Supplemental Testimony for the Application for Certification for the San Francisco Electric Reliability Project 04-AFC-1

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Site Contamination: Soil and Water/Waste Management

I. Introduction

A. Names: Susan M. Gallardo, Robert H. Cheung, and Lester Feldman of Geomatrix Consultants, Inc.

B. Qualifications: Ms. Gallardo's, Mr. Cheung's, and Mr. Feldman's declarations and qualifications are attached as Appendixes A and B.

II. Testimony

INTRODUCTION

Geomatrix Consultants, Inc. (Geomatrix), has been retained by the City and County of San Francisco (the City or the Applicant) to provide technical support to address testimony by the California Energy Commission's (CEC) staff regarding contamination at the San Francisco Electric Reliability Project (SFERP) site. This testimony sets forth the City's position on the appropriate regulatory framework and process to address soil and groundwater contamination identified at the SFERP site in a manner that is consistent with state law and that incorporates the development of documents set forth in draft conditions of certification proposed by CEC staff.

Numerous environmental investigations have been conducted at the SFERP site; a summary of these investigations is presented herein. Since the City acquired the property, these investigations were undertaken under the supervision of the San Francisco Bay Regional Water Quality Control Board (Water Board) pursuant to Health and Safety Code sections 25260-25268 (AB 2061). AB 2061 establishes a regulatory framework whereby property owners can have an appropriate regulatory agency designated as the administering agency with jurisdiction to oversee the process to address on-site contamination and ensure compliance with applicable state and local laws. The Water Board is the designated administering agency for the Western Pacific Property, which includes the SFERP site.

The investigations undertaken to date, including the most recent sampling undertaken in accordance with draft Condition of Certification Waste 6, suggest that chemicals present in soil and groundwater beneath the SFERP site are similar to the chemicals and concentrations reported at other neighboring properties. The data collected provide a basis to conclude that there are remedial and/or risk management measures available to reduce the risks from potential exposures to less than significant levels.

The next steps are to identify and implement the specific remedial and/or remedial risk management measures that should be applied to the site through the appropriate regulatory process. On behalf of the City, Geomatrix proposes a process to undertake these next steps that is consistent with AB 2061 and that incorporates the substantive recommendations included in the CEC staff's proposed Conditions of Certification.

SITE BACKGROUND

The SFERP site is located near San Francisco Bay in the Potrero district of San Francisco in an area reclaimed by the placement of fill material in the Islais Creek Estuary. The site is situated on a 4-acre parcel of City-owned land that is surrounded by industrial development. The site is zoned for industrial use and formerly was occupied by the Western Pacific Railroad (WPRR) yard. The site is located directly east of the San Francisco Municipal Railway (MUNI) Metro East Light Rail Vehicle Maintenance and Operations Facility and directly west of a parcel of land owned by the Port of San Francisco (the Port). These three parcels collectively are referred to herein as the Western Pacific Property.

The Western Pacific Property formerly was operated as a switchyard for rail cars brought across the bay on a ferry from Oakland. According to the Final Risk Management Plan and Site Management Plan prepared in 2000 by AGS, Inc. (AGS), major maintenance was not performed at the facility; however, a railroad engine house and a repair track building were present on site.[1] Major maintenance likely was conducted at facilities in Oakland and Stockton, California. Most of the rail cars at the site contained dry goods. Refueling operations for the train engines occurred at the yard, but not at the location of the proposed SFERP site (id.). No major spills from tank cars used at the site were known to have occurred.[2] Railroad operations at the site were reduced considerably in about 1975. No major operations have been conducted at the site since the 1970s. The site predominantly has been vacant or used for warehousing since most of the tracks and ties were removed in 1985 and 1986.[3]

The plant site has been cleared of all permanent structures. There are some temporary facilities on the property, including construction trailers, a construction laydown area, and a cement batch plant. The temporary facilities will be removed prior to the construction of the SFERP.[4]

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[1] AGS, Inc., 2000. Final Risk Management Plan and Site Management Plan, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility, San Francisco Municipal Railway, February.

[2] Dames & Moore, 1987. Site Characterization/Risk Assessment, 25th and Illinois Streets, San Francisco, California.

[3] AGS, Inc., 2000. Final Risk Management Plan and Site Management Plan.

[4] CH2MHill, 2005. Section 2, Application for Certification for San Francisco Electric Reliability Project, Supplemental A, Volume 1, May.

LOCAL GEOLOGY

The site is a reclaimed area of the Bay underlain by fill, the majority of which was placed at the property between 1930 and 1955.[5] The source of the fill material is unknown. Similar to adjacent and other nearby properties, the fill is composed of a mixture of crushed serpentinite bedrock, building debris (concrete, bricks, rubble, and rocks), sand, silty sand, and silt typical of fill material in the San Francisco Bay Area. Groundwater beneath the site was encountered in summer 2005 at a depth of approximately 11 feet below ground surface (bgs). Groundwater flow generally is northeastward toward the Bay, although likely is tidally influenced and, as such, could be variable.[6]

REGULATORY OVERSIGHT

Regulatory oversight of investigation and remediation of sites affected by hazardous materials releases is provided by state agencies such as the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC), regional agencies such as the Regional Water Quality Control Board, San Francisco Bay (Water Board), or local agencies such as the San Francisco Department of Public Health (SFDPH).

In 1998, pursuant to Health and Safety Code sections 25260-25268 ("AB 2061"), the City (through the Port and MUNI) requested that the state Site Designation Committee within Cal-EPA designate an administering agency to oversee site investigation and remedial action at the Western Pacific Property, which includes the SFERP site. After a public hearing, the Site Designation Committee determined that the Water Board was the appropriate agency to act as the administering agency (see Appendix C).

AB 2061 provides that the administering agency shall supervise all aspects of site investigation and remedial action, including those required by state or local laws, ordinances, or regulations, and shall have sole jurisdiction over all activities that may be required to carry out such actions (Health & Safety Code §25264(a)). This includes determining the adequacy of site investigation and remedial actions (id). Once an administering agency determines that a site investigation and remedial action is complete, the administering agency shall issue a certificate of completion (Health & Safety Code §25264(b)). The issuance of a certificate of completion shall constitute a final determination that the responsible party has complied with the requirements of all state and local laws, ordinances, regulations, and standards that are applicable to the site investigation and remedial action for which the certificate is issued (Health & Safety Code §25264(c)). Such certificate of completion prevents the administering agency and any other agency from taking action against the responsible party with respect to the hazardous material release

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[5] AGS, Inc., 2000. Final Risk Management Plan and Site Management Plan, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility, San Francisco Municipal Railway, February.

[6] CH2MHill, 2006. Draft Field Sampling Plan, SFERP Project, February.

that was the subject of the site investigation and remedial action, unless certain specific conditions are met as determined by the administering agency (Health & Safety Code §25264(c)).

Since January 1999, the Water Board has overseen investigation and remedial design for on-site hazardous materials releases on the Western Pacific Property and, under the proposed conditions of certification, will continue to oversee hazardous materials issues associated with the SFERP site.

Water Board procedures and standards for site investigation and remediation are promulgated in State Water Resources Control Board Resolution 92-49, *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304*. Responsible parties conduct work in a stepwise manner, beginning with preliminary assessment and followed by intrusive sampling (such as soil, groundwater, and soil vapor investigations), interim remedial measures (if warranted), and a human health and screening-level ecological risk assessment (or a site-specific risk assessment, if warranted). If the results of the risk assessment indicate that there may be a potential incremental risk to human health or the environment, soil and groundwater cleanup standards are established in a Site Cleanup Plan, which also proposes the remedial design and implementation plans to achieve the necessary cleanup (equivalent to a Removal Action Work Plan [RAW], an analysis and evaluation mechanism used by the DTSC). Based on the results of the risk assessment, an Risk Management Plan (RMP) may be required to address potential impacts to construction workers and off-site receptors prior to and during site development. Long-term management control measures are specified in a Site Management Plan (SMP) and recorded in an Environmental Restriction. These documents are discussed further below.

With respect to cleanup levels, Resolution 92-49 requires that the regional water boards ensure that polluted waters are restored to background water quality. Alternatively, if it is not reasonable to restore background water quality, an alternative level of cleanup can be proposed that complies with Title 23, California Code of Regulations (CCR) Section 2550.4, which may include attainment of the lowest concentrations that are economically and technologically feasible. The alternative cleanup concentrations must (1) be consistent with the maximum benefit to the people of the state, (2) not unreasonably affect present and anticipated beneficial use of impacted water, and (3) meet the requirements of plans and policies of the state and regional water boards, including water quality objectives listed in the Water Board's Water Quality Control Plan. Resolution 92-49 also requires that, where waste in soil discharges or threatens to discharge to Waters of the State, the cleanup level for soil must be restored to background levels or alternative cleanup levels that attain the lowest concentrations that are economically and technologically feasible. The cleanup level must be selected to ensure that any remaining waste continuing to discharge to water will not exceed the applicable water quality objectives for the groundwater.

In addition to the requirements of Resolution 92-49, all soil-disturbing activities at the site must comply with Article 22A (Analyzing the Soil for Hazardous Waste; the Maher Ordinance) of the San Francisco Public Health Code. The major requirements of Article 22A as applicable here include:

- Preparation of a site history report to describe past site uses.
- Sampling of soils to be disturbed to evaluate the potential presence of hazardous wastes in the soil.
- Preparation of a soil analysis report that evaluates the results of chemical analysis of the soil samples.
- Preparation of a site mitigation report, if hazardous waste is identified, assessing potential significant environmental and health and safety risks, recommending measures to mitigate the risks, identifying appropriate waste disposal and handling requirements, and presenting criteria for on-site reuse of soil.
- Preparation of a certification report stating that either (1) no hazardous wastes present in the soil present an unacceptable risk and no mitigation measures are required; or (2) all mitigation measures recommended in the site mitigation report have been completed and completion of the mitigation measures has been verified through follow-up soil sampling and analysis, if required.

SUMMARY OF PRIOR ENVIRONMENTAL INVESTIGATIONS AND SITE MANAGEMENT REQUIREMENTS

Prior to the City's acquisition of the site, environmental investigations were conducted at the site and adjacent properties. In 1987 and 1989, Dames & Moore collected soil and groundwater samples for chemical analysis at the site and at adjoining parcels west and east of the site.[7] Groundwater and soil samples were analyzed for metals, volatile and extractable petroleum hydrocarbons, organic pesticides, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs, including polynuclear aromatic hydrocarbons [PAHs]). The primary chemicals of concern detected at the Western Pacific Property included total petroleum hydrocarbons (TPH), PAHs, and certain metals.[8]

Following acquisition of the site by the City and the designation of the Water Board as the administering agency and in support of compliance with San Francisco Health Code Article 22A (Article 22A), investigations of site soil and groundwater were conducted in 1999 by AGS at the location of the proposed MUNI Maintenance and Operations Center, located

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[7] Dames and Moore, 1987, Site Characterization/Risk Assessment, 25th and Illinois Streets, San Francisco, California.

[8] Geomatrix Consultants, Inc., 2000. Human Health and Ecological Risk Assessment, Former Western Pacific Property – Port Site, September.

immediately west of the proposed SFERP site. Groundwater samples were collected by AGS from monitoring wells within the Western Pacific Property. The primary chemicals of concern identified in soil at the MUNI site included TPH quantified as diesel (TPHd), motor oil (TPHmo), and Bunker C-oil (TPHbunker), PAHs, and arsenic and lead. The primary chemicals of concern detected in groundwater were TPH, benzene, and naphthalene.

AGS conducted a risk assessment for the MUNI site using the soil and groundwater data collected during the environmental investigations. The results of the risk assessment indicated that chemicals underlying the MUNI site do not pose a significant risk to on- or off-site receptors and, therefore, "no active soil and groundwater remediation is required with the exception of capping the MUNI site with concrete, asphalt, or 2-foot of clean soil, and implementing risk management practices." Because conservative estimates of risk to future construction workers slightly exceeded the acceptable target risk levels, risk management practices were recommended to address health and safety issues associated with proposed construction work. The risk management practices were implemented in the use of a RMP/SMP.[9]

On behalf of the Port, Geomatrix prepared a human health and ecological risk screening evaluation for the SFERP site and the adjacent property east of the site based on data collected by Dames & Moore and AGS.[10] Based on the results of the risk assessment, Geomatrix concluded that the potential health risks were at or below the acceptable levels and that no remedial actions were warranted if the parcels were developed for high-density housing, commercial, light industrial, or recreational uses (id.). The Water Board approved the risk assessment in 2000.

The SFERP site is subject to a Covenant and Environmental Restriction on Property pursuant to Cal. Civil Code section 1471 ("Environmental Restriction"). The Environmental Restriction is a covenant enforceable by the Water Board which runs with the land and restricts certain uses. The neighboring MUNI site is also subject to an Environmental Restriction, which includes as a condition compliance with the RMP/SMP. The Environmental Restriction and RMP/SMP consist of the elements listed below:

- Restriction of land use to industrial activities and restriction of groundwater use.
- Risk management practices prior to redevelopment: implementation of risk management controls (e.g., site security).
- Risk management practices during redevelopment: implementation of a site-specific health and safety plan for construction workers, construction of impact-

[9] AGS, Inc., 2000. Final Risk Management Plan and Site Management Plan, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility, San Francisco Municipal Railway, February.

[10] Geomatrix Consultants, Inc., 2000. Human Health and Ecological Risk Assessment, Former Western Pacific Property – Port Site, September.

mitigating measures, dust control measures, and minimization of groundwater contact.

- Risk management practices after redevelopment: (1) paving of site or addition of 2 feet of clean fill, (2) restriction of groundwater use, (3) development of management protocols for future subsurface development, (4) long-term maintenance and compliance, and (5) agency notification in the event of a change in property use.

In June 2002, pursuant to AB 2061, the City submitted a request to the Water Board for a closure certification based on the fact that it had concluded the site investigation and remedial action required by the Water Board, including recordation of the appropriate Environmental Restrictions. The Water Board has not yet issued a certificate of closure.

In early 2005, the City, acting through its Department of Public Works, advised the Water Board that that it wished to extend the MUNI RMP/SMP to the SFERP site. In June 2005, the Water Board agreed that this would be appropriate and the City has acted accordingly. The City also sought the Water Board's approval to record the MUNI Environmental Restriction containing the RMP/SMP on the SFERP site in order to formalize this arrangement. The Water Board has advised that, due to limited resources, it prefers to delay recordation until a final site-specific RMP/SMP is developed for the SFERP site, as described in more detail below. The revised RMP/SMP or other appropriate conditions would be included in an Environmental Restriction tailored to the SFERP site. Until a site-specific revised RMP/SMP is prepared, the City will continue to comply with the existing MUNI RMP/SMP.

Also in summer of 2005, Geotechnical Consultants, Inc. (GTC), conducted a geotechnical investigation in July and August, to support the design of the power plant. Fifteen soil borings that ranged in depth from 30 to 150 feet were obtained throughout the site. Because borings were being advanced for the collection of geotechnical samples, environmental soil samples also were collected from the top 10 feet for chemical analysis from eight of the 15 borings to assess the presence and concentrations of potential contaminants that may pose a risk to future workers. Samples were analyzed for the primary chemicals of concern, asbestos and pH. The results of this investigation are consistent with those of earlier investigations in that they indicate that TPH, PAHs, and certain metals are present at elevated concentrations in soil.

In accordance with CEC staff-proposed Condition of Certification Waste-6, and consistent with a Field Sampling Plan approved by the Water Board, a targeted sampling and analytical program was conducted in February 2006 to collect additional data to further characterize soil and groundwater conditions at the site. Sixteen borings were advanced at the site for the collection of soil, soil vapor, and grab groundwater samples. In addition to the primary chemicals of concern, soil and groundwater samples were analyzed for TPH

quantified as gasoline (TPHg), PCBs, and chlorinated herbicides. Soil vapor samples were analyzed for VOCs using U.S. Environmental Protection Agency (U.S. EPA) Method TO-14.

The results of the February 2006 investigation indicate that TPH is present in soil and groundwater. TPHd, TPHbunker, and TPHmo were detected in several soil and groundwater samples collected across the site. TPHg was detected in a small number of soil and groundwater samples. Low concentrations of VOCs in soil, soil gas, and groundwater generally were detected in samples collected from borings located in the southern part of the site. PAHs were detected in soil and groundwater samples collected across the site, but only appear to be at elevated concentrations near the central portion of the site. No chlorinated herbicides were detected in samples collected from the site. PCBs were detected in soil at concentrations below 3 milligrams per kilogram (mg/kg); PCBs were not detected in groundwater at or above the laboratory reporting limits. Arsenic was detected in soil at concentrations as high as 44 mg/kg across the site. Metals were detected in a few groundwater samples. Asbestos was detected at concentrations up to 3 percent in samples collected from a boring advanced in the central portion of the site in which serpentinite was observed during drilling.

The February 2006 results are consistent with those of previous investigations in that they indicate that petroleum hydrocarbons, certain metals, and PAHs are the primary constituents present in soil and groundwater at the site. These constituents commonly underlie neighboring properties along the southeastern waterfront. Thus, the source of these chemicals likely can be attributed to fill material or possibly, historical railroad operations.

REGULATORY PROCESS FOR THE SFERP SITE GOING FORWARD

Given its designation as administering agency under AB 2061, it is the responsibility of the Water Board to coordinate and incorporate input, policies, guidelines, and requirements from other local and regional environmental agencies, as applicable, with regard to addressing contamination on the SFERP site. The City is proposing Conditions of Certification that are consistent with this responsibility and that incorporate all of the substantive requirements of Conditions of Certification proposed by CEC staff. Consistent with AB 2061, the process provides that the Water Board will actively consult with the SFDPH to ensure that the Article 22A requirements are addressed in the evaluation and mitigation of soil and groundwater contamination at the project site. In addition, the process provides for CEC verification that the requirements of its Conditions of Certification have been implemented in a manner that is satisfactory to the Water Board and SFDPH. The process is similar to the approach taken by the agencies on adjacent properties, including Mission Bay, where the Water Board is the administering agency under AB 2061.

The Conditions of Certification, as proposed in the Final Site Assessment (FSA) and subsequent staff testimony, request compliance with various regulatory requirements and programs that are administered by multiple agencies. The overall goal of the requirements is to identify, evaluate, and mitigate soil and groundwater contamination at the site in a manner that is protective of human health and the environment. The City is proposing a streamlined approach that has been used at other Water Board sites which meets the overall goal stated above and which ensures mitigation of significant impacts during and after construction. Consistent with the Conditions of Certification proposed by staff, the Conditions of Certification proposed by the City require preparation of the following documents:

Human Health Risk Assessment (HHRA) – The HHRA will involve evaluation of the potential site-specific human health risk associated with exposure to chemicals of concern. The HHRA also will include evaluation of the potential risks to construction workers and off-site receptors and will be consistent with Water Board, DTSC, and U.S. EPA guidelines. The HHRA will identify the media and chemicals at the site that require further risk reduction efforts to limit unacceptable exposures at the site.

Screening-Level Ecological Risk Assessment (ERA) – The screening-level ERA will be conducted by comparing site-specific groundwater concentrations to appropriate Water Board ESLs.[11]

Site Cleanup Plan (SCP) – The SCP will present site-specific cleanup goals and remedial alternatives considered and selected to address the incremental human health and ecological risks identified in the HHRA and screening-level ERA to a less than significant level. The SCP, which is equivalent to a RAW, will be developed in compliance with Water Board requirements and Article 22A and will detail the program and schedule to implement the selected remedies. Either a waiver or a "no further action" letter from the Water Board may be submitted instead of an SCP. The overall objective of the SCP is to outline a program for implementing remedial measures that are protective of human health and the environment for soil and groundwater while meeting the objectives of Resolution 92-49.

Revised Risk Management Plan (RRMP) - The RRMP will govern soil and groundwater handling procedures during construction, incorporate the requirements of Article 22A, and serve as a Site Mitigation Plan under Article 22A.

Site Management Plan (SMP) – The SMP, which will be developed based on the findings of the HHRA and ERA and will take into account the SCP, will govern the long-term management of environmental conditions at the site relative to potentially ongoing mitigation programs and procedures to be followed, should intrusive activities into

[11] Water Board, San Francisco Bay, 2005, Environmental Screening Levels, February.

subsurface soil and groundwater be required in the future. The SMP will be recorded in an Environmental Restriction.

Certification Report – The Certification Report will be prepared in accordance with Water Board requirements and Article 22A and will contain the results of verification sampling analysis, if required by the Water Board in consultation with SFDPH.

These plans will either reduce risks below or document that risks are already below the following levels: $1x10^{-6}$ for off-site receptors with a hazard index less than 1.0 and $1x10^{-5}$ for construction and operations workers with a hazard index of 1.0.

Although a site-specific human health and screening-level ecological risk assessment has not yet been prepared, chemical data collected at the site suggest that the primary chemicals of concern and the ranges of detected concentrations are similar to the chemicals and concentrations detected in soil and groundwater at the adjacent MUNI site.[12] Therefore, if the results of the site-specific risk assessment support the conclusion that the potential health risks and hazards at the SFERP site are similar to those estimated at the MUNI site, the MUNI RMP will be updated to include the SFERP site and/or include additional measures, as needed.

However, if the results of the site-specific human health and screening-level ecological risk assessment suggest that additional measures are necessary to reduce the risk levels to less than significant, remedial mitigation measures will be evaluated and selected in the SCP. The attainment of acceptable risk levels can be accomplished through the adoption of various measures, including those discussed in the CEC staff's report, and include removal actions, in situ treatment, engineering controls, and/or the use of risk management measures (e.g., revision of the MUNI RMP/SMP). The SCP will identify the measures to mitigate health impacts and ecological risks to less than significant levels, and to address environmental protection goals. Certain mitigation measures, including removal actions, may be conducted concurrent with construction, provided that adequate construction mitigation measures are in place.

Range of Mitigation Measures

As stated previously, the investigations undertaken to date demonstrate that the chemicals present in soil and groundwater beneath the SFERP site are similar to the chemicals and concentrations reported at other neighboring properties. The amount of data collected provides a basis to conclude that there are remedial and/or risk management measures available to reduce potential exposures to less than significant levels. A range of cleanup measures could be employed singly or in combination to address identified on-site risks. As suggested in the Supplemental Testimony, these measures could include, but are not limited to, excavation of small, isolated chemically-impacted areas, soil vapor extraction to mitigate

[12] Fugro West, 2005. SFERP Project, Statistical Analyses of Data, November.

chemicals in soil vapor, dual-phase extraction to remove separate-phase petroleum and impacted groundwater, and groundwater extraction to contain and remove chemically-impacted groundwater. In addition to the above-mentioned technologies, there are other available, effective, and commonly-applied technologies to address and mitigate the constituents of concern (TPH, PAHs, and metals) identified at the site, including natural or enhanced biodegradation and monitoring. A range of alternatives will be evaluated in the SCP in compliance with Resolution 92-49 for their relative applicability to site conditions, implementability, and economic feasibility.

Based on the current understanding of soil and groundwater conditions, it is likely that mitigation measures could include excavation of soil in localized, chemically-impacted areas, capping, and groundwater monitoring in support of natural attenuation. Although it is not anticipated at this time that active systems such as soil vapor, dual phase, or groundwater extraction will be necessary, the City will undertake the necessary actions for short- and long-term protection of human health and the environment in accordance with the requirements of the Water Board and the proposed Conditions of Certification.

ADDITIONAL INVESTIGATION RESULTS AND HEALTH RISK ASSESSMENT

In the Supplemental Testimony, analytical results for soil and groundwater samples collected from the site in February 2006 were compared to environmental screening levels (ESLs) published by the Water Board. ESLs are conservative, non-site-specific screening levels that the Water Board considers to be below thresholds of concern for risks to human health. Concentrations of compounds detected at or below corresponding ESLs generally can be assumed to not pose a significant threat to human health and the environment. As ESLs constitute *screening* levels, exceedance of the corresponding ESL does not necessarily indicate that adverse health effects will occur, but suggests that additional evaluation of the potential risks is warranted. Accordingly, it is important to note that, although some of the constituents detected in soil and groundwater at the site exceed their respective ESLs, a more refined site-specific evaluation is necessary to assess the potential significance of analytical results and develop site-specific mitigation measures.

The potential that petroleum products and/or industrial chemicals present in site soil or groundwater at concentrations above ESLs could pose a risk to human health or the environment during or following construction of the proposed power plant will be further assessed in a site-specific risk assessment. Following construction of the site, operations of the power plant are not expected to contribute to potential ecological impacts to the Bay.

As part of the site-specific risk assessment planned for the site, a site conceptual model (SCM) will be developed based on the future land use. The SCM identifies potential chemical sources, release mechanisms, transport media, routes of chemical migration through the environment, exposure media, and future receptors.

Exposure may occur when chemicals migrate from their sources to exposure points (locations where receptors come in contact with the chemicals) or when receptors make direct contact with chemicals or contaminated media. An exposure pathway is complete if there is a way for the receptor to come in contact with the chemicals (i.e., ingestion, inhalation, or dermal adsorption). No exposure exists (and, therefore, no health risk exists) unless the exposure pathway is complete. For a pathway to be complete, each of the following elements must exist:[13]

- a source and mechanism for chemical release;
- an environmental transport medium (e.g., air, water, or soil);
- a point of potential contact with the medium; and
- an exposure route at the contact point (e.g., inhalation, ingestion, or dermal contact).

There must be a complete exposure pathway from the source of chemicals in the environment (i.e., from soil, air, or groundwater) to human or ecological receptors for chemical intake to occur. If all exposure pathways are incomplete for human or ecological receptors, no chemical intake occurs and, therefore, no health effects are associated with site-related chemicals. For example, if the entire site is paved with asphalt or concrete, the potential exposure pathway to soil based on direct contact (i.e., incidental ingestion, dermal contact, and inhalation) is incomplete.

Potential receptors that will be considered for further evaluation in the site-specific HHRA include construction workers during site redevelopment, future power plant workers after construction, and nearby off-site residents or workers during construction. Using the results of the HHRA, remedial measures will be selected to ensure that the risk to off-site receptors posed by the site after remediation shall not exceed $1x10^{-6}$ and the hazard index shall not exceed 1.0, and the risk to site construction and operations workers during site activities shall not exceed $1x10^{-5}$ and a hazard index of 1.0.

For the screening-level ecological risk assessment, site-specific groundwater concentrations will be compared to the Water Board ESLs. Potential dilution and attenuation from the site to the Bay will be considered in consultation with the Water Board. The results of the assessment will be submitted to the Water Board for its information and guidance on further requirements for ecological protection.

As indicated in the Supplemental Testimony, detected concentrations of total chromium in three soil samples collected from the site were much higher than those detected at other locations and appear to correlate with high concentrations of nickel. In the Supplemental Testimony, CEC staff also stated that the presence of these metals may be related to past

[13] U.S. EPA, 1989, Risk Assessment Guidance for Superfund,

plating operations (which are not a documented site use) and, therefore, chromium in soil could consist of a more toxic, form of chromium, hexavalent chromium (CrVI), as well as the more prevalent, but less toxic trivalent chromium (CrIII). Without site-specific speciated data, assumptions must be made regarding the presence of CrIII and CrVI.

Using an assumption that 5 percent of total chromium is CrVI, staff suggested that there may an excess cancer risk greater than $1x10^{-6}$ for an off-site receptor at the fence line. A site-specific evaluation has not been completed and no data exist indicating the presence of CrVI. Elevated chromium and nickel concentrations may be associated with naturally occurring serpentinite materials typically found in fill. Furthermore, CrVI, if present, would be expected to be reduced to CrIII in soil where anaerobic conditions exist. Given the presence of TPH in soil at the site, which would produce anaerobic and lower pH conditions, it is reasonable to assume that the chromium detected in site soil would be present as CrIII.

However, the City acknowledges that absent speciated chromium data, conservative assumptions would have to be made to ensure that risks are addressed. The City intends to undertake further data collection in order to support a more accurate quantification of the potential health risks from chromium and selection of commensurate mitigation measures. Even in the unlikely event that CrIV constitutes 5 percent of the total chromium, there are mitigation measures available that would reduce potential impacts to less than significant. The City will, under the direction of the Water Board, undertake the necessary actions for short- and long-term protection of human health and the environment.

III. Proposed Licensing Conditions

The City has reviewed the proposed Conditions of Certification presented in the FSA, staff's supplemental testimony, and the errata to that testimony, Soil and Water 6, 7 and 13, and Waste 6 and 7. The City recommends changes to the Conditions of Certification as set forth in more detail below to: (1) ensure continuity with prior work at the site and other San Francisco sites with respect to the regulatory framework; (2) use the same terminology as that set forth in the State Water Resources Control Board Resolution 92-49, *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304* and the Article 22A - Maher Ordinance; and (3) provide for consistency among the Soil and Water Resources and the Waste Management Sections. The City proposes the following conditions as alternatives to Soil and Water 6, 7 and 13, and Waste 6 and 7.

SOIL AND WATER 6, WASTE 6

At least sixty (60) days prior to the earlier of activities that disturb soil or the beginning of site mobilization, the project owner shall submit the documents listed below to address

contaminated soil and groundwater at the project site to the Water Board for review and approval, to the San Francisco Department of Public Health (SFDPH) for review and verification of compliance with Article 22A requirements, and to the Compliance Project Manager (CPM) for its approval that these documents meet the requirements of this Condition of Certification.

- ***Human Health Risk Assessment (HHRA)*** – the HHRA will evaluate the potential site-specific human health risk associated with exposure to chemicals of concern. The HHRA will also evaluate the potential risks to construction workers and off-site receptors, and will be consistent with Water Board, DTSC, and U.S. EPA guidelines. The HHRA will identify the media and chemicals of concern at the site that require further risk-reduction efforts to limit unacceptable exposures at the site.
- ***Screening-Level Ecological Risk Assessment (ERA)*** – the screening-level appropriate will be conducted using site-specific groundwater concentrations compared to Water Board ESLs. If the results of the screening-level ERA indicate that there is a potential ecological impact, further site-specific analysis will be conducted. If the site-specific analysis suggests a possible ecological impact, the ERA will identify any chemicals of concern at the site that cause significant water quality impacts and pose significant ecological risks given the proximity of the site to the San Francisco Bay.
- ***Site Cleanup Plan (SCP)*** – the SCP will present site-specific cleanup goals and remedial alternatives considered and selected to address the incremental human health and ecological risks identified in the HHRA and screening-level ERA to less than significant levels. The SCP, which is equivalent to a Removal Action Work Plan (RAW), will be developed in compliance with Water Board requirements and Article 22A. This plan will detail the program and schedule to implement the selected remedies. Either a waiver or "no action" letter from the Water Board and SFDPH may be submitted instead of an SCP.
- ***Risk Management Plan*** - the Revised Risk Management Plan (RRMP) will govern soil and groundwater handling procedures during construction; this plan will incorporate the requirements of Article 22A and will serve as a Site Mitigation Plan under Article 22A.

Verification: At least 60 days prior to the earlier of activities that disturb soil or the beginning of site mobilization, the project owner shall submit the documents listed above to the Water Board for review and approval, to the SFDPH for review and verification of compliance with Article 22A requirements, and to the CPM for its approval that these documents meet the requirements of this Condition of Certification. The project owner shall provide the CPM with a copy of any correspondence between itself and the regulatory agencies within 10 days of submittal. At least 10 days prior to the earlier of activities that disturb soil or start of site mobilization, the project owner shall submit approval letters from the Water Board and SFDPH for each of the documents listed above to the CPM.

SOIL AND WATER 7, WASTE 7

At least forty-five (45) days prior to the start of commercial operations, the project owner shall submit the documents listed below to address the long-term management of

contaminated soil and groundwater at the project site to the Water Board for review and approval, to the San Francisco Department of Public Health (SFDPH) for review and verification of compliance with Article 22A requirements, and to the Compliance Project Manager (CPM) for its approval that these documents meet the requirements of this Condition of Certification.

- ***Site Management Plan*** – The Site Management Plan (SMP), which shall be developed based on the findings of the HHRA, ERA, and taking into account the SCP, will govern the long-term management of environmental conditions at the SFERP site relative to potentially ongoing mitigation programs (which could include treatment and/or monitoring programs, if required) and procedures to be followed should subsurface intrusion into chemically-impacted soil or groundwater be required in the future. The SMP will be recorded in an Environmental Restriction.

- ***Certification Report*** – The Certification Report shall be prepared in accordance with Water Board requirements and Article 22A. The Certification Report shall contain the results of verification sampling analysis, if required by the Water Board and SFDPH.

Verification: At least 45 days prior to the start of commercial operation, the project owner shall submit the SMP and Certification Report to the Water Board for review and approval, to the SFDPH for review and verification of compliance with Article 22A requirements, and to the CPM for its approval that these documents meet the requirements of this Condition of Certification. The project owner shall provide the CPM with a copy of any correspondence between itself and the regulatory agencies within 10 days of submittal. At least 10 days prior to the start of commercial operation, the project owner shall submit approval letters from the Water Board and SFDPH for the SMP to the CPM. In addition, at least 30 days prior to the start of commercial operation, and after approval of the SMP, the project owner shall submit to the CPM documentation that the SMP has been recorded as part of an Environmental Restriction.

SOIL AND WATER 13, WASTE 9

Collectively, the implementation of the SCP, RRMP, and SMP shall ensure that, during and after construction, the risk to off-site receptors shall not exceed $1x10^{-6}$ and the hazard index shall not exceed 1.0, and the risk to site construction and operations workers during site activities shall not exceed $1x10^{-5}$ and a hazard index of 1.0.

Verification: At least 45 days prior to the start of commercial operation, the project owner shall submit a copy of the above-specified documentation to the CPM for approval that this Condition of Certification has been met.

VI. Correlation to FSA and Hearing Topics:

- Soil and Water
- Waste Management

APPENDIX A

Declarations

DECLARATION OF
SUSAN M. GALLARDO, PE

I, Susan M. Gallardo, declare as follows:

1. I am presently employed by Geomatrix Consultants, Inc. as a Principal Engineer.

2. A copy of my professional qualifications and experience are provided in Appendix B to the Supplemental Testimony of the City and County of San Francisco filed on May 1, 2006.

3. I am sponsoring the attached testimony on Site Contamination: Soil and Water/Waste Management. Based on my independent analysis and my professional experience and knowledge I concur with the analysis provided in this testimony.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed herein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: May 1, 2006 Signed: Susan M. Gallardo

At: Oakland, CA

DECLARATION OF
ROBERT H. CHEUNG

I, Robert H. Cheung, declare as follows:

1. I am presently employed by Geomatrix Consultants, Inc. as a Senior Risk Assessor.

2. A copy of my professional qualifications and experience are provided in Appendix B to the Supplemental Testimony of the City and County of San Francisco filed on May 1, 2006.

3. I am sponsoring the attached testimony on Site Contamination: Soil and Water/Waste Management. Based on my independent analysis and my professional experience and knowledge I concur with the analysis provided in this testimony.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed herein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: MAY 1, 2006 Signed: Robert H. Cheung

At: Oakland, CA

DECLARATION OF
LESTER FELDMAN

I, Lester Feldman, declare as follows:

1. I am presently employed by Geomatrix Consultants as a Principal Scientist.

2. A copy of my professional qualifications and experience are provided in Appendix B to the Supplemental Testimony of the City and County of San Francisco filed on May 1, 2006.

3. I am sponsoring the attached testimony on Site Contamination: Soil and Water/Waste Management. Based on my independent analysis and my professional experience and knowledge I concur with the analysis provided in this testimony.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed herein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: April 26, 2006 Signed: Les Feldman

At: Oakland, CA

APPENDIX B

Resumes for Susan Gallardo, Robert Cheung and Lester Feldman

SUSAN M. GALLARDO, PE

Environmental Site Assessments
Redevelopment of Impacted Sites
Environmental Engineering

EDUCATION

M.S., Environmental Engineering, University of California, Berkeley, 1985
B.S., Civil Engineering, University of California, Berkeley, 1980

REGISTRATION

Professional (Civil) Engineer, CA No. 038154, 1984

PROFESSIONAL HISTORY

Geomatrix Consultants, Inc., Principal Engineer, 1985 to date
Bechtel, Inc., San Francisco, CA, Engineer, 1980 – 1984
California Department of Transportation, Sacramento, CA, Engineering Assistant, 1979

SKILLS AND EXPERIENCE

Ms. Gallardo's technical expertise is in the areas of civil and environmental engineering. She has directed numerous environmental site assessments and site characterization studies associated with soil and groundwater contamination issues, where the constituents of concern have included volatile organic compounds, petroleum products, and metals. She has applied her particular expertise in civil design work to the development and implementation of cost-effective remedial action programs and has been responsible for the preparation of design specifications, bid packages, and contract requirements for these programs. Additionally, she has administered field construction and overseen system start-up activities for remediation programs. Ms. Gallardo is experienced in evaluating and applying remedial technologies to problems associated with underground storage tanks, active and inactive manufacturing facilities, former waste disposal units and commercial facilities, and has further applied her experience to developing and analyzing failure scenarios for in-place remediation programs in support of insurance negotiations. Ms. Gallardo has worked on numerous redevelopment projects in northern California with property owners, developers, and regulatory agencies to arrive at solutions that address both client and regulatory requirements.

REPRESENTATIVE PROJECTS

REMEDIATION INVESTIGATION AND FEASIBILITY STUDY

***Groundwater Containment/Treatment, Former Scrap Metal Facility**, Southern Pacific Railroad, Santa Rosa, CA.* Peer reviewer directing the design and construction of a containment and treatment system for groundwater containing chlorinated volatile organic compounds (VOCs). For this program, she installed 13 on-site and off-site extraction wells, and designed a subsurface piping system to convey air to pneumatic pumps in each well and extracted groundwater to on-site air stripping system. The piping system extended 0.5 mile off site and was installed using directional drilling. Ms. Gallardo was responsible for design drawings, specification and bid package

development, air modeling to support air quality permit application, and all other technical and permitting aspects of the project. The site characterization and remediation activities at this site were conducted under a Site Cleanup Requirements Order issued by the California Regional Water Quality Control Board, North Coast Region, within the framework and requirements of Resolution 92-49 and the Porter-Cologne Act.

Electronics Manufacturing Facility Investigation/Remediation, *Ampex Corporation, Sunnyvale, CA.* Principal-in-charge for site characterization studies for a site where volatile organic compounds had infiltrated into the groundwater. Regulatory oversight for this project was provided by the California Regional Water Quality Control Board, San Francisco Bay Region. Highlights of the studies included a shallow groundwater survey to initially screen the areal distribution of organic constituents, and development of a monitoring well network to confirm the results of the study and to provide long-term groundwater monitoring. She directed the remedial action evaluation and implementation at this site, which consisted of an extraction network to contain affected groundwater and an air stripping system to treat the affected groundwater. Design considerations for the treatment system included the scaling potential of the groundwater, regional air quality emission standards, and local zoning restrictions limiting the height of the stripping tower. Remediation was completed and the site was closed in 2004.

ENVIRONMENTAL ASSESSMENT

Preliminary Site Assessments, Southern Pacific Caltrain Corridor, *Hanson, Bridgett, Marcus, Northern CA.* Project manager on numerous Phase I and Phase II PSAs on behalf of property buyers or sellers, and has worked closely with legal counsel on many of these projects. Directed PSAs to evaluate the environmental issues along approximately 50- and 140-mile sections of railroad right-of-way prior to purchase of these properties by a public agency from a private railroad company. The Phase I and Phase II portions of these projects were formulated to efficiently and economically evaluate historical and current practices affecting environmental conditions on and adjacent to the railway.

Portfolio Analysis. Principal-in-charge directing a program that evaluated the potential environmental cost liability associated with thousands of lease properties that are owned by a private entity. This evaluation included utilizing a statistical approach for selecting a subset of the total population of properties for site visits, developing a model to estimate potential environmental costs that ere extrapolated to the total population of properties, and developing a program for long-term environmental property management.

PIPELINE

Phase I Assessment Along Southeast Geysers Effluent Pipeline, *City of Santa Rosa, Sonoma County, CA.* Project environmental engineer on a Phase I environmental assessment for this 32-mile long pipeline, which included evaluating natural and potential anthropogenic impacts along the alignment that could impact construction procedures and costs. These issues included the identification of natural deposits that contain mercury and serpentine, and man-made impacts from features such as gas stations. Based on the results of the Phase I assessment, she assisted with the preparation of specifications that outlined procedures for those areas where environmental impacts

could influence worker safety and material handling and disposal, and preparation of a guideline to address potential impacts not identified during the Phase I, should they be encountered.

Seismic Retrofit - Phase I and Phase II, *Bay Area Rapid Transit, Oakland, CA.* As a team member for the BART Seismic Retrofit Program, Ms. Gallardo was responsible for evaluating the possible presence of chemically-impacted soil or groundwater that could impact worker safety during construction activities or soil reuse/disposal. For this evaluation, Ms. Gallardo directed a Phase I assessment over a 6-mile segment from West Oakland to the East Bay Hills, and, based on the results of the Phase I, developed a Phase II program to address specific planned construction areas where the potential for environmental impacts were identified. Using the information from both these programs, potential additional costs during construction were estimated, and soil handling procedures were developed.

RAILROADS

Preliminary Site Assessments, Southern Pacific Caltrain Corridor, *Hanson, Bridgett, Marcus, Northern CA.* Project manager on numerous Phase I and Phase II PSAs on behalf of property buyers or sellers, and has worked closely with legal counsel on many of these projects. She has directed PSAs to evaluate the environmental issues along approximately 50- and 140-mile sections of railroad right-of-way prior to purchase of these properties by a public agency from a private railroad company. The Phase I and Phase II portions of these projects were formulated to efficiently and economically evaluate historical and current practices affecting environmental conditions on and adjacent to the railway. Most recently, Ms. Gallardo has directed a program that evaluated the potential environmental cost liability associated with thousands of lease properties that are owned by a private entity. This evaluation included utilizing a statistical approach for selecting a subset of the total population of properties for site visits, developing a model to estimate potential environmental costs that ere extrapolated to the total population of properties, and developing a program for long-term environmental property management.

Closure of Former Railyard for Future Development, *Southern Pacific Railroad, Martinez, CA.* Principal-in-charge for this site where petroleum-stained soil was observed. A constituent-specific analysis of soil and groundwater indicated that no chemicals were present at concentrations that would pose human health or ecological risk given the future planned land use. Therefore, no remediation of the petroleum-stained soil was required, and this "brownfields" site was granted closure.

Water Front Property, *Union Pacific Railroad, Eureka, CA.* Principal-in-charge of assisting the waterfront property owner in complying with state and federal environmental regulations by implementing a phased scope of work to coordinate removal of debris and potentially hazardous materials, conducting an investigation of soil and groundwater quality, interacting with the RWQCB, and documenting investigative efforts at the site. Site characterization consisted on conducting a shallow groundwater quality survey to evaluate the lateral and vertical distribution of affected groundwater, drilling exploratory soil borings, performing piezometric cone penetrometer tests to evaluate site stratigraphy, and collecting data to evaluate potential ecological risks.

Railroad Maintenance Yard, *Union Pacific Railroad, Eureka, CA.* Principal-in-charge responsible for directing the technical, regulatory, and transactional requirements for a former railroad switching and maintenance yard; a commercial development is the planned future use of the site.

Soil samples collected during exploratory trenching and monitoring well installation indicated the presence of later-boiling petroleum hydrocarbons and some metals. Shallow groundwater at the site is not impacted by the relatively immobile, insoluble constituents present in on-site soil. An evaluation of storm water runoff indicates that a significant impact to a nearby slough and bay from constituents detected at the site is unlikely. For this project, Ms. Gallardo worked with the seller and regional and local regulators to address issues related to site development and long-term future site use, including establishing site grade to minimize export soil, and developing a human health risk assessment to support long-term in situ management of the affected soil.

REDEVELOPMENT

Risk-based Evaluation for Redevelopment, *IRG Environmental, LLC, San Francisco, CA.* Principal-in-charge responsible for directing the investigative activities, risk assessment, and engineering and construction planning for redevelopment of a former paint manufacturing site in San Francisco. The site, which is located within the former Bay Margin (thereby subject to the requirements of the Maher Ordinance), is impacted by a variety of chemicals including petroleum constituents, metals, and to a lesser degree, chlorinated solvents. Ms. Gallardo is working with the developer to identify remedial action alternatives and long-term management strategies relative to the future, planned multi-family residential use of the property.

Redevelopment of a Former Cannery, *South County Housing Corporation, Gilroy, CA.* Principal-in-charge responsible for the Phase I/II activities at this former cannery site in the south Bay Area on behalf of the buyer, a non-profit developer. Soil vapor sampling was used to evaluate potential residual issues from a former underground storage tank, which had been closed by the regulatory agency. The soil vapor sampling indicated significant concentrations of benzene in vapor, which were several orders of magnitude higher than the screening criterion considering a residential indoor air exposure. Subsequent grab groundwater sampling demonstrated that product remains in the subsurface. Ms. Gallardo worked with the developer, local regulatory agency, and legal counsel to 1) reopen the regulatory case; 2) re-assign the State Tank Fund to the buyer; and 3) mitigate the site to the degree appropriate for long-term protection of human health and beneficial uses of waters of the State.

Risk-based Evaluation for Redevelopment, *Former Paint Manufacturing Facility, San Franciso, CA.* Directing the investigative activities, risk assessment, and engineering and construction planning for redevelopment of a former paint manufacturing site in San Francisco. The site, which is located within the former Bay Margin (thereby subject to the requirements of the Maher Ordinance), is impacted by a variety of chemicals including petroleum constituents, metals, and to a lesser degree, chlorinated solvents. Ms. Gallardo is working with the developer to identify remedial action alternatives and long-term management strategies relative to the future, planned multi-family residential use of the property.

Evaluation of a Former Dry Cleaner Site, *Sares Regis, San Mateo, CA.* On behalf of the buyer and seller, directed an investigation to evaluate the extent of tetrachloroethene in soil and groundwater at a former dry cleaner site and strategized a remedial plan for the property based on the results of a risk assessment that was acceptable to the local and regional regulatory agencies and facilitated site redevelopment. Based on the results of the work, long-term mitigation of the site consisted of downgradient groundwater monitoring and implementation of a site management plan.

SUSAN M. GALLARDO, PE

Third Party Review, Oakland Army Base, *Oakland Base Reuse Authority, Oakland, CA.* Directed the review of numerous site history and environmental documents generated for the Oakland Army Base to provide the Oakland Army Reuse Authority an evaluation of data gaps, possible regulatory issues, and potential cost liabilities to mitigate environmental conditions at the site. This review was documented in a summary report that subsequently was used as an initial basis for negotiations with the Army

AFFILIATIONS

American Society of Civil Engineers (President of San Francisco Section 1993-1994)
Engineering Alumni Society, University of California (Served on Board)
Groundwater Resources Association
National Brownfields Association, California Chapter

PUBLICATIONS AND PRESENTATIONS

"A California Case Study for Leaving Petroleum-Affected Soil in Place." S.M. Gallardo, R.A. Steenson, and J.A. Levy. *Principals and Practices for Diesel-Contaminated Soils*, v. 7, Amherst Scientific Publishers. 1998.

"A Case Study: Interference with TPH analyses of grab groundwater samples." G.R. Foote, D. A. Zemo, S. M. Gallardo, M.J. Grant, B. T. Benson, and J. E. Bruya. Abstract and Presentation for 11th Annual Contaminated Soils Conference, Amherst, MA. October 1996.

"Site Assessment for Rail Rights-of-Way." Susan Gallardo. *California Consulting Engineer and Land Surveyor*, p. 19. Spring 1993.

ROBERT H. CHEUNG, REA

Human Health Risk Assessment
Remedial Investigation

EDUCATION

B.A., Biology/Chemistry, Whittier College, Whittier, CA, 1988

REGISTRATION

Registered Environmental Assessor, CA No. 06493

CERTIFICATIONS

Certificates in Hazardous Materials Management and Site Remediation, U.C. Berkeley Extension
29 CFR 1910.120 40-Hour OSHA Hazardous Waste Emergency Response Training
AHERA Certified Asbestos Building Inspector and Management Planner

PROFESSIONAL HISTORY

Geomatrix Consultants, Inc., Senior Risk Assessor, 2000 to date
IT Corporation, Senior Scientist, 1999 – 2000
ICF Kaiser Engineers, Environmental Associate, 1991 – 1999
Norcal Waste Systems, Inc., Environmental Scientist, 1989 – 1991

SKILLS AND EXPERIENCE

Mr. Cheung has more than 16 years of experience integrating risk assessment into investigations and cleanup strategies. His work involves evaluating possible human exposure to chemicals in the environment, providing support for risk-based investigations, quantifying multi-pathway and multi-chemical health risks, developing health-based cleanup goals using deterministic and Monte Carlo simulations, assisting clients with converting unused industrial properties into residential and commercial uses, and making presentations to and negotiating with regulatory agencies and stakeholders. Using his risk assessment background, Mr. Cheung also evaluates field and laboratory data, prepares work plans and project reports, and provides solutions for decision making and corrective action.

REPRESENTATIVE PROJECTS

RISK ASSESSMENT

Subsurface Vapor Intrusion, *Various Locations, CA and AZ.* Conducted numerous assessments evaluating the subsurface vapor intrusion pathway using modeling to estimate indoor air concentrations. Developed and designed work plans, testing procedures, and quality control programs for collection and analysis of soil vapor, flux chamber, ambient air, and indoor air samples for site characterization and model validation and calibration.

VOCs in Groundwater, *Stanford Management Company, Palo Alto, CA.* Provided consultation services on the potential health risks from inhalation of indoor air in buildings and trichloroethene (TCE) in shallow groundwater using modeling approaches and site-specific soil vapor and indoor air samples.

Petroleum Pipeline, *Chevron Environmental Management, Pittsburg and Tracy, CA.* Evaluated the potential health risks to future residential receptors from possible exposures to crude oil released from a pipeline. Provided strategies for site investigations and negotiated site closures with agencies.

RCRA Closure, *San Francisco Giants, San Francisco, CA.* Obtained site closure by preparing a health risk assessment on a former industrial facility that was transformed into a recreational park. Providing input into site investigation strategies, health risk evaluations are performed based on guidance from the Department of Toxic Substance Control (DTSC) Preliminary Endangerment Assessment (PEA) Manual.

Environmental Impact Studies, *Fieldstone Communities, Inc., Orange, CA.* Evaluated the potential for adverse health effects to future residential receptors from air emissions generated from a closed municipal waste landfill. The evaluation focused on volatile air pollutants listed under the Clean Air Act and methane.

Post-Remediation Risk Assessment, *Landels Ripley & Diamond, Riverside, CA.* Conducted a post-remediation risk assessment for chemicals in soil following treatment by thermal desorption. Residual chemicals included PCBs and chlorinated pesticides. The risk assessment confirmed that the treated soil could be re-used as grading material.

RCRA Facility Closures, *Fort Irwin, San Bernardino, CA.* Prepared risk-based reports to achieve RCRA facility closure at several different sites at the Fort Irwin Training Center. Because the majority of the constituents of concern were primarily petroleum hydrocarbons, Mr. Cheung derived a range of cleanup levels utilizing the hybrid fraction approach developed by the Massachusetts Department of Environmental Protection and the Total Petroleum Hydrocarbon Criteria Working Group.

Human Health Risk Assessment, *Port of Oakland, Oakland, CA.* Task manager for the Human Health Risk Assessment for Operable Unit 7 within the Oakland Army Base. Responsibilities include managing and controlling costs, quantifying the potential health risks associated with volatile organic compounds in shallow groundwater, and preparing the risk assessment report.

Human Health Risk Assessment, *Port of Oakland, Oakland, CA.* Evaluated the potential health risks to workers who were involved with the redevelopment of an active shipping container and storage transfer facility that was formerly occupied by bulk oil storage tanks. The risk assessment was used to evaluate the need for health-protective equipment and/or the need to adopt safe practices while working intrusively (e.g., excavation, trenching) on site. After evaluating existing soil and groundwater data, recommended an additional investigation to search for hazardous constituents that were not previously evaluated, but that were suspected to be present based on available descriptions of historical activities conducted on site. The investigation was also used to further characterize the nature and extent of contamination in specific areas of the site where intrusive work was scheduled.

Human Health Risk Assessment, *Southern California Aerospace Division, CA.* A Monte Carlo analysis was performed using available information on the exposure parameters to estimate potential health risks. The analysis provided a distribution of potential exposures that supplied far more information than a single-point estimate. In addition to estimating the attendant risks, risk-based cleanup goals were estimated using the same distributions. Through repeated iterations, a distribution of cleanup levels was created, allowing a full range of possible values and integrating their likelihood of occurrence.

Baseline Human Health Risk Assessment, *Superfund Site, Southern CA.* Analyzed the potential health risks associated with the presence of chemicals in groundwater. A screening analysis was conducted to determine potential localized areas of groundwater that may have unusually high concentrations that could pose significantly higher risks to individuals than that posed by the groundwater aquifer as a whole. These were defined as areas of groundwater represented by a select group of wells or individual wells. The resulting group of wells was selected to represent potential sources of exposure, and the associated risks to each of the potential sources were estimated based on ingestion, dermal contact, and inhalation exposure pathways.

Baseline Human Health Risk Assessment, *Superfund Site, Central CA.* Because of the potential variability and bias of the existing soil dataset to support a risk assessment of a 29-acre former wood treating facility, used a spatially dependent statistical procedure to estimate realistic exposure point concentrations that are representative of the site. Chemicals of concern included PAHs, PCP, arsenic, and dioxins/furans. The risks associated with consuming fish also were evaluated by incorporating different exposure durations and daily fish consumption rates.

Risk Assessment Support, *Confidential Aerospace Contractor, Southern CA.* Managed a baseline risk assessment to support the remediation of an 80-acre parcel formerly used as an aircraft manufacturing and subassembly plant. The risk assessment included the development of cleanup goals for chemicals in soil based on groundwater impacts and health risks using traditional USEPA default parameters and stochastic Monte Carlo simulation methods. Responsible for the exposure assessment, estimating emissions and exposure point concentrations from fate and transport models, and quantifying and characterizing risks.

Risk-Based Cleanup Goals, *Various Locations.* Conducted a Monte Carlo analysis to estimate site-specific cleanup goals, which provided a distribution of potential exposures that supplied more information than a single-point estimate. Through multiple iterations, a distribution of cleanup levels was created, allowing a full range of possible values and integrating their likelihood of occurrence.

REMEDIAL INVESTIGATION

Defense Distribution Depot Hill, *Ogden Site, UT.* Project manager responsible for overseeing a fast-tracked remedial investigation of a former canal that was originally constructed to carry surface water runoff away into existing drainage channels. The project consisted of site characterization activities, risk assessment, remediation, site restoration, and site closure. Responsible for preparing project plans, evaluating investigation data, preparing work plans to execute the remedial action, providing oversight on the remediation, and preparing the closure report following remediation. Prepared and provided monthly cost reports to stakeholders. Fostering cooperation between the U.S. Army Corps of Engineers, the Ogden Depot, the U.S. Environmental Protection Agency, and the

Utah Department of Environmental Quality, the total duration of the project was completed in less than two years, streamlining the process several years ahead of schedule.

Intermodal Railyard, *Port of Oakland/Union Pacific, Oakland, CA.* Task manager responsible for overseeing a large investigative effort to further characterize and evaluate the potential impacts of previously identified releases in and adjacent to an active shipping container intermodal storage and transfer facility. The subject property encompasses an area of approximately 7,000 feet by 300 feet, covering approximately 44 acres of land. Responsibilities include developing a work plan for collection of soil and groundwater samples to fill data gaps and coordinating the field investigation with port officials and intermodal yard and railroad personnel. The goals of the investigation were to adequately characterize and to quantify the volume of contamination by maintaining worker safety, avoiding subsurface utilities, railcars and tracks, and other potential safety hazards in an active railyard.

Container Terminal Yard, *Port of Oakland, Oakland, CA.* Task manager of a field investigation to evaluate the environmental hazards associated with the redevelopment of a container terminal yard formerly occupied by a bulk oil storage tank farm. Responsibilities include the oversight of soil, soil gas, free product, and groundwater sample collection. Using data collected from the field investigation, prepared a risk assessment that evaluated the likelihood of adverse human health effects that could result from exposure to chemicals that may be encountered during construction activities.

ENVIRONMENTAL ASSESSMENTS

Phase I and Phase II Assessments, *Bay Area Rapid Transit District, Oakland, CA.* Mr. Cheung conducted a Phase I assessment to evaluate potential environmental issues that could be encountered during construction activities related to a seismic retrofit program. The results of the Phase I were used to develop a focused investigation program to collect data that were used to assess the potential health risks to future construction workers from possible chemical exposures.

Site Assessments, *Port of Oakland, Oakland, CA.* Managed site assessment activities of a former ship repair facility and three major thoroughfares in the City of Oakland. The reports provided conclusions regarding the risk of actual or potential contamination and recommendations for further environmental investigations (phase II activities) to assess the environmental concerns.

Environmental Site Inspections, *Guam Naval Air Station, Guam.* Provided consulting services to the Guam Airport Authority by reviewing environmental work and remediation efforts performed by the Navy in preparation for the reuse and redevelopment of the facilities located within the former Naval Air Station. Environmental documents were reviewed in detail to determine if the findings and conclusions were satisfactory. Site inspections also were conducted to document existing conditions.

Environmental Due Diligence Assessments, *Varian Associates, Northern CA.* Within two weeks of client authorization, managed and coordinated due diligence assessments of four Varian properties and operations. The assessments consisted of site visits and document reviews to address existing or past environmental investigations, identify all known or potential sources of contamination, and review site processes that may have the potential to cause releases of hazardous substances. The findings were summarized to provide recommendations for further site characterization and estimates of costs for remedial activities.

ROBERT H. CHEUNG, REA

Property Assessments, *Ford Dealerships, Western U.S.*. Under a corporate contract with the Ford Motor Company, managed and conducted assessments at Ford-owned automobile dealerships throughout the western United States. Responsibilities included conducting phase I assessments and providing oversight for phase II activities. Areas of environmental concern included underground storage tanks, septic tanks, below-ground hydraulic hoists, wastewater discharge, and hazardous waste management practices.

REMEDIAL INVESTIGATION AND RISK ASSESSMENT

Risk-Based Remedial Investigation, Provided oversight on a fast-tracked remedial investigation of a former canal at a military base that was originally constructed to carry surface water runoff away into existing drainage channels. The project consisted of site characterization activities, risk assessment, remediation, site restoration, and site closure. Remedial activities consisted of excavation and treatment by soil stabilization. Mr. Cheung was responsible for preparing project plans, evaluating investigation data, preparing work plans to execute the remedial action, providing oversight on the remedial activities, and preparing the closure report following remediation. Fostering cooperation between the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the Utah Department of Environmental Quality, the total duration of the project was completed in less than two years streamlining project completion by several years.

Site Characterization and Construction Worker Risk Assessment, Lead an inter-disciplinary team overseeing an investigative effort to further characterize and evaluate the potential impacts of previously identified releases at a 44-acre active shipping container intermodal storage and transfer facility. Responsibilities included developing a work plan for the collection of soil and groundwater samples to fill data gaps, and coordinating the field program among various stake holders. The goal of the investigation was to adequately characterize and to quantify the volume of impacted soil by maintaining worker safety avoiding subsurface utilities, railcars and tracks, and other potential safety hazards in an active railyard.

Environmental Impact Studies, Evaluated the potential for adverse health effects to adjacent future residential and recreational receptors associated with air emissions generated from a closed municipal waste landfill. The evaluation focused on the health impacts associated with nonmethane organic compounds (NMOC) and various volatile air pollutants listed under Section 112 of the Clean Air Act. Methane was evaluated for its potential explosion impacts.

Post-Remediation Risk Assessment, Conducted a post-remediation risk assessment by evaluating the potential health risks associated with residual chemicals in soil following treatment by thermal desorption. Residual chemicals included polychlorinated biphenyls and chlorinated pesticides. The risk assessment confirmed that the treated soil could be re-used as grading material.

HEALTH RISK ASSESSMENT

Vapor Intrusion, Conducted numerous risk assessments evaluating the vapor intrusion pathway using mathematical modeling in support of risk assessments, as well as designing sampling plans to collect soil vapor, flux chamber, ambient air, and indoor air samples for site characterization and model validation and calibration.

Petroleum, Evaluated the potential health risks associated with releases from petroleum hydrocarbon pipelines at various locations in central California. Providing input into site

investigation strategies, health risk evaluations are performed based on guidance from the Department of Toxic Substances Control Preliminary Endangerment Assessment Manual.

RCRA Closure, After identifying data gaps associated with site characterization, conducted a health risk assessment that was specific to the future use of a recreational park. The assessment indicated that based on site conditions and the proposed redevelopment, chemicals in soil would not pose an unacceptable risk to human health.

VOCs in Groundwater, Evaluated the potential health risks from chemicals in indoor air to workers. Historical information indicated that leakage from damaged drums was allowed to drain into the ballast of a railyard located next to the warehouse. Vinyl chloride and trichloroethene were present in both shallow soil and groundwater. Based on modeling results, VOC migration into the indoors was minimal, and existing conditions did not pose an unacceptable human health risk.

Human Health Risk Assessment, Evaluated the potential health risks to workers involved with the redevelopment of an active shipping container/transfer facility that was formerly occupied by bulk oil storage tanks. The assessment was used to evaluate the need for health-protective equipment and/or the need to adopt safe practices while working intrusively on site. Recommended additional investigations to search for constituents that were not previously evaluated but were suspected to be present.

Risk-based Cleanup Goals, Performed a Monte Carlo analysis using information on exposure parameters to estimate risk-based cleanup goals. The analysis provided a distribution of potential exposures that supplied far more information than a single point estimate. Through multiple iterations, a distribution of cleanup levels was created, allowing a full range of possible values and integrating their likelihood of occurrence.

AFFILIATIONS

Northern California Society of Environmental Toxicology and Chemistry
Society for Risk Analysis
Groundwater Resource Association

PUBLICATIONS AND PRESENTATIONS

"Comparison of Indoor Air Concentrations from Surface Flux Chambers to Modeled Concentrations from Subsurface Volatile Organic Compounds." F. Szerdy and R. Cheung. Presented at the Association of Environmental Health and Science (AEHS) Conference, San Diego, CA. March 2004.

"Methodological Issues in Radionuclide Risk Assessment for Coal-Fired Power Plants."
C. Whipple, R. Roberson, D.W. Berman, R.H. Cheung, and D. Jeffrey. Presented at the EPRI/DOE International Conference on Managing Hazardous and Particulate Air Pollutants, Toronto, Canada. August 1995.

LESTER FELDMAN

Regulatory Strategist
Hazardous Material Control

EDUCATION

University of Michigan, Ann Arbor, M.S., Civil Engineering, 1972
University of Michigan, Ann Arbor, B.S., Engineering-Meteorology and Oceanography, 1970

PROFESSIONAL HISTORY

Geomatrix Consultants, Principal Scientist, 1994 to present
California Regional Water Quality Control Board, Supervisor,
Toxics Cleanup Section, 1975-1994
Bechtel, Incorporated, San Francisco, Process Engineer, 1973-1974

REPRESENTATIVE SKILLS AND EXPERIENCE

Mr. Feldman has 30 years of experience in the development, implementation, and consultation related to water resources and toxic and hazardous materials control programs. At the California Regional Water Quality Control Board (RWQCB), he was Senior Environmental Specialist and was responsible for directing staff in developing and implementing toxic and hazardous materials control programs covering nine San Francisco Bay Area counties. Programs included policy development, underground storage tank (UST) cleanups, waste disposal control, hazardous waste site investigations and cleanup, subsurface chemical leak detection and control, and groundwater and soil remediations, including those based upon risk assessments. At Geomatrix, he has advised and/or provided expert opinions and testimony in the following areas: site investigation and remediation; cost recovery; risk management strategies; policies, regulations and practices of the U.S. and California environmental protection agencies and other state and local environmental and health agencies; inter-agency coordination matters; litigation support and strategy; regulatory matters; urban redevelopment projects (brownfields); storm water management and toxic site and tank site closures.

- *UST Program.* Mr. Feldman managed the San Francisco Bay RWQCB's leaking UST program from 1981 – 1994. He assisted U.S. EPA staff in Washington, D.C., in developing and implementing the federal program and participated in EPA State Program Coordination Conferences. Mr. Feldman served as an original member of the California State Water Resources Control Board's Task Force on Underground Storage Tanks. He participated in the development and implementation of the Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites. Mr. Feldman coordinated the leaking UST program for numerous local agencies in the San Francisco Bay Region, including local implementing agencies (LIAs) and the state and federally funded local oversight programs (LOPs).

- *Toxic Site Cleanup Programs.* Mr. Feldman coordinated the regulation of numerous federal facility toxic site cleanup programs, including Hunters Point Naval Shipyard, Concord Naval Weapons Station; and Moffett Field; he provided regulatory guidance for remedial investigations and groundwater cleanup at Lawrence Livermore National Laboratory (chlorinated volatile organic chemicals in the drinking water) and Sandia National Laboratories (petroleum hydrocarbons in vadose zone).

- *Regulatory Compliance Strategy.* Mr. Feldman provides clients with guidance and interpretation related to existing and planned agency permit and enforcement actions, both formal and informal. These activities primarily relate to regulation of releases of hazardous substances to the environment and the interpretation of agency policies, staff guidelines, and practices.

- *Ongoing Regulatory Compliance Support.* Mr. Feldman is the principal-in-charge of ongoing investigation, cleanup and regulatory support activities for one party at a 120-acre industrial site where groundwater has been affected by on-site as well as off-site releases of various chlorinated volatile organic chemicals. Key ongoing activities involve designing, implementing and interpreting water quality investigations in order to allocate responsibility for the numerous groundwater plumes, and to manage a limited groundwater cleanup with a focus on the on-site releases.

- *Superfund.* Mr. Feldman participated in the negotiation of several federal and state Consent Orders involving multiple responsible parties at complex sites, including those involving trichloroethylene and other industrial solvents in soil and groundwater; and lead, arsenic, and other metals in soil, wetlands, and aquatic organisms. He coordinated numerous enforcement actions with the State Attorney General's Office, the Federal Justice Department, and local District Attorneys' offices, including toxic chemical cases with the Alameda County District Attorney's office. He coordinated numerous multi-agency projects involving approvals of remedial plans for National Contingency Plan and other toxic sites. Mr. Feldman was also responsible for the development and presentation of numerous enforcement orders for consideration by the RWQCB at public hearings, and coordinated many State Superfund remediation projects with the California Department of Toxic Substances Control and local agencies.

- *Insurance Litigation Support.* Mr. Feldman provided testimony for the plaintiff in an environmental insurance matter involving a large multinational automobile manufacturer, primarily related to actions and costs associated with the investigation and cleanup of chlorinated volatile organic chemicals in groundwater. In another matter, he provided expert opinions in support of plaintiff interpreting agency records relating to the prior release of petroleum hydrocarbons from leaking USTs and related piping systems. In another matter, Mr. Feldman assisted a defense team in California with the review of proposed NCP-based local ordinance related to liability matters for sites with potential releases of chlorinated volatile organic chemicals principally from dry cleaning operations, including a specific groundwater quality site review.

- *Agency Litigation Support.* Mr. Feldman provided expert testimony for the State of Arizona, the plaintiff, concerning the potential for releases to soil and groundwater of chlorinated volatile organic chemicals from concrete tanks, degreasing equipment, buried wastewater pipes, and an on-site wastewater disposal system at a former industrial site in Phoenix, Arizona.
- *Ongoing Litigation Support.* Mr. Feldman assisted defendant former site owner and operator reach a settlement with the current landowner related to releases of chlorinated volatile organic chemicals to soil and groundwater from an on-site wastewater storage facility. Activities involved review of plaintiff's claims and related projected costs, provision of additional site investigation and completion of soil excavation activities acceptable to California EPA, and thus the property owner. The matter is ongoing, primarily related to findings of chlorinated volatile organic chemicals in soil gas and groundwater at an adjoining property, with ongoing activities interpreting new data from both properties.
- *Other Litigation Support.* Mr. Feldman assisted defendant counsel in the review and interpretation and ultimate allocation of responsibility for groundwater affected by chlorinated volatile organic chemicals. Defendant was a former tenant at the facility and Mr. Feldman's activities included review of site use history, agency records, and interpretation of existing groundwater data. In a separate matter related to reported releases of chlorinated volatile organic chemicals from a dry cleaning facility adversely affecting groundwater, Mr. Feldman reviewed site history, recommended and implemented an investigation plan that resulted in an agency letter releasing the current site operator (defendant) from responsibility, assisting with resolution of existing litigation.
- *Private Enforcement.* Mr. Feldman assists numerous clients by providing input to litigation defense actions and litigation prevention strategies both for lawsuits filed and for those noticed to be filed under the Federal Clean Water Act. This relatively new and growing practice area primarily relates to assisting with responses to letters of intent to file law suits related to storm water matters at industrial and construction sites. Activities include providing regulatory and technical advice related to compliance with the Clean Water Act, including the review of storm water pollution prevention plans (SWPPPs) and erosion control plans, performing site inspections and obtaining compliance letters from the regulatory agencies.
- *Water Quality Programs.* As Section Leader in the RWQCB's Surface Water Protection Division, Mr. Feldman directed local water quality programs in the San Francisco Bay area. Programs included permitting and regulation of municipal, agricultural, and commercial waste treatment facilities; storm water runoff; water reuse and reclamation; erosion control; timber harvest regulation; and small community wastewater program assistance. He coordinated U.S. EPA Clean Water Grant Program funding for numerous communities, involving more than $200 million. This work included recommending waste discharge requirements, reviewing facility plans and designs, and enforcing construction schedules for seven major sewage treatment plants.

- *Storm Water Management.* Mr. Feldman has assisted clients with the understanding of the Clean Water Act and California requirements for storm water, including assisting with preparation of "Notices of Intent to Comply", developing SWPPPs, performing informal compliance inspections, developing response actions related to specific storm water permit non-compliance, assisting clients with agency inspections, interpreting local agency and RWQCB directives, and assisting with the preparation of required annual reports.
- *Brownfields Redevelopment.* At the RWQCB in the early 1980s, Mr. Feldman provided a leadership role in the development and use of risk-based corrective actions for sites affected by metals, fuel releases, chlorinated volatile organic chemicals and semi-volatile organic chemicals, promoting cost-effective "smart" redevelopment projects. He was a key developer of the Risk Management Plan concept, helping to assure long-term sustainable risk-based cleanup site management. At Geomatrix, Mr. Feldman has managed the implementation of numerous site specific Brownfields cleanup and redevelopment projects, and has presented papers and held workshops at the US EPA Brownfield and at international conferences. He was the Principal Consultant for the very successful City of Emeryville, California Brownfields Cleanup Program grant implementation.

- *Additional Testimony.* Mr. Feldman testified in Napa County Superior Court concerning RWQCB staff involvement in water reclamation activities of the Napa Sanitation District as these activities related to the acquisition of farmlands by the District.
- *Additional Testimony.* Mr. Feldman provided material witness testimony concerning investigation, cleanup, monitoring, and agency coordination requirements for a dry-cleaner release of chlorinated volatile organic chemicals at a UST site in Berkeley, California.
- *Additional Testimony.* Mr. Feldman testified in Alameda County Superior Court concerning the requirements of the RWQCB pertaining to USTs, the relationship between the RWQCB and Alameda County, and the RWQCB's involvement in remediation activities at a leaking underground storage tank site in Emeryville, California.
- *Additional Expert Testimony.* Mr. Feldman provided expert opinions and testimony for the plaintiff regarding the Water Quality Control Plan of the RWQCB as it relates to the impacts on beneficial uses from releases of metals to soil, groundwater, and San Francisco Bay at a bay margin site.
- *Additional Expert Testimony.* Mr. Feldman provided expert testimony and provided declarations in support of defendant in Alameda County Superior Court related to fingerprint analyses for metal waste, storm water regulations, soil and waste sampling procedures, and the requirements for investigation and cleanup of the RWQCB, Alameda County Health, and the California Department of Toxic Substances Control at a foundry in Oakland, California.
- *Additional Expert Testimony.* Mr. Feldman provided expert testimony in San Francisco Superior Court related to the regulatory requirements for assessment, cleanup and disposal of lead in soil at a construction project site in San Francisco.

- *Additional Expert Testimony.* Mr. Feldman provided expert opinions, testimony and provided input to regulatory strategy for the defense concerning the orders, policies, and practices of the RWQCB and hazardous waste regulations for the period 1980 and 1985.
- *Additional Expert Testimony,* Mr. Feldman provided expert opinions and testimony for the U.S. Department of Justice related to the release of fuel to the soil and groundwater at a currently used drinking water source. Opinions concerned the investigation, cleanup and environmental monitoring requirements of the underground storage tank program, with specific applications at the North Coast RWQCB as contained in federal and state practices, regulations, and policies. Also, for the Department of Justice, Mr. Feldman assisted in the development of summary judgment arguments for the defense on a fuel release and chlorinated volatile organic chemical release site in Monterey, California.
- *Additional Expert Testimony,* Mr. Feldman provided expert opinions and testimony in U.S. District Court in San Jose, California for the former owner/operator of a paper manufacturing facility in San Jose, California related to the environmental and regulatory significance, and sources, of releases and suspected releases of metals, fuel and chlorinated volatile organic chemicals from underground storage tanks and manufacturing operations.
- *Additional Expert Testimony,* Mr. Feldman provided expert opinions, prepared rebuttals to other expert opinions, executed declarations, and provided expert testimony related to alleged vapor intrusion from soil and groundwater into a residence, and standard of care in such matters during the early 1990's.

HONORS

Federal Water Pollution Control Fellowship, University of Michigan, 1970-1972

City of Stockholm, Sweden – Bangemann Challenge, June 8-11, 1999, Winner: City of Emeryville, "Supporting the Environment."

PUBLICATIONS

"Risk-Based Environmental Remediation – Defining the Magnitude of Potential Health and Environmental Threats," Feldman, L., California Environmental Law and Regulation Reporter, Argent Communications Group, Vol. 5, No. 5, July 1995.

"Redeveloping Brownfields: The Emeryville California Model," Feldman, L. and D. Arulanantham, a white paper for the National Environmental Policy Institute, Washington, D.C., June 1995.

"Put Risk-Based Remediation to Work," Johl, C., L. Feldman, and M. Rafferty, Environmental Engineering World, Vol. 1, No. 5, September-October 1995.

"Demonstrating Natural Attenuation of Petroleum Hydrocarbons for Closure at a Redevelopment Site," Feldman L. and J. Nelson, presented at IPEC, Albuquerque, New Mexico, October 1998 and AEHS Conference in Oxnard, California, March 1999.

"Sustaining Risk-Informed Decision Making (RIDM) Measures", Feldman, L. and Arulanantham, R.; Ecosystems and Sustainable Development IV, WIT Press, 2003.

"Risk Management at a Brownfields Site: A Case Study in Long-Term Stewardship", L. Feldman, Brownfield Sites II, Assessment, Rehabilitation & Development, WIT Press, 2004.

APPENDIX C

Designation of Administering Agency

Winston H. Hickox
Secretary for
Environmental
Protection

California Environmental Protection Agency

Air Resources Board • Department of Pesticide Regulation • Department of Toxic Substances Control
Integrated Waste Management Board • Office of Environmental Health Hazard Assessment
State Water Resources Control Board • Regional Water Quality Control Boards

Gray Davis
Governor

January 5, 1999

Ms. Carol Bach
Port of San Francisco
Ferry Building, Suite 3100
San Francisco, California 94105

Dear Ms. Bach:

REQUEST FOR DESIGNATION OF AN ADMINISTERING AGENCY FOR THE FORMER WESTERN PACIFIC PROPERTY SAN FRANCISCO, CALIFORNIA, COUNTY OF SAN FRANCISCO

The Site Designation Committee has designated the Regional Water Quality Control Board as the administering agency for the site investigation and remediation of the hazardous waste release site located west of Pier 80, San Francisco, California. The designation was made pursuant to the requirements of Assembly Bill 2061 (Umberg, Chapter 1184, 1993) (Health and Safety Code, Division 20, Chapter 6.65, Section 25260 *et seq.*). Enclosed is a copy of the approved Resolution No. 98-11.

Mr. Vic Pal, will oversee coordination of regulatory efforts for the site. Mr. Pal can be contacted, at (510) 622-2403.

The Office of the Secretary appreciates your application to consolidate site remediation efforts and would like to offer our continued commitment to assist you in this matter. If you have any questions or concerns, please call Ms. Laurie Grouard, Acting Site Designation Coordinator, at (916) 323-3394.

Sincerely,

Kenneth Selover, Chair
Site Designation Committee

Enclosure

cc: See next page.

cc: Mr. John Fong
San Francisco Municipal Railway
1145 Market Street, 5th Floor
San Francisco, California 94103

Mr. Stephen Morse
S.F. Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

Mr. Vic Pal
S.F. Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

Mr. Kenneth Leung, Ph.D., P.E., REA
AGS, Inc., Consulting Engineers
111 New Montgomery, Suite 500
San Francisco, California 94105

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
SITE DESIGNATION COMMITTEE
RESOLUTION NO. 98-11
DECEMBER 10, 1998
FORMER WESTERN PACIFIC PROPERTY, SAN FRANCISCO COUNTY, CA

WHEREAS, Chapter 6.65 of the Health and Safety Code, commencing with Section 25260 establishes a Site Designation Committee; and

WHEREAS, the Site Designation Committee may designate an administering agency to oversee a site investigation and remedial action at a hazardous materials release site upon request of a responsible party; and

WHEREAS, the Port of San Francisco and the San Francisco Municipal Railway, responsible parties as defined in Health and Safety Code Section 25260(h), requested the Site Designation Committee to designate an administering agency to oversee site investigation and remedial action at the Former Western Pacific Property, approximately 30 acres of property west of Pier 80 in San Francisco, San Francisco County, California, more particularly described in Attachment A (site), and agreed to carry out the site investigation and remedial action at the site; and

WHEREAS, this site is a hazardous materials release site as defined in Health and Safety Code Section 25260; and

WHEREAS, the Site Designation Committee held a meeting on December 10, 1998, and provided an opportunity at the meeting for public comment regarding the application; and

WHEREAS, the Site Designation Committee considered the application and furthermore, considered all factors and criteria set forth in Health and Safety Code Section 25262(c); and

WHEREAS, the Port of San Francisco and the San Francisco Municipal Railway agree to reimburse appropriate agencies for their appropriate oversight costs and/or costs of permit development, where those agencies' significant involvement and/or permit development is necessary for the furtherance of the project goals; and

WHEREAS, the Site Designation Committee has determined that, based on consideration of all of the factors listed in Health and Safety Code Section 25262(c), the San Francisco Bay Regional Water Quality Control Board is the appropriate agency to act as the administering agency; and

NOW, THEREFORE BE IT RESOLVED that the Site Designation Committee hereby designates the San Francisco Bay Regional Water Quality Control Board as the administering agency for the site; and

BE IT FURTHER RESOLVED that this designation is subject to the following conditions:

1. The San Francisco Bay Regional Water Quality Control Board shall consult, on an ongoing basis, with all appropriate agencies who have expressed an interest in this site, including all agencies who would otherwise be issuing a permit or other form of authorization:

   a) in administering all state and local laws which are applicable;

   b) in determining the adequacy of site investigation and remedial action activities; and

   c) prior to issuing any permit or other form of authorization.

2. Such consultation will also include notification if information becomes available to the administering agency that the original application was inaccurate or was incomplete.

3. If an advisory team is convened by the Site Designation Committee, a representative of the administering agency shall attend all advisory team meetings.

4. The San Francisco Bay Regional Water Quality Control Board shall submit quarterly reports to the Site Designation Committee and to other appropriate agencies concerning the status of the investigation and/or remediation of the Site and shall comply with applicable public participation requirements.

CERTIFICATION

The undersigned Chair of the Site Designation Committee does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the Site Designation Committee held in Sacramento, California on December 10, 1998.

DATED: 1-5-99

KENNETH SELOVER, CHAIR
Site Designation Committee

ATTACHMENT A
Applicants

The Port of San Francisco (Port) and the San Francisco Municipal Railway (MUNI) jointly request a lead agency to be designated for the "Former Western Pacific Property" (the "site"). Both the Port and MUNI are agencies of the City and County of San Francisco. The Former Western Pacific Property, consisting of about 39 acres of property (30 acres are land reclaimed by filling and about 9 acres are water lots in San Francisco Bay), is located west of Pier 80 in San Francisco. The area subject to this request for designation of a lead agency is shown on Attachment B, and represents all above-water portions of the site. The Port expects this property to be transferred by Catellus Development Corporation to the City and County of San Francisco, acting by and through the Port, as part of the Mission Bay development project. Potential contamination on the property exists due to former operations by Western Pacific Railroad. Results of preliminary environmental investigations of the site have been reviewed by the California Environmental Protection Agency's Regional Water Quality Control Board - San Francisco Bay Region (RWQCB).

The Port, as the potential future owner of the Former Western Pacific Property, agrees that it will be a responsible party for the site for the purpose of California Health & Safety Code Chapter 6.65. The Port's long term plans for the site include commercial and possibly residential development, as well as a substantial leasehold to MUNI. MUNI plans to construct and operate a light rail vehicle maintenance facility (shops and yard) on its leasehold in the near future. MUNI has agreed to be a responsible party for the purpose of California Health & Safety Code Chapter 6.65 for existing hazardous materials releases requiring remediation on its leasehold. Major milestones for the construction of the light rail vehicle maintenance facility are as follows:

- Begin soil stabilization and site remediation, if required, in August, 1999.
- Begin construction of the light rail vehicle maintenance facility in November, 2000.
- Complete construction by August, 2002.

Winston H. Hickox
Secretary for
Environmental
Protection

California Environmental Protection Agency

Air Resources Board • Department of Pesticide Regulation • Department of Toxic Substances Control
Integrated Waste Management Board • Office of Environmental Health Hazard Assessment
State Water Resources Control Board • Regional Water Quality Control Boards

Gray Davis
Governor

January 5, 1999

Mr. Stephen Morse
S.F. Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

Dear Mr. Morse:

DESIGNATION OF AN ADMINISTERING AGENCY FOR
THE FORMER WESTERN PACIFIC PROPERTY
SAN FRANCISCO, CALIFORNIA, COUNTY OF SAN FRANCISCO

Pursuant to Health and Safety Code, Division 20, Chapter 6.65, Section 25260 *et seq.* (AB 2061, Chapter 1184, Statutes of 1993 (Umberg)), the Site Designation Committee has designated the Regional Water Quality Control Board as the administering agency for the Former Western Pacific Property hazardous materials release site (site). The site is located west of Pier 80, San Francisco, California. Enclosed is a copy of approved Resolution No. 98-11.

The administering agency's responsibilities include administering all state and local laws that govern the site cleanup, determining the adequacy and extent of cleanup, issuance of necessary authorizations and permits, and following the determination that an approved remedy has been accomplished, issuance of a certificate of completion. All of these activities should be administered after consultation with other regulatory agencies having jurisdiction over cleanup activities at the site. The administering agency should hold an initial meeting with support agencies to clarify roles, arrange cost recovery contracts, and set project proposed timeliness.

If requested, a Consultative Work Group can assist in coordinating all site investigation and remediation activities. The work group would consist of front-line staff from all appropriate agencies. As the administering agency, your staff should organize and chair meetings of the work group if one is formed. The work group should meet within 45 days of designation and as often as necessary thereafter. The administering agency, and any interested members of the work group, should meet

cc: Ms. Carol Bach
Port of San Francisco
Ferry Building, Suite 3100
San Francisco, California 94105

Mr. John Fong
San Francisco Municipal Railway
1145 Market Street, 5th Floor
San Francisco, California 94103

Mr. Kenneth Leung, Ph.D., P.E., REA
AGS, Inc., Consulting Engineers
111 New Montgomery, Suite 500
San Francisco, California 94105

Mr. Vic Pal
S.F. Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

SITE DESIGNATION COMMITTEE MEETING
OF THE
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

December 10, 1998
1:30 p.m.

Union Building
301 Capitol Mall
Fourth Floor Large Conference Room
Sacramento, California 95814

A G E N D A

Notice: Testimony will be taken from those who identify themselves as wishing to speak at the beginning of the proceedings. Speakers for each item will be called in the following order: Applicant, Proposed Administering Agency, Representatives of Organizations, Governmental agencies; and other interested parties. Please note that there may be time limits placed upon testimony according to the number of parties who wish to participate. When submitting written comments, please provide 10 two-sided copies. If you need further information, please contact Laurie Grouard, at (916) 323-3394.

1. CONSIDERATION OF AN ADMINISTERING AGENCY FOR THE FORMER WESTERN PACIFIC PROPERTY CONSISTING OF ABOUT 39 ACRES OF PROPERTY (30 ACRES ARE LAND RECLAIMED BY FILLING AND ABOUT 9 ACRES ARE WATER LOTS IN THE SAN FRANCISCO BAY), LOCATED WEST OF PIER 80 IN SAN FRANCISCO, COUNTY OF SAN FRANCISCO. THE APPLICANTS, THE PORT OF SAN FRANCISCO AND THE SAN FRANCISCO MUNICIPAL RAILWAY (MUNI), HAVE REQUESTED THAT THE REGIONAL WATER QUALITY CONTROL BOARD BE DESIGNATED AS ADMINISTERING AGENCY FOR THIS SITE.

2. CONSIDERATION OF AN ADMINISTERING AGENCY FOR A 4-ACRE PARCEL OF PROPERTY SUBJECT TO A STREET EASEMENT AND USED AS A CITY STREET (THE "BUCHANAN STREET PROPERTY") WHICH IS SURROUNDED BY THE 82-ACRE ALBANY PLATEAU PROPERTY, COUNTY OF ALAMEDA. THE APPLICANT, CATELLUS DEVELOPMENT CORPORATION, EAST SHORE PARK PROPERTIES, HAS REQUESTED THAT THE REGIONAL WATER QUALITY CONTROL BOARD BE DESIGNATED AS ADMINISTERING AGENCY FOR THESE SITES.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

Docket No. 04-AFC-01
PROOF OF SERVICE
Revised 2/17/06

DOCKET UNIT

Instructions: *Send an original signed document plus 12 copies* ***or*** *an electronic copy plus one original paper copy to the address below:*

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 04-AFC-01
DOCKET UNIT, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

Also send a printed ***or*** *electronic copy of all documents to each of the following:*

APPLICANT

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BHale@sfwater.org

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Robert Sarvey
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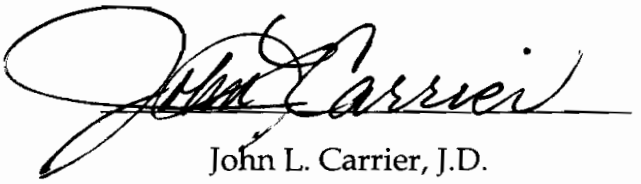
Tracy, CA 95376
sarveyBob@aol.com

DECLARATION OF SERVICE

I, John L. Carrier, declare that on May 1, 2006, I deposited copies of the attached Supplemental Testimony, Site Contamination: Soil and Water/Waste Management in the United States mail at Sacramento, California with first class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above. Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. I declare under penalty of perjury that the foregoing is true and correct.



John L. Carrier, J.D.
Program Manager