point and Carpinteria Gas Odorant Station EIR. This project would consolidate two existing facilities by dismantling and removing the odorant equipment at the Carpinteria Odorant Station, constructing a new natural gas pipeline, and installing new equipment at the Pitas Point Odorant Station. Although the project would result in reduced public health and safety impacts, reduced air emissions, and upgraded equipment, it generated significant public controversy due to the proximity of residential and public use areas.

- Mr. Peirson was project manager for Santa Barbara County's Tranquillon Ridge Oil and Gas Development Project, LOGP Produced Water Treatment System Project, and Sisquoc Pipeline Bi-Directional Flow Project EIR. This complicated EIR assessed the environmental impacts associated with three different but interrelated projects proposed by three applicants. The proposed Tranquillon Ridge Project would involve the development of oil and gas wells in a proposed State Tidelands Lease from Platform Irene, which is in Federal Waters and is currently used to develop and produce the Point Pedernales Field. This EIR involved a wide range of alternatives for oil development, pipeline replacement, processing facility location, and drill mud/cuttings disposal.

- Mr. Peirson was the project manager of the City of Carpinteria's Paredon Project EIR. This project involved the construction and operation of an oil and gas development project in close proximity to local neighborhoods and the California coast. Major issues of concern were noise, air quality, hazards and aesthetics. For the hazards portion of the EIR a QRA was developed to estimate the risk to local populations for the proposed development. This project involved close cooperation with the State Lands Commission and the California Coastal Commission, as well as the local neighbors who would be affected by the proposed project.

- Mr. Peirson was the project manager of the Molino Gas Development Project EIR. This project was the first project approved for the development of offshore reserves using an onshore drilling location. The project involved assessing the environmental impacts of the development, and the development of new land use and coastal development policies covering onshore development of offshore oil and gas reserves.

- Mr. Peirson was a project manager for the Chevron Point Arguello Field EIR/EIS which evaluated the environmental impacts of three offshore oil and gas platforms, oil and gas pipelines, and a large oil and gas processing facility.

- Mr. Peirson was the program manager for the Chevron Point Arguello Field Q-6 Supplemental EIR, which addressed the transportation of oil by tanker from the Gaviota Interim Marine Terminal. As part of this Supplemental EIR, he helped develop an air quality impact analysis for various tanker routes as well as for most of the alternatives covered in the Gaviota Marine Terminal Supplemental EIR/EIS. Mr. Peirson was also responsible for the preparation of the alternatives description and screening analysis done as part of the Q-6 Supplemental EIR. Mr. Peirson was the project manager for the Unocal Point Pedernales Field Development EIR/EIS, which included two offshore platforms, oil and gas pipelines, and an onshore oil and gas processing facility.

- In addition, Mr. Peirson was the Project Manager for the Unocal Point Pedernales Supplemental EIR prepared for Santa Barbara County. This document addressed the impact associated with the construction of a new gas plant near Lompoc, as well as the effect that the closing of the Battles Gas Plant would have on other gas producers within Northern Santa Barbara County and Southern San Luis Obispo County. This study required existing oil and gas facilities in the study area to be evaluated, which include all of the existing Unocal facilities. This document presented one of the most comprehensive insights into oil and gas development activities within Northern Santa Barbara County.

- Mr. Peirson was Project Manager of the Exxon SYU Supplemental EIR, the Exxon Lompoc Pipeline Supplemental EIR, the Pacific Pipeline EIR, and numerous other EIRs covering housing developments and modifications to existing facilities. Mr. Peirson was also the Director in Charge of Arthur D. Little's ongoing contract with the SCAQMD to provide CEQA support.

- Mr. Peirson was program manager for the preparation of the Crude Oil Transportation Analysis (COTA). This study was done for Santa Barbara County, and addressed the economic, technical, and environmental issues associated with various crude oil transportation alternatives including rail transport.

Refinery Projects

- For a two Southern California refineries, Mr. Peirson was the audit team leader for an environmental, health and safety (EHS) audit. The audit covered all Federal State and local regulations that were applicable to the refinery. Mr. Peirson was responsible for overseeing the entire audit, which include a team of 20 personnel. Mr. Peirson was personally responsible for conducting the process safety management (PSM) portion of the audit. The result of the audit was a set of recommendations for assuring compliance with applicable regulations.

- For the Chevron Richmond Refinery, Mr. Peirson managed a safety culture assessment of the refinery operations. This work was done at the request of the City of Richmond. As part of this project, Mr. Peirson conducted safety audit and reviewed the operating procedures of various operating units at the refinery. The project also involved extensive interview with operators, maintenance workers, and refinery management. The result of this assignment was an assessment of the safety culture at the refinery and a set of recommendations for improvement.

- For Contra Costa County Mr. Peirson managed a safety audit of the Golden Eagle Refinery. The focus of the audit was on compliance with Process Safety Management (PSM) requirements and the Contra Costa County Industrial Safety Ordinance. This audit looked at all of the operating units at the Refinery. The results of the audit were a set of recommendations for improving safety and the safety culture at the Refinery. The report was accepted by the County and the operator, and Mr. Peirson was responsible for monitoring process on implementing the report's recommendations.

- For the City of Benicia, Mr. Peirson conducted a safety audit of the Benicia Refinery. The audit cover PSM regulations were well as safety culture. The majority of the operating units at the refinery were evaluated. The results of the audit were a set of recommendations for improving safety and the safety culture at the refinery. The report was accepted by the County and the operator, and Mr. Peirson was responsible for monitoring process on implementing the report's recommendations.

- As part of the Oil Transportation Plan (OTP) prepared for the County of Santa Barbara, Mr. Peirson was responsible for developing the refinery portion of the analysis. This study looked at the economic impacts process OCS crude could have on various refineries in both Southern and Northern California. Mr. Peirson worked with the refineries to develop operating data that could be used in computer models to estimate the economic impacts of processing OCS crude.

Safety and Risk Assessments

- Mr. Peirson was one of the principal investigators in conducting a risk analysis on the alkylation unit at a Los Angeles refinery. This study was requested by the LA Refinery to investigate the relative degree of risk associated with alkylation processes involving hydrogen fluoride (HF) and sulfuric acid (H_2SO_4) catalysts. The study provided the Refinery with a comparative summary of the two alkylation processes based on the risk attributable to accidental releases from the processes. The study included operation, re-generation, and transportation of HF and sulfuric acid utilizing risk analysis techniques. The project involved developing frequency analysis, demographics, and process specific release scenarios.

- MR. Peirson was one of the team members that conducted Process Hazards Analysis on the North Slope of Alaska for a wide range of oil and gas facilities including well pads, gathering centers, utilities and gas and oil production facilities. The work involved leading

Hazard and Operability Studies (HAZOPs) and developing an Occupational Safety & Health Administration (OSHA) compliant Process Hazard Analysis (PHA) reports and hazard analysis approach.

- For a U.S. refinery, Mr. Peirson worked with a team to perform a critical task analyses on operating and maintenance procedures. The project involved the development of a standard format to document procedures by task, responsibility, deviations, consequences, and precautions required to perform the task safely. Procedures were analyzed and documented in a tabular form to facilitate training and to provide a convenient reference.

- Under contract to the County of Santa Barbara, California, Mr. Peirson lead a team of consultants that conducted a detailed risk assessment of the proposed Chevron development in the Santa Barbara Channel. The project consisted of three oil production platforms in 600 to 800 feet of water, gathering lines, subsea main oil and gas pipelines, shoreside upgrading of the very sour crude at the nearby Gaviota, California processing facility, onshore pipelines and tanker loading facilities. Impacts of particular concern to this study included public risks and risk of oil pollution.

- For the County of Santa Barbara Fire Department, Mr. Peirson worked with other staff to conduct a detailed QRA of an offshore oil and gas production platform and an onshore oil and gas processing facility. The project included a complete HAZOP of the facilities and a detailed review of the safety management systems including mechanical integrity. The results of these studies were then used to develop a detailed risk assessment of the operations to determine the level of public risk. Mitigation measures were developed that allowed the level of public risk from the facility to be reduce to acceptable levels. All of the mitigation measures were adopted by the operator of the facility.

- Mr. Peirson was project manager for a project to assess the level of public risk associated the transportation of liquefied petroleum gases (LPG) and natural gas liquids (NGL) via tanker truck along various routes within California. The project involved the development of truck specific accident and release rates, estimated spill volumes and associated hazard zones. This data was all used in a QRA to estimate the overall public risk associated with transporting LPG and NGL along various highway routes. Mitigation measures were developed that allowed the level of public risk along various routes to be reduced to acceptable levels.