

agency (RWQCB, DTSC, City and County of S.F.) approval of risk-based investigation and remediation approaches for various chemical compounds discovered at the site. Negotiated a soil cleanup waiver for remediation of lead-affected soil along a transportation corridor leading to the site.

Former Benicia Arsenal Residential Construction Project, Pacific Bay Homes, Benicia, CA. (GMX # 6768) Principal-in-charge of a multi-year, multi-site effort for AMEC Geomatrix that primarily included consultation, regulatory interaction, and field services for two closed landfills and part of a former military site and landfill that has been converted into several residential housing projects of more than 300 homes. Additional activities included assisting with the regulatory closure of one landfill and liability transfer of a second landfill, including interactions with the housing developer.

American Brass & Iron, Oakland, CA. (GMX # 4032) Principal-in-charge of multiple activities at this industrial facility primarily related to storm water management. AMEC Geomatrix has participated in numerous inspections by staff of the RWQCB. AMEC Geomatrix has also completed the engineering and project management activities associated with a completed assessment project for impacted sediments in a nearby waterway, as well as directing a sediment cleanup of the waterway. This effort involved coordination with the adjacent railroad as well as the California Department of Fish and Game. Additional upstream waterway cleanup is currently being planned by AMEC Geomatrix engineering staff. Project is ongoing.

LITIGATION SUPPORT

Expert Testimony, International Paper Company, Northern California. Expert testifier in United States District Court for the Northern District of California concerning the types and sources of groundwater quality impacts at a former underground tank and toxic chemical use facility in San Jose, California. Opined on the regulatory significance of various metals, chlorinated solvents, and petroleum hydrocarbons found in soil and groundwater at the facility.

Expert Testimony, United States Department of Justice, San Francisco, CA. Expert testifier in the United States Court of Federal Claims in San Francisco concerning the requirements of the North Coast RWQCB pertaining to the causes, investigations, and cleanup and monitoring requirements for groundwater impacted by petroleum hydrocarbons. Opined on the RWQCB's involvement in remediation activities at this leaking underground storage tank site within a National Forest in Northern California.

Expert 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.

Expert Testimony. (Prior to GMX) Mr. Feldman provided material witness testimony concerning investigation, cleanup, monitoring, and agency coordination requirements for a dry-cleaner release of volatile organic chemicals at a UST site in Berkeley, CA.

Expert Testimony. (Prior to GMX) 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.

Expert Testimony. (Prior to GMX) 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.

Expert Testimony. (Prior to GMX) 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.

Expert Testimony. (Prior to GMX) 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.

Expert Testimony. (Prior to GMX) Mr. Feldman provided expert opinions, testimony and regulatory strategy for the defense concerning the orders, policies, and practices of the RWQCB and hazardous waste regulations for the period 1980 and 1985.

Insurance Litigation Support. (Prior to GMX) Mr. Feldman provided testimony for the plaintiff during depositions pertaining to an environmental insurance settlement involving a large multinational automobile manufacturer. Also, provided expert declaration in support of plaintiff for lawsuit filed in U.S. District Court for the Northern District California. This declaration concerned agency records relating to the release of petroleum hydrocarbons from leaking USTs and related piping systems.

Agency Litigation Support. (Prior to GMX) Mr. Feldman provided testimony for the State of Arizona concerning expert opinions filed for the plaintiff concerning the potential for releases of halogenated volatile organic chemicals from concrete tanks, buried wastewater pipes, and an on-site wastewater disposal system in Phoenix, Arizona.

Private Enforcement. (Prior to GMX) 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 field primarily relates to storm water matters. Activities include providing regulatory and technical advice related to compliance with the Clean Water Act, including the creation of storm water pollution prevention plans (SWPPPs) and erosion control plans, and obtaining compliance letters from the regulatory agencies. Activities also include assisting with the response to storm water pollution incidents, coordinating and negotiating response actions, and providing reports to the appropriate agencies. This practice area also includes providing input to required annual reports.

MINING

Talc Mine Closure, Central Valley, California. Mr. Feldman assisted with the development of a closure strategy for a former "talc" mine in the Sierra foothills. Specifically, Mr. Feldman reviewed the waste discharge requirements, the Central Valley RWQCB's Basin Plan requirements, and the staff practices as part of his consulting assignment.

WATER RESOURCES

Leona Quarry Storm Water Management, De Silva Group/ Gallagher Properties, Oakland, CA. (GMX # 5326) Principal-in-charge of storm water management activities for a road-base materials quarry located in an urbanized area of Oakland. AMEC Geomatrix was hired after the failure of storm water BMPs at the facility resulted in the flooding of California Highway 580 and in sediment

discharges to the adjacent waterway. AMEC Geomatrix developed a revised SWPPP, advised in the implementation of extensive BMPs, provided routine storm water sampling required by the California Industrial Facilities NPDES General Permit; and provided regulatory interaction services with RWQCB and City of Oakland staff. Since the site collected upstream urban runoff from an uphill subdivision and because of the past history of BMP failure, BMPs were closely monitored during the seven years that AMEC Geomatrix consulted on the project. The site is currently being developed into a housing project.

Metal Recycling Facility Storm Water Best Management Practice, Oakland, CA. Principal-in-charge of AMEC Geomatrix activities related to storm water management program designed to comply with both the Industrial General Permit as well as a Consent Decree applicable to the site. Activities involve the review and revision of the SWPPP for the facility, review of BMP performance at an existing filtration system, storm water flow management consultation, and conceptual design of additional BMPs including an infiltration system for impacted storm water. AMEC Geomatrix conducted water quality and soil quality studies at the facility related to design and operation of existing and proposed BMPs. AMEC Geomatrix also provided a review of water quality criteria as part of the litigation support services related to storm water litigation under the Federal Clean Water Act

American Brass and Iron, Radcliff, Frandsen & Dongell, Oakland, CA. (GMX # 4032) Principal-in-charge of multiple activities at this industrial facility primarily related to storm water management. AMEC Geomatrix has provided litigation support consultation for the facility related to potential citizen suits filed under the Federal Clean Water Act. These services related to SWPPP review and providing recommendations for improving the implementation of existing BMPs, as well as suggesting additional BMPs for the facility, which is managed under the NPDES General Permit for Industrial Activities. AMEC Geomatrix has participated in numerous inspections by staff of the RWQCB. AMEC Geomatrix has also completed the engineering and project management activities associated with a completed cleanup project for sediments formerly located in an outfall pipe to a nearby waterway, as well as a cleanup of the waterway. This effort involved coordination with the adjacent railroad as well as the Department of Fish & Game. Additional upstream waterway cleanup is currently being planned by AMEC Geomatrix engineering staff.

Water Quality Programs, Sonoma and Marin Counties, California. (Prior to GMX) As section leader in the RWQCB's Surface Water Protection Division, Mr. Feldman was the RWQCB's Area Engineer and assisted local water quality programs in Marin and Sonoma counties. Activities included municipal, agricultural, and commercial waste treatment facilities; dairy and agricultural waste control programs; on-site wastewater management; storm water runoff; water reuse and reclamation; erosion control; timber harvest regulation; and assistance with the development of local hazardous waste control programs.

Storm Water Management. (Prior to GMX) Assisted clients with the understanding of the Clean Water Act requirements for storm water, including assisting with Notices of Intent to Comply, developing SWPPPs, performing informal compliance inspections, developing response actions related to agency inspections, and interpreting local agency and RWQCB directives. 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 personalities, and agency staff and board practices.

REMEDIATION/INVESTIGATION

Environmental Investigation and Remediation, Former Industrial Facility, Palo Alto, CA.

(GMX # 3311) Principal-in-charge of investigation and remedial activities at this former industrial site where solvents (PCE) was released to the soil and groundwater and where numerous solvent plumes (TCE) have migrated onto the site which has since been subdivided into numerous properties under separate land use and ownership. AMEC Geomatrix has completed extensive soil, soil vapor and groundwater investigation, monitoring, reporting and agency interaction activities, implemented remedial actions that have included soil excavation, in situ groundwater remedial activities including construction of a permeable reactive treatment barrier utilizing zero-valent iron, implementing a successful enhanced bioremediation program and experimenting with the use of nano-scale iron. AMEC Geomatrix also operates a groundwater pump-and-treat system on one of the affected properties.

Former Aerospace Facility, Newport Beach, CA. Managed AMEC Geomatrix activities associated with the investigation of groundwater and soil vapor impacted with solvents (primarily TCE), and conducting monitoring, reporting and agency interaction at this currently residential area where former industrial activities had been conducted.

PUBLICATIONS AND PRESENTATIONS

"Should Water Quality Outweigh Hydraulic Controls for a 303(D)-Listed Eutrophic Water Body?" J.H. Honniball, G. Stemler, L. Feldman, M. Bavinger, and L. Estes. (ABS.) CASQA 5th Annual Conference, California Stormwater Quality Association. San Diego, CA. November 2-4, 2009.

"Alternative Methods for Constructing Passive In Situ Treatment Systems Composed of Zero Valent Iron." P. Bennett, L. Feldman, M. Goerz, and S. Warner. *Proceedings of the Fifth European Conference on Oxidation and Reduction Technologies for In-Situ Treatment of Soil and Groundwater and the Third European Conference on DNAPL Characterization and Remediation, Amsterdam, The Netherlands.* October 21-23, 2008.

"The Economic Impact Analysis of a California Water Board Brownfield Remediation Project: The Great Mall in Milpitas." L. Feldman, S. Hill, M. Johnson, and E.J. Pearson. Report for the California Environmental Protection Agency, State Water Resources Control Board. July 7, 2008.

"Local Applications of Innovative Groundwater Cleanup Using Zero Valent Metals." L. Feldman and P. Bennett. Regional Workshop, U.S. EPA Region 9, San Francisco, CA. January 31, 2008.

"Chlorinated Solvent Source Zone Identification and Characterization Using Direct-push Drilling Technologies." P. Bennett, L. Feldman, M. Goerz, and P. Peischl. *Proceedings of the 4th European Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater and the 2nd European Conference on DNAPL Characterization and Remediation, Amsterdam, The Netherlands.* October 16-18, 2007.

"On-site Preparation and Field Testing of 'Stabilized' Reactive Bi-metallic Nanoparticles Composed of Iron and Palladium." P. Bennett, L. Feldman, B. Aiken, D. Gandhi, and P. Peischl. *Proceedings of the 4th European Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater and the 2nd European Conference on DNAPL Characterization and Remediation, Amsterdam, The Netherlands.* October 16-18, 2007.

"Combined Biotic and Abiotic Destruction of PCE." P. Bennett, L. Feldman, M. Goerz, S. Archer, and P. Peischl. *Proceedings of the 4th European Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater and the 2nd European Conference on DNAPL Characterization and Remediation, Amsterdam, The Netherlands.* October 16-18, 2007.

"Installation of a Multiple Funnel-and-gate ZVI Reactive System in a Heterogeneous Alluvial Environment." L. Feldman, M. Goerz, P. Bennett, A. Cox, F. Szerdy, D. Gandhi, M. Calhoun, and P. Peischl. *Proceedings of the 4th European Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater and the 2nd European Conference on DNAPL Characterization and Remediation, Amsterdam, The Netherlands.* October 16-18, 2007.

"High Resolution Transects of Surface ER and Geoprobe EC Profiles for Assessing Geologic Controls on Groundwater Flow." P. Bennett, M. Einarson, M. Goerz, L. Feldman, R. Arulanantham, and Y. Hashimoto. *Proceedings of the Groundwater Resources Association of California (GRAC) 2nd Symposium on Tools and Technologies, High Resolution Site Characterization and Monitoring, Long Beach, CA.* November 2006.

"3D Geologic Model Development from High Resolution Transects of CPT Profiles for Assessing Geologic Controls on Groundwater Flow." T. Mote, P. Bennett, M. Goerz, and L. Feldman. *Proceedings of the Groundwater Resources Association of California (GRAC) 2nd Symposium on Tools and Technologies, High Resolution Site Characterization and Monitoring, Long Beach, CA.* November 2006.

"Geoprobe EC Profiles for Identifying Water Bearing Zones." M. Goerz, P. Bennett, L. Feldman, and P. Peischl. (Abs) Groundwater Resources Association of California (GRAC) 2nd Symposium Tools and Technology, Long Beach, CA. November 2006.

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

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

"Demonstrating Natural Attenuation of Petroleum Hydrocarbons for Closure at a Redevelopment Site." L. Feldman and J. Nelson. Presented at IPEC, Albuquerque, NM. October 1998. Also presented at AEHS Contaminated Soils and Water Conference, Oxnard, CA. March 1999.

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

"Redeveloping Brownfields: The Emeryville California Model." L. Feldman, S. Morse, R. Arulanantham, and I. Dayrit. "White Paper" for National Environmental Policy Institute, Washington, D.C. June 1995.

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

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."

BEFORE THE STATE WATER RESOURCES CONTROL BOARD

In the Matter of the California Regional Water
Quality Control Board – Los Angeles Region.)
Action to Impose Clean-Up Goals for Soil and)
Groundwater – Former GATX Los Angeles)
Marine Terminal, Port of Los Angeles, Berths)
171 through 173, Wilmington, CA)

**DECLARATION OF
ANDREW D. COX
IN SUPPORT OF
PETITION FOR REVIEW
AND REQUEST FOR
STAY**

I, Andrew David Cox, hereby declare and state as follows based upon my personal knowledge and experience:

1. I am a Senior Engineer of AMEC Geomatrix, Inc. (“AMEC”) with extensive experience in the design and implementation of soil and groundwater remediation projects. I have worked at AMEC Geomatrix from 1991 to present.
2. I hold a B.Sc. Degree in Engineering from the University of London. I am a registered Professional Engineer in the State of California. I have over 25 years experience in civil and environmental engineering.
3. AMEC is currently providing consulting services to Kinder Morgan (“Petitioner”) related to the site investigation and remediation project at the Former Los Angeles Marine Terminal at the Port of Los Angeles, Berths 171 to 173 in Wilmington, California (“LAMT”). Other responsible parties identified for LAMT include ConocoPhillips, Texaco, Inc., and the Port of Los Angeles (“the Parties”).
4. I have worked on the LAMT project since September 2008 in the capacity of lead environmental engineer. My primary duties have been the technical formulation of remedial alternatives to address soil and groundwater impacted with petroleum hydrocarbons from historic operations at LAMT. This has included providing cost estimates to implement the alternatives. These alternatives have been formulated using my professional judgment, past experience, and in general accordance with Environmental Protection Agency guidance, in particular *Guidance for Conducting Remedial Investigations and Feasibility Studies under Comprehensive Environmental Response, Compensation and Liability Act*¹ (henceforth, the “Guidance”).
5. In summary, my understanding of the water quality related environmental impacts at the LAMT is that soil and groundwater are impacted with chemicals relating to former petroleum storage and transmission activities at the site and additionally with chemicals that may have migrated onto the site from other properties or may have been included in fill brought to the site (collectively, the chemicals of concern or “COCs”). In some areas

¹ U.S. EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies under Comprehensive Environmental Response, Compensation and Liability Act*, EPA/540/G-89/004, OSWER Directive 9355.3-01, Office of Emergency and Remedial Response, Washington, D.C., October.

of the site light non-aqueous phase liquids (“LNAPL”; primarily petroleum hydrocarbons) are present. Sheen is alleged to have seeped from LAMT to the harbor and may continue to do so although observations of sheen have only occurred in three of the last 12 months and only when absorbent booms have been disconnected to allow mixing with harbor water. No sheen has been observed in the last four months. I am aware that the Port’s consultant Tetra Tech is currently implementing interim remedial measures to remove LNAPL from the site and to prevent potential seepage of sheen into the harbor.

6. The remedial objectives for the site as developed by AMEC are to:

- Protect human health.
- Protect surface water and groundwater quality for its designated beneficial uses.
- Remove free product to the extent practicable.
- Eliminate sheen attributed to site (if any) in harbor.
- Eliminate identifiable oil seeps at soil surface.
- Implement the appropriate alternative in coordination with site redevelopment plans.

I worked on developing remedial alternatives to satisfy these objectives.

7. In formulating alternatives to address impacted soil and groundwater at LAMT, I have been responsible for the identification of appropriate remedial technologies for soil and groundwater. Technologies were identified based on considerations of their applicability to site conditions, chemicals of concern, and relative cost, using the guidelines published by the Federal Remediation Technologies Roundtable, in particular the Remediation Technologies Screening Matrix.² The cleanup goals considered previously are those in the Regional Water Board’s November 14, 2008 letter.³

8. The selected technologies were combined into alternatives that were evaluated using the nine criteria contained in the Guidance. These criteria include considerations of overall protection of human health and the environment, short- and long-term effectiveness, and cost.

9. As part of my consulting services for the LAMT site, I have reviewed the January 28, 2010 Amendment to the Revised Cleanup & Abatement Order No. R4-2008-0006 (Issued April 9, 2008) (“CAO Amendment”) issued by the Executive Officer of the Regional Water Board.

² http://www.frtr.gov/matrix2/section3/table3_2.pdf

³ Regional Water Board, 2008, Clean-up Goals for Soil and Groundwater – Former GATX Los Angeles Marine Terminal, Port of Los Angeles, Berths 171 through 173, Wilmington, California, letter from Tracy Egoscue of the Regional Water Board to the Parties.

10. The CAO Amendment orders the Parties to remediate the site in accordance with the revised Cleanup Goals set forth in Exhibit A to the CAO Amendment. The CAO Amendment further requires the submittal of a Remedial Action Plan (RAP) based on these Cleanup Goals for soil, soil gas, and groundwater for the entire site by March 29, 2010
11. Several of the Cleanup Goals prescribed in the Regional Water Board's CAO Amendment are different and more restrictive than those set forth in the November 2008 Letter or in the Regional Water Board's documents or correspondence issued since that time. Proper development of a RAP depends on clear identification of Cleanup Goals and other project objectives. Changes in Cleanup Goals can result in significant changes in the remedial approach, alternatives, and implementation steps that need to be expressed in a RAP.
12. AMEC estimates, based on a review of site chemical data and the language of the CAO Amendment, that the Regional Water Board's Cleanup Goals for TPH would require remediation of soil to a minimum of 5.7 feet below ground surface across the majority of the site. The depth of 5.7 feet corresponds to the average depth to the bottom of the vadose zone, assumed to be at mean low low water level. The volume of soil targeted for remediation would be approximately 101,000 cubic yards. For the purposes of preliminary conceptual designs and cost estimates the groundwater table is assumed to be an average of 4 feet below ground surface. If Board's Cleanup Goals hold, then the presence of other chemicals, particularly metals, could increase this volume since currently the extent of some chemicals (e.g., the metal thallium) above Cleanup Goals is unknown.
13. Subject to more detailed analysis in a new RAP, the most economical way to remediate the soil to attain the new Cleanup Goals mandated by the CAO Amendment would be to excavate it and dispose of it off-site. Similar excavation is a major component of the recommended remedy in Tetra Tech's Draft RAP of 2009, which was based on the Regional Water Board's prior November 2008 Cleanup Goals. Given the relatively low permeability of soils at the site and the nature of the chemicals of concern, it is unlikely that in-situ techniques would be cost-effective; however, this requires further study.
14. Groundwater would be removed as part of dewatering operations, treated on site, and discharged to the harbor under appropriate permits. However, after backfilling, it is likely that groundwater would continue to be re-impacted by off-site sources. Such impacts would result in groundwater impacts exceeding the groundwater Cleanup Goals prescribed in the CAO Amendment. Therefore, this remedial solution may not achieve the Cleanup Goals in perpetuity, and it may generally prove to be a squandering of resources if the adjacent properties do not address their own groundwater contamination at the same time or before LAMT work begins
15. Adjacent sites and soil and groundwater beneath adjacent Port streets are impacted above the Cleanup Goals. Migration of offsite plumes onto LAMT is evident by the fact that oxygenates are present in groundwater beneath LAMT. Regardless of the remedial

alternative eventually adopted, groundwater from adjacent contaminated sites will re-impact the site. Therefore, the Regional Water Board should consider the remediation of the site in the context of the surrounding properties

16. Assuming that the Cleanup Goals are attained by excavation and concurrent dewatering as described in Paragraphs 12 and 13, AMEC has estimated the cost to remediate the site to the Cleanup Goals in the CAO Amendment. We followed the procedure outlined in EPA's *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study*⁴ ("Cost Estimate Guide"). The Cost Estimate Guide recommends percentages for items such as design, project management, construction management, and for bid and scope contingencies. I estimate the 30-year net present value (NPV) cost of complying with the Cleanup Goals in the CAO Amendment to be approximately \$35 – 45 million.⁵ The upper end of this cost range assumes that almost all the lead- and other metals-impacted soil (for example thallium) that are presently known would need to be disposed as RCRA hazardous waste⁶ at Kettleman Hills. Additionally, soil with higher concentrations of TPH may not be acceptable at Class II facilities and may also, therefore, need to be disposed at Kettleman Hills.⁷ The lower end of the range assumes either on-site treatment prior to disposal or that some of the soil is suitable for disposal at a Class II disposal facility. As described in Paragraph 12, the volume of soil requiring removal, and, therefore, the cost of remediation, could increase since the extent of some chemicals (e.g., the metal thallium) now listed in the Cleanup Goals has not been defined across the site.
17. Attaining the Cleanup Goals mandated by the Regional Water Board, which would likely require excavating and disposing of soil over nearly the entire site, would likely cause significant environmental harm through generation of greenhouse gases and particulates. Therefore, attaining the Cleanup Goals through excavation and disposing of soil may not have a positive net impact on the environment. This assumes that a roughly equivalent level of protection of beneficial use of groundwater and surface water could be implemented at lower energy consumption (see Paragraph 20, below).
18. As a general example of the atmospheric impacts of the excavation that would be required: Assume excavation of 101,000 cubic yards of soil with a medium sized excavator. Given an excavation rate of 500 cubic yards per day⁸, this would take 200 days. A medium-sized excavator consumes approximately 120 gallons of diesel fuel per

⁴ U.S. EPA, 2000, *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, OSWER No. 9355.0-75, Office of Emergency and Remedial Response, Washington, D.C., July.

⁵ This cost for the similar Alternative 1 in Tetra Tech's RAP of 2009 was \$13.3 million; however, as explained in Kinder Morgan's Addendum to the signature page submitted with the RAP, it is believed that Tetra Tech underestimated some of the costs and risks associated with the Alternative 1 it described. For example, Tetra Tech only allowed for the off-site disposal of a small quantity of metals-impacted soil. This is an error because Tetra Tech's proposed treatment technology for TPH would not work for metals.

⁶ Letter from Clearwater Environmental dated 2/26/10.

⁷ Clearwater Environmental, personal communication with Jessie Hurd of AMEC, 2/26/10.

⁸ RSMMeans, 2008, *Heavy Construction Cost Data*. The value of 500 cubic yards per day is an approximate average from Item No. 31 23 16.13 for trench excavation to from 4 to 6 feet in common earth.

10-hour day.⁹ Therefore, given the above assumptions, the total diesel fuel burned would be 24,000 gallons. According to the EPA,¹⁰ this would emit 24,000 gallons x 22 lbs/gallon of diesel consumed = 0.5 million lbs of carbon dioxide.¹¹ This does not include the carbon dioxide generated by other construction equipment such as trucks and loaders and does not include the energy required for on-site treatment of the soil. Nevertheless, the example gives an idea of the large quantity of greenhouse gases generated during large-scale excavation projects. In addition to greenhouse gases, the particulate matter in diesel fuel also negatively impacts air quality and would need to be included in a comprehensive analysis of atmospheric impacts. Since a portion of the excavated soil will most likely be considered RCRA hazardous waste or require disposal at a Class I facility, transportation of this soil to Kettleman Hills, 200 miles from the site, should be considered in the evaluation of atmospheric impacts. Assuming a truck capacity of 13 cubic yards¹² and one third of the soil (approximately 35,000 cubic yards) disposed to Kettleman Hills, and assuming a truck's fuel consumption of 6 miles per gallon,¹³ the total carbon dioxide emitted for transportation would be approximately 3.9 million pounds.¹⁴ Adding to this the carbon dioxide emitted due to excavation activities on site, it is likely that the total carbon dioxide emitted to comply with the Cleanup Goals mandated by the Regional Water Board would be in excess of 5 million pounds; equivalent to the carbon dioxide emitted by nearly 160,000 passenger cars in one day on the freeways of Los Angeles.¹⁵

19. Petitioner Kinder Morgan, Inc. is a named responsible party at LAMT, and thus Petitioner will incur significant costs to meet the Regional Water Board's Cleanup Goals. Petitioner would incur substantial financial harm because they would be implementing a remedial alternative at a substantially higher cost (\$35 – 45 million) than another alternative (Paragraph 20, below) that would provide at least equivalent protection of beneficial uses of groundwater and surface water (\$8 million). Thus, Petitioner would be forced to incur a portion of the additional costs of approximately \$27 to 37 million (substantial harm) if the Stay is not granted.
20. Following the procedure outlined in Paragraphs 7 and 8 above, AMEC has identified a remedial alternative that satisfies the remedial objectives listed above in Paragraph 6 although it does not specifically comply with the Regional Water Board's Cleanup Goals.

⁹ http://trenchsafety.com/downloads/Diesel%20Blues_7-08.pdf

¹⁰ <http://www.epa.gov/oms/climate/420f05001.htm>

¹¹ Carbon dioxide is identified by the Intergovernmental Panel on Climate Change (IPCC) as the most important anthropogenic greenhouse gas, *Climate Change 2007, Synthesis Report*.

¹² A semi-truck has a capacity of approximately 20 tons depending on the type of soil, personal communication with Clearwater Environmental, 3/1/10; assuming 1.5 tons/cy; the capacity of a truck is approximately 20/1.5 = 13 cubic yards.

¹³ http://www.engineersedge.com/engineering/Engineers_Edge/navistar_work_to_increase_semitruck_fuel_efficiency_5055.htm

¹⁴ The calculation is as follows: 30,000 cubic yards / 13 cubic yards/trip roundtrips x 400 miles / 6 miles/gallon x 22lbs / gallon = 3.9 million lbs of carbon dioxide (rounded)

¹⁵ According to the EPA (<http://www.epa.gov/oms/consumer/f00013.htm>) on average a passenger vehicle emits 11,450 pounds of carbon dioxide per year, equivalent to 11,450 / 365 = 31 pounds per day; therefore, 5 million pounds of carbon dioxide is equivalent to the carbon dioxide emitted by 5,000,000 / 31 = 159,389 passenger vehicles per day.

Importantly, this remedial alternative could be implemented at the substantially lower cost of \$8 million¹⁶ with lower energy usage and reduced external environmental impacts. The major components of this alternative are listed below together with their contribution to achievement of remedial objectives:

Element	Contribution to Achievement of Remedial Objectives
Phase 1 – Upon Approval of RAP	
Asphalt cap	Protect future human receptors.
Subsurface barrier along shoreline	Mitigate the entry of LNAPL into the harbor from the site.
Extraction of LNAPL inland of barrier from new extraction points and existing wells	Remove LNAPL to the extent practicable.
Monitored natural attenuation of groundwater where WQOs are exceeded	Further protect the beneficial use of groundwater by reducing concentrations of chemicals of concern (COCs).
Absorbent booms and natural attenuation	Mitigate LNAPL believed to be emanating from the riprap.
Excavate seeps	Eliminate identifiable deposits of tarry material (seeps).
Phase 2 – At the Time of Site Development	
Manage excavated soil and dispose off site excess soil that cannot be disposed of as Class 3 material.	Coordinate remediation with site development and protect human health by removing COCs in soil affected by development and above risk-based Cleanup Goals.
Mitigate potential for vapor intrusion to indoor air.	Protect human health.

With regard to Phase 2, it is my understanding that there are currently no published plans to develop this industrial site, so the timing of this phase is uncertain. For the purposes of cost estimation, development in 5 years is assumed.

21. The remediation alternative developed by AMEC on behalf of Petitioner reduces costs and energy consumption by minimizing excavation while protecting human health and water quality. This will contribute to the sustainable remediation and development of the site by helping avoid unnecessary use of landfill space, reduce construction and truck traffic, and limit air quality impacts. Consequently, implementation of this remediation alternative would result in substantial environmental benefit to the public interest. Stated differently, the work required to achieve attainment of the Cleanup Goals described in Paragraph 13 above as mandated by the CAO Amendment would result in substantial environmental harm to the public if Petitioner is forced to go forward in accordance with the mandates of the CAO Amendments as adopted on January 28, 2010.
22. Because the Port is currently implementing interim remedial measures to address LNAPL both on the site and with the potential of seeping into the shipping channel, and because there are no imminent plans to develop the site, I believe that, provided the interim measures are properly implemented and achieve their goals, there is no substantial harm

¹⁶ This cost for the similar Alternative 3 in Tetra Tech's RAP of 2009 was \$5.3 million; however, this did not include an allowance for disposal offsite of soil excavated during possible future site development. In addition, the \$8 million estimate was developed using contingencies more in line with the EPA's Cost Estimate Guidance.

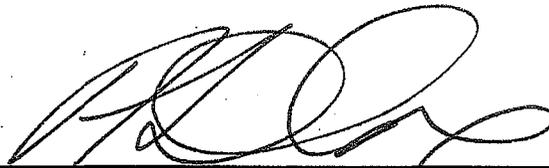
to the environment, the Port, or the general public caused by a reasonable delay in implementing a final remedy for the site to allow for the formulation of a sustainable remedial alternative which complies as closely as possible with the Guidance while minimizing consequential environmental impacts due to the generation of greenhouse gases and particulate matter.

23. In summary, based on the information provided above, it is my conclusion that: 1) substantial harm to Petitioner and the public interest would result if a Stay is not granted, and 2) there would be no substantial harm to the Port of Los Angeles, the other responsible parties, or the public interest if a Stay is granted. Furthermore, the 42 working days¹⁷ demanded by the Regional Water Board for submittal of a new RAP is insufficient to develop and evaluate appropriate remedial approaches for LAMT cleanup. The Stay is therefore necessary to develop a technically sound remedial alternative for the site that is protective of the environment, that is in the public interest, and that is acceptable to stakeholders.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: March 1, 2010

Andrew David Cox



(signature of declarant)

(type or print name)

¹⁷ 42 working days is the time between the issuing of the revised Cleanup Goals on January 28, 2010 and the date stipulated by the Regional Board for submission of a revised RAP on March 29, 2010.



ANDREW DAVID COX, PE

Environmental and Civil Engineering
Water Resources
Construction Management

EDUCATION

M.F.A., Conceptual Design and Information Arts, San Francisco State University, San Francisco, CA, 1997

B.Sc., Civil Engineering, University of London, King's College, England, 1982

REGISTRATION

Professional Engineer, CA No. C66649, 2003

Member of the Institution of Civil Engineers, United Kingdom, No. 44965611, 1993

PROFESSIONAL HISTORY

AMEC Geomatrix, Inc., Senior Engineer, 2008 to date

Geomatrix Consultants, Inc., Project to Senior Engineer, 1991 – 2008

Binnie and Partners, United Kingdom, Assistant Engineer, 1985 – 1991

WLPU Consultants, United Kingdom, Staff Engineer, 1982 – 1985

SKILLS AND EXPERIENCE

Mr. Cox has over 20 years of civil and environmental engineering experience. He has worked for 12 years on complex environmental projects involving remediation of soil and groundwater. His experience includes planning site investigations, interpreting data, selecting remedial alternatives, preparing detailed designs and contract documents, and providing construction management. Mr. Cox is thoroughly conversant with the National Contingency Plan/Comprehensive Environmental Response, Compensation, and Liability Act (NCP/CERCLA) process (Remedial Investigation, Feasibility Study, Remedial Action Plan) for the selection, design, and implementation of environmental remediation. He has held positions of responsibility on projects varying in cost from \$10,000 through \$10 million during both design and construction.

In addition to a degree in civil engineering, Mr. Cox holds an advanced degree in conceptual art, which has provided him with the tools to consider projects in the wider context, make connections between disparate elements, and conceptualize innovative solutions to complex problems. Additionally, he brings a diverse range of experience on civil engineering projects in Europe, Africa, and Asia.

REPRESENTATIVE PROJECTS

ENVIRONMENTAL AND CIVIL ENGINEERING

Design and Installation of a Permeable Reactive Barrier System (PRB) for Treating Chlorinated VOCs in Groundwater, Confidential Client, San Mateo County, CA. (GMX # 11154.001.0) Design engineer and construction manager for a multiple funnel-and-gate PRB that was over 370 feet long and 60 feet in depth. The system included 172 hydraulically isolated treatment gates, at four to five depth intervals within saturated alluvial sediments between 10 and

60 feet. This was the first PRB installed of this configuration, which allowed for a relatively low-cost PRB installation in a deep, complex hydrogeologic environment.

Los Angeles Marine Terminal Remedial Action Plan, Kinder Morgan Energy Partners and ConocoPhillips, Wilmington, CA. (GMX # 12703) Lead environmental engineer for a feasibility study and remedial action plan for remediation of a former fuel storage terminal (the terminal) in the Port of Los Angeles (Berth 171 to 173).

Building 1 Excavation, Oakland Base Reuse Authority, Oakland, CA. (GMX #10395) Provided engineering support to resident engineer during implementation for an excavation project at a former oil reclamation plant. Activities included excavation of 13,000 cubic yards of petroleum and metals-affected sludge and soil, on-site stabilization of 3,000 cubic yards of characterized sludge and soil to reduce mobility of lead and neutralize acid, utility demolition and restoration, backfilling, site regrading, and paving.

San Jose Risk Assessment, RTI International, San Jose, CA. (GMX #10044) Lead engineer for conceptual design of tiered vapor control systems to provide an overview of volatile organic compounds in soil vapor. One of three systems was implemented throughout the site depending on vapor concentration.

Our House Dam Sediment Disposal Site, Yuba County Water Agency, Yuba County, CA. (GMX #12313) Lead engineer for design of 80,000 cubic yards of sediment fill at Our House Dam in Yuba County, California. Design maintained geotechnical stability, maximization of existing drainage facilities, and prevented excessive erosion of placed fill. Also worked closely with client and client's contractor to optimize design for cost and constructability.

Container Facility Redevelopment, Port of Oakland, Oakland, CA. (GMX # 8207) Task manager for the design of a \$3 million container facility redevelopment. The project included design of 25 acres of grading and paving, a new storm drain system, fire water system, electrical system, and site-wide high mast lighting. The deliverable included: 50 construction drawings, engineer's estimate, specifications, and bid form. The design involved taking into account soil and groundwater contaminated with petroleum constituents.

Gasoline and Diesel Remediation, Confidential Client, Newark, NJ. (GMX # 9334.001) Project manager for investigation, monitoring, and remediation of soil and groundwater affected with gasoline and diesel at a major car rental facility. The project included soil vapor extraction, bioslurping, ongoing investigation, studies of natural attenuation, and regular reporting to the agencies. Responsible for negotiation, management of services, and construction contracts.

VOC and Chromium Remediation, General Electric Company, Ontario, CA. (GMX # 1796) Selected remedial alternatives and designed facilities to pump, treat, discharge, and percolate 2,000 gallons per minute (gpm) of water affected with trichloroethene (TCE) and chromium from a former manufacturing facility. Prepared feasibility studies and remedial action plans in accordance with National Contingency Plan/Comprehensive Environmental Response, Compensation, and Liability Act (NCP/CERCLA). Met with the city, county, groundwater agencies, and other public entities to facilitate the project.

VOC and PAH Remediation, Richmond Redevelopment Agency, Richmond, CA. (GMX # 6293) Prepared NCP/CERCLA feasibility study and remedial action plan for a project involving treatment of 10,000 cubic yards of soil and groundwater affected with tetrachloroethene (PCE), vinyl chloride, other volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), and

benzo(a)pyrene. The selected remedy included in situ thermal desorption, excavation, and off-site disposal. Prepared bid documents, evaluated bids, and recommended contractor to the client.

VOC and Dioxane Remediation, Willits Trust, Willits, CA. (GMX # 7177) As part of the feasibility study for a former manufacturing facility, prepared detailed analysis of applicable or relevant and appropriate requirements (ARARs) and detailed evaluation of technologies, including innovative phytoremediation systems, in situ oxidation, and bioremediation.

VOC Remediation, Intersil, Inc., Sunnyvale, CA. (GMX # 1998) As part of groundwater remediation at a former electronics manufacturing facility, designed a soil-cement-bentonite slurry wall to contain groundwater affected by volatile organic compounds.

Crude Oil Remediation, Chevron Corporation, Tracy, CA. (GMX # 7243.011) On behalf of a major petrochemical company, managed design of treatment systems to remove crude oil from a construction dewatering project. Four treatment systems provided a capacity of 6,000 gpm and incorporated dewatering wells, settling tanks, particulate filters, anthracite/clay, and granular activated carbon pressure vessels. The entire project was designed, constructed, and commissioned within one month.

Petroleum Remediation, Kinder Morgan Energy Partners, L.P., Elmira, CA. (GMX # 3824) Prepared reports and designs relating to remediation of various petroleum constituents leaked from a major mixed-use, cross-country pipeline into the backfill of various utilities that served a rural community.

Arsenic Remediation, Rhone-Poulenc, Inc., Palo Alto, CA. (GMX # 1220) Prepared detailed design for major arsenic remediation project involving post-excavation and in situ fixation of soil, grading, and paving.

RAP #3 Main Installation Sites, The Presidio Trust, San Francisco, CA. (GMX # 9886) Lead Designer. Managed the production of design drawings and specifications for the remediation of 12 sites in the historic Presidio area of San Francisco. Worked closely with Presidio Trust and National Park Service staff to protect and restore ecological resources affected by the work. Other issues addressed during the design included deep excavations adjacent to buildings, excavation around complex underground utilities, and work close to recreational areas used by the general public.

WATER RESOURCES

Groundwater Quality Investigation and Remedial Action Program, Confidential Client, Palo Alto, CA. (GMX #3311) Construction Manager. Managed the construction of a 60-foot deep permeable reactive barrier consisting of a 400-foot slurry wall and forty 3-foot diameter caissons backfilled with a mixture of sand and iron. Duties included managing several field staff, negotiating contracts and change orders, certifying invoices for payment, implementing health and safety procedures, maintaining quality standards, and communicating with agencies and the general public.

Groundwater Well Development, General Electric Company, Ontario, CA. (GMX # 1796) Managed studies, design, and installation of 300-foot-deep groundwater well and pumping facilities with a capacity of 2 million gallons per day. Studies involved groundwater modeling to investigate impact of the well on local groundwater conditions. Acted as the client's resident engineer during installation of the well.

Groundwater Basin Planning, General Electric Company, Ontario, CA. (GMX # 1796) Managed studies to investigate the feasibility of percolating groundwater in basins and injection wells. Worked with hydrogeologists to develop a computer groundwater model using MODFLOW; employed specialist consultants; and liaised with local agencies, including Chino Basin Watermaster and Chino Basin Water Conservation District.

Water Pipelines, General Electric Company, Ontario, CA. (GMX # 1796) Managed studies, detailed design, and construction of several miles of PVC and double-contained HDPE pipeline and appurtenances to convey a total of 5 million gallons per day to percolation basins as part of a groundwater development project. Acted as the client's resident engineer during construction.

Reinforced Concrete Reservoirs, Thames Water, London, United Kingdom. (Prior to GMX) Responsible for design of two reservoirs having a combined total capacity of 19 million gallons. Supervised design of associated valve houses, pipelines, storm water drainage, grading, retaining walls, and an access road; completion of more than 100 detailed construction drawings; and a geotechnical investigation involving 30 boreholes and specialized field testing.

Water Supply Projects, Overseas Development Agency / Government of Nepal, Eastern Region, Nepal. (Prior to GMX) Supervised design and construction of six rural water supply projects in a remote area of eastern Nepal in the Himalayas of south Asia. Responsible for supervising 50 local staff, running a small office, and financial control of the projects. Prepared regular progress reports for the Overseas Development Administration of the British government.

Water Supply Feasibility Study, Government of Iraq, Basrah, Iraq. (Prior to GMX) Collected data and conducted site reconnaissance to locate facilities and pipelines for Basrah's water supply. Prepared drawings and drafted report sections.

Flood Alleviation, Borough of Eastbourne, Eastbourne, United Kingdom. (Prior to GMX) Designed and drafted construction drawings for a reinforced concrete gate structure to control flood discharges. Design work, which involved concrete and sheet piling, required hydraulic analysis of the flood canal leading to the structure. Also prepared specifications for contract documents.

CONSTRUCTION MANAGEMENT

Emergency Crude Oil Remediation, Chevron Corporation, Tracy, CA. (GMX #7243.011) Supervised construction of an emergency project to treat groundwater contaminated with petroleum. The work included four treatment systems and several miles of temporary pipe. Prepared permit application, liaised with agencies during operation, administered contracts, oversaw construction and operation, and prepared completion report.

VOC and Chromium Remediation, General Electric Company, Ontario, CA. (GMX # 1796) As part of a major groundwater remediation project, supervised the construction of extraction wells, treatment systems, and 3 miles of pipeline in the public right-of-way.

Airbase Development, Department of Defense, RAF Leeming, UK. (Prior to GMX) Supervised construction of heavily reinforced concrete structures; efforts included coordinating mechanical and electrical services with construction. Particular responsibility for installation of high-grade underfloor stainless steel aircraft fuel pipelines.

Valve House and Pipeline Design and Construction, General Electric Company, Ontario, CA. (GMX # 1796) Acted as the client's resident engineer during installation of a 1,000-gpm production well. Managed construction of several miles of pipelines as well as prepared as-built drawings and completion report.

Former Union Pacific Roundhouse, Port of Oakland, Oakland, CA. (GMX # 8207) Task manager for the design of a \$6.5 million container facility redevelopment. The project included design of 25 acres of grading and paving, a new storm drain system, fire water system, electrical system, and site-wide high mast lighting. The deliverable included: 50 construction drawings, engineer's estimate, specifications, and bid form. Responsible for technical review of contractor's submittals.

Slurry Wall, Intersil, Inc., Sunnyvale, CA. (GMX #1998) Designed a soil-cement-bentonite slurry wall to contain groundwater affected by volatile organic compounds at a former electronics manufacturing facility. Responsible for preparing contract documents and specifications, negotiating with contractors, and supervising construction.

Site Characterization and Remediation, Former Pesticide Manufacturing Facility, Bay Road, Rhone-Poulenc, Inc., East Palo Alto, CA. (GMX #1220) Prepared specifications and bid packages for two major remediation contracts involving in situ and ex situ fixation of a 35 year old former pesticide manufacturing facility. Scope included arsenic remediation. As resident engineer, supervised successful completion of the remediation of 15,000 cubic yards of soil contaminated with arsenic and related compounds.

PUBLICATIONS AND PRESENTATIONS

"Installation of a Multiple Funnel-and-gate ZVI Reactive System in a Heterogeneous Alluvial Environment." L. Feldman, M. Goerz, P. Bennett, A. Cox, F. Szerdy, D. Gandhi, M. Calhoun, and P. Peischl. *Proceedings of the 4th European Conference on Oxidation and Reduction Technologies for In-situ Treatment of Soil and Groundwater and the 2nd European Conference on DNAPL Characterization and Remediation, Amsterdam, The Netherlands. October 16-18, 2007.*

BEFORE THE STATE WATER RESOURCES CONTROL BOARD

In the Matter of the California Regional Water)	
Quality Control Board – Los Angeles Region.)	DECLARATION OF
Action to Impose Clean-Up Goals for Soil and)	DAWN A. ZEMO
Groundwater – Former Los Angeles)	IN SUPPORT OF
Marine Terminal, Port of Los Angeles, Berths)	PETITION FOR REVIEW
171 through 173, Wilmington, CA)	AND REQUEST FOR
		STAY

I, Dawn A. Zemo, based upon my personal knowledge, declare as follows:

1. I am Principal Hydrogeologist of Zemo & Associates LLC with extensive experience in the investigation, risk assessment, remediation and closure of soil and groundwater contamination projects. I started my firm Zemo & Associates in 2002. Prior to starting my own firm, I was a Principal Hydrogeologist for Geomatrix Consultants Inc. since 1989.
2. I hold a Master of Science in Geology from Vanderbilt University. I am a registered Professional Geologist and Certified Engineering Geologist in the State of California. I have 28 years of experience as a professional geologist, including 21 years of experience as a hydrogeologist in the environmental field. A true and correct copy of my resume is attached to this declaration.
3. I am currently providing expert consulting services to Kinder Morgan related to the site investigation and remediation project at the Former Los Angeles Marine Terminal at the Port of Los Angeles, Berths 171 to 173 in Wilmington, California (“LAMT”). I have worked on the LAMT project for several years.
4. The Los Angeles Regional Water Quality Control Board (Regional Water Board) issued a Cleanup and Abatement Order (CAO) for the LAMT site (R4-2008-006; revised August 26, 2008), and transmitted final numerical Cleanup Goals for soil and groundwater at LAMT in a January 28, 2010 Amendment to the CAO (CAO Amendment). The CAO Amendment requires submittal of a Remedial Action Plan for the site by March 29, 2010.
5. Given the site setting, the primary goals of groundwater and soil cleanup at the LAMT are to protect the beneficial uses of the surface water in the adjacent East Basin Channel (part of the Los Angeles Harbor) and to protect the beneficial use of groundwater. Groundwater beneath the site is not designated as a source or potential source of drinking water. The beneficial use of site groundwater is recharge to surface water of the shipping channel; the beneficial uses of the channel surface water include recreation (fishing and swimming) and habitat for marine aquatic organisms.
6. Soil, groundwater, surface water, and sediment conditions at LAMT have been thoroughly evaluated. Groundwater has been monitored quarterly for the last four years, and

concentrations of all site-related constituents are stable or declining. Sediments have been tested for aquatic toxicity, and a human health risk assessment has been completed.

7. Results from these studies show that although soil at LAMT is impacted by elevated concentrations of weathered petroleum (TPH), the site groundwater meets the Regional Water Board's Cleanup Goals for all site-related dissolved constituents except for TPH. Site evaluations and data demonstrate that the "TPH" in site groundwater is composed primarily of byproducts from biodegradation of the petroleum, and that the concentrations of the actual dissolved petroleum hydrocarbons in groundwater are relatively low. This is clear evidence that natural attenuation is active in the subsurface at LAMT, and that it has already restored site groundwater quality to Cleanup Goals except for TPH.
8. Measureable thickness of product has historically been reported on the groundwater, but it has now been reduced to a sheen in all on-site wells because an active product recovery program has been conducted since 2006.
9. An intermittent sheen was observed on the surface of the shipping channel water adjacent to LAMT in 2006, and this was immediately contained in booms. A product recovery program was then set up in 2008 to mitigate that sheen by skimming in on-site trenches. The channel sheen has reportedly been observed in only three of the last 12 months, and not at all in the last four months. In addition, the sheen was reportedly only observed when the boom was broken, which allowed shipping channel water to enter the boomed area. The product recovery program appears to have been successful, and is ongoing.
10. The shipping channel surface water ("seawater") was tested for dissolved constituents and the sediments were tested for toxicity in 2008. No site-related dissolved constituents, including TPH, were detected in the surface water samples; this includes samples collected from the immediate vicinity of the sheen that was present at that time. The sediments were found to be either "not toxic" or of "low toxicity"; the low toxicity was driven by zinc, which is not a site-related chemical. These results are clear evidence that the constituents in site groundwater, including TPH, are naturally attenuating before they can pose a risk to surface water quality or aquatic receptors. Based on these data, current soil and groundwater conditions at LAMT are not threatening the beneficial use of surface water.
11. The Regional Water Board has concurred with the findings of the sediment and surface water testing, and it has concurred that no remedial action is required for sediments or surface water.
12. The quantitative human health risk assessment found that current soil and groundwater conditions do not pose an unacceptable risk to current or future receptors, except for the future construction worker and the future outdoor worker (at isolated soil areas), and the potential for vapor intrusion for the future indoor air worker. The Regional Water Board and OEHHA have approved the risk assessment. The identified risks can be addressed by targeted soil excavation and/or engineered and institutional controls.

13. The site is vacant and fenced. It is my understanding that the site has been vacant and inactive since 1999 and that there are no present plans for site redevelopment.
14. Current conditions at the site are not posing a risk to beneficial uses of surface water or to human health. Soil and groundwater conditions are stable, and the channel sheen is being mitigated.
15. Kinder Morgan has proposed cleanup goals for soil and groundwater at LAMT (based on voluminous site-specific data and a risk evaluation) that are protective of beneficial use of surface water and human health. The Regional Water Board's Cleanup Goals (which are not based on site-specific data) are *significantly* lower than what is scientifically defensible to protect these receptors. Kinder Morgan has appealed the Regional Water Board's Cleanup Goals. The significant difference in these cleanup goals, and the resultant approaches and costs for remediation to meet the goals, amounts to many millions of dollars to Kinder Morgan. The extreme difference in these numerical cleanup goals, and the fact that the Regional Water Board is requiring cleanup of several metals in soil to "background" concentrations, means that the preparation of a RAP by March 29, 2010 is premature and wasteful because the Cleanup Goals may be revised and the remedial treatment technologies for petroleum and metals are not the same.
16. Based on all of these facts, it is my conclusion that there would be substantial harm to Kinder Morgan if a Stay is not granted because money would be wasted preparing an inappropriate RAP.
17. Based on all of these facts, it is my conclusion that there would be lack of substantial harm to the Port of Los Angeles and to the public interest if a Stay is granted because (a) the site conditions are stable; (b) the product recovery programs will continue; (c) current conditions at the site pose no risk to beneficial use of surface water; (d) current conditions at the site pose no risk to current human receptors; and (e) there are no present plans for site redevelopment.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: 2/28/2010

Dawn A. Zemo
(type or print name)


(signature of declarant)

201049906.1

DAWN A. ZEMO, P.G., C.E.G.

**Geology and Hydrogeology
Site Characterization and Remediation
Environmental Forensics**

CONTACT INFORMATION

Zemo & Associates LLC
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Incline Village, NV 89451
775-831-6179; dazemo@zemoassociates.com
www.zemoassociates.com

EDUCATION

Vanderbilt University, Nashville, Tennessee: M.S., Geology, 1982
Stephens College, Columbia, Missouri: B.A., Geology, 1980

PROFESSIONAL REGISTRATION

California Certified Engineering Geologist, No. 1747
California Professional Geologist, No. 4824

PROFESSIONAL HISTORY

Zemo & Associates LLC, Principal Hydrogeologist, 2002 to present
Geomatrix Consultants, Inc., Principal Hydrogeologist, 1989 - 2002
Ecology & Environment, Inc., Senior Geologist, 1988-1989
Amoco Production Company, Senior Geologist, 1981-1988
Hanna Mining Company, Well-Site Geologist, 1980
U.S. Bureau of Land Management, Field Geologist, 1978-1979

SYNOPSIS

Ms. Zemo provides expert specialty technical consulting services in the areas of environmental hydrogeology, evaluation of subsurface characterization data, evaluation of chemical data, assessment of remediation approaches, environmental forensics, strategic project advice, and peer review.

Ms. Zemo's extensive professional experience as a practicing consultant includes management or technical/strategic direction of hundreds of site investigation and remediation projects. Constituents of concern include chlorinated solvents, petroleum hydrocarbons (crude oil, refined products, and residuals), fuel oxygenates (MTBE, TBA etc.), tars, and metals in soil and groundwater. Types of facilities include rail yards, refineries, pipelines, bulk storage facilities (petroleum and chlorinated solvent), retail service stations, manufacturing facilities, dry cleaners, and manufactured gas plants. Ms. Zemo was among the first in the consulting community to integrate risk-based decision-making into project strategy. She has been an industry leader in developing and implementing innovative screening methods for cost-effective site characterization. Ms. Zemo continues to advance the state-of-the-practice by developing improved sample handling techniques for groundwater samples. From 1997 to 1999, she managed Geomatrix's Bay Area environmental practice group. In 2004, Ms. Zemo was an invited member of the National Water Research Institute's working group on "Subsurface Monitoring Strategies for Fuel Hydrocarbons and Oxygenates". In 2009, Ms.

Zemo served on the editorial board and contributed original content to several chapters for the LUFT Manual revision, and also served on the California State Water Board's UST Program Task Force.

Ms. Zemo is a nationally recognized expert and published author in the areas of petroleum fate and analysis, site characterization, groundwater monitoring, and the use of environmental forensic chemistry ("fingerprinting") for regulatory or litigation application to hydrocarbon projects. She is a frequent speaker at national and local technical workshops on these subjects for attorneys, regulators, industry, and consultants. Ms. Zemo is a valuable addition to a technical or legal team because of her 1) chemistry and hydrogeology expertise, 2) years of practical experience collecting and evaluating data at hundreds of "typical" sites, and 3) ability to effectively communicate technical issues to non-specialized audiences. She has served on the editorial review boards for the international journals *Ground Water Monitoring & Remediation* and *Environmental Forensics*. Ms. Zemo has been an expert for the California State Board for Geologists, assisting the Board in their prosecution of licensee enforcement matters.

REPRESENTATIVE LITIGATION SUPPORT EXPERIENCE

Ms. Zemo has been engaged as an expert witness or confidential consultant on numerous occasions. She has been deposed, prepared declarations and expert opinion reports, and has testified in binding arbitration hearings, a jury trial and a bench trial. Representative assignments include:

- *Confidential Consultant for Defendant, Dry Cleaner Litigation.* Ms. Zemo is retained as a confidential consultant to a dry cleaner equipment manufacturer on a portfolio of several sites. Services include assessment of: the fate and transport of PCE, release sources, and cost estimates for site remediation.
- *Expert Witness for Joint Defendants, Diesel Release.* Ms. Zemo was an expert in the case *Stockton Redevelopment Agency vs. BNSF and UPRR* (U.S. District Court, Eastern District of California) in which she rendered written opinions and deposition testimony regarding the age-dating of the diesel release, the source of diesel and other chemicals found in site soil, and the appropriateness of the remedial actions performed by plaintiff. Ms. Zemo testified at the bench trial.
- *Fact Witness and Non-Retained Expert for Defendant, and Testimony at Jury Trial, Chlorinated Solvent Plume.* Ms. Zemo testified in the case *Clark vs. UPRR, et al* (Sonoma County Superior Court) regarding her previous work characterizing a chlorinated solvent plume that plaintiffs alleged had migrated to their properties. She explained to the jury about the techniques used in her work, her evidence that the data were representative, and that the plume had not migrated as alleged. Her testimony was essential to the jury's finding for the defense.
- *Expert Witness for Defendant, Marine Sediments Offshore of Creosote Facility.* Ms. Zemo was an expert in the case *Pacific Sound Resources v. Burlington Northern Santa Fe Railway Corporation* (U.S. District Court, Western District of Washington) in which she rendered written opinions and deposition testimony regarding her forensic evaluation of the sources (petrogenic v. pyrogenic, and "urban background" v. site specific) of PAHs in sediments of Elliot Bay, Seattle, Washington.
- *Confidential Consultant for Joint Defense Group, MTBE Litigation.* Ms. Zemo was retained as part of a confidential consultant team for a large case focused on MTBE releases in the Central Valley of California. Ms. Zemo provided input regarding the timing, magnitude and

migration of releases from multiple facilities, and the efficacy of remedial actions at each facility.

- *Confidential Consultant for Defendant, Mixed Releases: MGP Tar, Heavy Fuel Oils and Diesel.* Ms. Zemo was engaged to distinguish among impacts caused by MGP tars and heavy fuel oils that migrated downgradient into a separate diesel plume. It was alleged that these fuels and tars had also impacted near-shore sediments. Forensic interpretations of soil and sediments were primarily centered on previously-existing "TPH" and PAH data, and included evaluating chromatograms and constituent ratios. The evaluation was successful in distinguishing the sources and costs were allocated accordingly.
- *Expert Witness for Defendant, Dry Cleaner Litigation.* Ms. Zemo was retained as an expert in the case *Adobe Lumber v. Taecker et al* (U.S. District Court, Eastern District of California) in which she provided written opinions and deposition testimony regarding PCE impacts to soil and groundwater, and remediation cost estimates.
- *Expert Witness for Cross-Defendant, Co-Mingled Dry Cleaner and Gasoline Station Plumes.* Ms. Zemo served as a technical expert in the case *Clark v. Boyett et al* (Sonoma County Superior Court) for a property owner impacted by both a PCE plume emanating from a dry cleaner and a BTEX plume from a former service station. Ms. Zemo provided remedial alternatives and cost estimates for her client's property and assisted during mediation among all the parties so that a comprehensive remedial strategy was selected.
- *Expert Witness for Defendant, Solvent Storage Terminal Litigation.* Ms. Zemo was retained as an expert in the case *Richmond Redevelopment Agency v. Petromark, Inc, et al* (U.S. District Court, Northern District of California) in which she was to render opinions regarding impacts of PCE, TCE, and other chlorinated solvents to soil and groundwater and the appropriateness of remedial alternatives and cost estimates put forward by the plaintiff. The case settled one day before submittal of expert reports.
- *Expert Witness for Joint Defense Group, State-Wide Proposition 65 Litigation.* Ms. Zemo was retained by a joint defense group of eight oil companies in the case *Communities for a Better Environment v. Tosco Corp., et al.* (San Francisco County Superior Court). This case centered on the timing of gasoline releases to the subsurface at hundreds of service station sites within California. She submitted to the Court a technical declaration that explained the common factors that influence analytical results and product thickness at fuel release sites, and the challenge of distinguishing between a new release and site-specific variability caused by non-release factors. In opposition to plaintiff's expert, Ms. Zemo's declaration included site-specific opinions about timing of release and factors causing concentration changes in monitoring data.
- *Confidential Consultant for District Attorney.* Ms. Zemo provided confidential consulting to the Santa Clara County (CA) DA's Office Environmental Enforcement Group in the prosecution of a case focused on the timing of releases from a retail service station and the delay in remediating an MTBE plume and source area.
- *Confidential Consultant for Defendants, Port and Other Redevelopment Properties.* Ms. Zemo has been engaged on several matters for industrial clients in which Port authorities or other local government entities have claimed damages for remedial costs associated with property redevelopment under either the Polanco Act or other laws. Her services have focused on environmental forensics (either product/material identification and attribution, or timing of the release) and/or appropriateness of the remedial action contemplated or

undertaken by the Port or redevelopment agencies. Constituents include petroleum, lead, tars, and chlorinated solvents.

- *Member of Neutral Consultant Team.* Ms. Zemo was part of a neutral consultant team engaged by counsel for four parties (three major oil companies and a county department) to collect and evaluate data from four adjacent former bulk fuel storage facilities for developing remedial cost allocations among the parties. The project included performing a CPT/LIF investigation for further source delineation (residual NAPL) and developing a 3-D visualization model to display all site data. Ms. Zemo evaluated the correlation between the new CPT/LIF results and historical soil TPH data in defining source areas. Ms. Zemo was subsequently engaged as the neutral technical assistant to the mediator during cost allocation deliberations.
- *Expert Witness for Defendant, Product Identification Based on "TPH".* This case focused on TPH data that plaintiff claimed proved oil contamination to plaintiff's soil and creek water. After reviewing the chromatograms and other lab data, Ms. Zemo concluded that the "TPH" detections resulted from organic interferences to the measurement, and that no petroleum was present in the samples. She collected site-specific samples of organic material (twigs, pine needles, leaves) that produced a fingerprint that matched plaintiff's samples.
- *Specialty Technical Consulting for Settlement Discussions.* This assignment centered on the timing and migration of multiple fuel releases at an operating bulk storage terminal that changed ownership. Ms. Zemo argued to USEPA Region 9's in-house counsel and project officers that the previous owner should be added to the site cleanup order because they were responsible for fuel releases prior to the property transfer date. Ms. Zemo presented the forensic chemistry basis for age-dating the gasoline, which relied on comparing ratios of key constituents that reflected changes in local refining practices over specific time periods.
- *Expert Witness and Testimony at a Jury Trial.* Ms. Zemo served as a testifying expert on the case *Wine World v. The Beverage Source, et al* (Sonoma County Superior Court). Her opinions focused on the development and discovery of a "smear zone" in the site subsurface subsequent to a fuel oil release, and using site physical and hydrogeologic data to estimate when the release occurred. Ms. Zemo also provided an opinion about the appropriateness of the remediation completed by the site owner. Ms. Zemo was deposed and later testified at the jury trial.
- *Expert Witness for Arbitration of Service Station Portfolios.* This case centered on the transfer of 200 retail service station properties between two major oil companies and allocation of environmental cost liabilities at each property. Ms. Zemo developed expert opinions regarding the source and timing of releases, site-specific vs. regional sources of MTBE in groundwater, interpretation of analytical data (including interferences to "TPH" and MTBE quantification), and appropriateness/efficacy of remedial solutions. Ms. Zemo submitted expert technical opinion reports for six sites. In addition to opinions on the source/timing of the release(s), each report contained a recommended cost allocation between the two parties. She provided expert testimony to a panel of three arbiters, including direct and cross-examination, at two arbitration hearings.
- *Other Expert Witness and Confidential Consulting Assignments.* Ms. Zemo has been engaged on several other matters either to render expert opinions or to provide confidential technical support centered on the issues of the interpretation of analytical data (in particular, detailed evaluations of "TPH" data), forensic chemistry of product composition, timing and magnitude of releases, site-specific vs. background sources of chemicals, fate

and transport of groundwater plumes, and appropriateness/efficacy of remedial solutions. These have included sites affected by petroleum hydrocarbons (crude oil, refined products, and residuals), oxygenates (MTBE, TBA, etc.), tars and chlorinated solvents. Sites have been in California, Texas, Louisiana, Washington, Wyoming, South Dakota, Utah, Idaho, Canada, and Ecuador.

REPRESENTATIVE INVESTIGATION AND REMEDIATION EXPERIENCE (Hydrocarbons: Petroleum and Fuel Oxygenates, and Tars)

- *Risk-Based Investigation and Closure for Multiple Re-Development Properties.* Since forming Zemo & Associates, Ms. Zemo has been routinely engaged as a technical specialist to enhance and focus the site investigation and remediation strategy for several former petroleum bulk storage facilities, service stations, and rail yards. She has interacted with regulators to negotiate cleanup goals for soil, groundwater and product (including minimizing the reliance on TPH); focused the investigation on constituents that would drive the risk evaluation; assisted with the risk assessment; and developed streamlined remedial strategies. These consulting services have resulted in significant reduction of remediation costs and reduced the time to site closure and redevelopment. Clients include large and small consulting firms, industrial companies, developers and the US Military.
- *Development of Specialty Technical Field and Laboratory Protocols to Produce More Accurate Groundwater Characterization for Petroleum Sites.* In the last several years, Ms. Zemo has been engaged on a number of sites to review groundwater data to assist consultants and responsible parties with accurately assessing the impact of petroleum to groundwater quality. Based on her long history of applied research into false TPH detections and interferences from non-dissolved petroleum (see publications/presentations lists), Ms. Zemo has developed protocols focused on isolating and quantifying the dissolved petroleum hydrocarbons in water samples. These protocols have significantly reduced reported groundwater concentrations at sites, whether they are quarterly monitoring data from wells or groundwater screening samples from initial site investigations. In all cases the maximum reported concentrations in groundwater were reduced considerably (some up to 100%), resulting in a smaller or lower-concentration plume, thus reducing monitoring and remediation costs.
- *Expedited Site Characterization and Remediation of Fuel Release.* Ms. Zemo directed the expedited characterization and remediation work that focused on gasoline, diesel, and jet fuel released from a pipeline. MTBE and other fuel constituents were found in groundwater 60 feet below the water table and approximately 1000 feet downgradient of the release point. Site conditions were quickly and cost-effectively characterized in three dimensions with minimal disturbance using CPT and discrete-depth groundwater sampling (Hydropunch). A targeted monitoring and extraction well network was constructed at multiple depths. The fate and transport of BTEX and MTBE was evaluated using groundwater monitoring data and hydrogeologic modeling; these findings were used to refine regulatory requirements for remediation. A three-phase (product, vapor, groundwater) extraction and treatment system was installed to remediate elevated concentrations of BTEX and MTBE and to protect downgradient domestic wells.
- *Expedited Site Characterization, MTBE / TBA Release.* Ms. Zemo directed the expedited groundwater characterization that focused on fuel oxygenates emanating from a newly-constructed retail service station. High concentrations of both MTBE and TBA were found in groundwater beneath the facility, with no record of liquid-phase fuel release from the USTs, piping, or dispenser sumps. A detailed soil vapor survey was performed and a tracer

test was conducted on the UST system to identify the source. A three-dimensional CPT/Hydropunch groundwater screening program delineated the lateral and vertical extent of the plume prior to installation of a monitoring well network. A design for hydraulic control of the plume was recommended, including treatment options for the high (up to 1:1) MTBE:TBA ratio.

- *Remediation and Closure of Gasoline Release in Urban Neighborhood.* Ms. Zemo directed this project that focused on a gasoline release from city operations in a largely residential area. Timely site closure was important to the city for property redevelopment. Her project team re-engineered the previously existing site remediation system to optimize product/vapor recovery and biodegradation of BTEX in groundwater. The team worked with the regulatory agency to proactively educate the residents about the overall approach to ultimate site closure, which would rely in part on risk assessment. Once the active remediation system reached asymptotic recovery of product and BTEX, it was shut off and groundwater and soil vapor data were collected quarterly under natural conditions for about a year to assess the potential risk to human health posed by the residual BTEX in soil and groundwater. Results of the risk assessment and evidence for natural attenuation of the groundwater plume were presented to the public and the agency. Site closure was acceptable to the public and approved by the agency.
- *Soil, Groundwater and Utility Backfill Investigation and Cleanup, Fuel Pipeline Release.* Ms. Zemo directed a project that involved site investigation and remediation in response to a leak from a pipeline that conveys gasoline, diesel, and jet fuel. The leak intersected a town's utility line network (including sewer and water lines). Work included characterizing local hydrogeology, identifying natural and man-made migration pathways, and quickly defining the extent of fuel in soil and groundwater and along the backfill of utility lines. Numerous private wells were sampled and video logged to confirm well construction information. A soil vapor/product/groundwater extraction system was installed and operated to contain and remediate MTBE and other fuel constituents in native soil, groundwater, and utility backfills. Project activities also included investigating and remediating combustible vapors in the sewer system through vapor extraction and sewer rehabilitation, and participating in community relations programs.
- *Development of Risk-Based "Consistent Approach" for Portfolio of Sites, Former Pipeline Route.* California is known for its inconsistency in remedial requirements between regulatory agencies and between case workers within an agency. Ms. Zemo developed a strategic and technical "consistent approach" for a major oil company client by which multiple sites along a 400-mile long former pipeline in central and northern California, all affected by degraded crude oil, would be evaluated as a portfolio in a consistent, risk-based manner. Properties along the former pipeline are being developed primarily as residential subdivisions. Details included the required analytical suite and criteria for site closure. This approach allowed for efficient and systematic site evaluation by the client and multiple agencies instead of the usual protracted individual site negotiations. Between 1995 and 2000, multiple sites were closed by either local or state agencies using the "consistent approach".
- *Risk-Based Investigation and Evaluation, Former Rail Yard.* Ms. Zemo developed the strategic approach and directed regulatory interaction for a fast-track, focused, risk-based investigation and evaluation of a former rail yard near San Francisco Bay that was subsequently redeveloped for commercial use. Petroleum hydrocarbons and metals (especially lead) were present at the site as "background" within the fill and as a result of site operations. These constituents, along with minor chlorinated VOCs, were assessed

with respect to future human receptors and sensitive ecological receptors. Site closure was granted by the state agency within 12 months of implementing investigation fieldwork.

- *Site Characterization and Human Health Risk Assessment, Former Pipeline Route.* Ms. Zemo managed this project for a major oil company client in which soil within the saturated zone along a former pipeline contained residual separate-phase crude oil. The remedial selection by the former consultant was excavation and biotreatment. Ms. Zemo negotiated with two state regulatory agencies to leave the petroleum in place based on its low water solubility and limited risk to human health under a residential exposure scenario. She demonstrated to the agency that TPH detections in groundwater samples were the artifacts of positive interferences to the TPH measurement and were not representative of dissolved-phase petroleum. The site was closed in 1995 and has been developed as a subdivision. This was one of the first risk-based site closures issued by the California RWQCB-CV.
- *Technical Review Regarding Site Investigation or Remediation Focused on Tars or Creosote.* Ms. Zemo provided specialty technical review on several sites impacted by tars or creosote (MGP facilities, wood treating facilities, and a roofing tar manufacturing facility). She focused on the fate and transport of the dense separate phase and the dissolved plume, and the interpretation of "TPH" data and PAH ratios. On several projects, Ms. Zemo identified significant interference to groundwater analytical data by a non-dissolved component, which resulted in dramatic decreases to remediation requirements.
- *Site Characterization and Reassessment of Remedial Approach, Former Gasification Plant.* Ms. Zemo managed this project for a municipal client in which site characterization by others had resulted in selection of an excavation and treatment alternative for remediation of 7000 cubic yards of soil affected by petroleum hydrocarbons. With limited additional characterization and working closely with a specialty analytical laboratory, forensic chemistry (fingerprinting) was used and a technical argument was developed about the risk to human health and groundwater quality posed by the material. Although this was very early for a "risk-based" solution in California (1991-1992), she successfully negotiated with the regulatory agency to leave the affected soil in place and received site closure after four quarters of groundwater monitoring. The cost-effective and timely site closure was critical for the client's property redevelopment budget and schedule.

REPRESENTATIVE INVESTIGATION AND REMEDIATION EXPERIENCE (Chlorinated and Other VOCs)

- *Soil and Groundwater Remediation, Former Chemical Repackaging Facility.* For an industrial client, Ms. Zemo managed a large remediation project involving significant soil and groundwater contamination by chlorinated and non-chlorinated VOCs. The presence of DNAPL, high dissolved concentrations, and a mixture of 20 different chemicals required creative selection of remedial technology. Soil remediation focused on removal of DNAPL in the unsaturated zone; techniques included soil vapor extraction and treatment using a resin-absorption unit or a catalytic oxidizer. Groundwater containment was achieved by extraction followed with treatment through two air strippers in series and off-gas treatment using catalytic oxidation. Reduction of concentrations within the plume was accomplished with an in-situ enhanced anaerobic biodegradation program. The site remedial strategy was carefully developed with state regulators within the context of significant off-site (upgradient and transgradient) sources of similar VOCs.
- *Groundwater Assessment and Remediation, Former Metals Recycling Facility.* Ms. Zemo managed this large, multidisciplinary project for an industrial client in which chlorinated

VOCs had impacted groundwater within multiple flow zones to a depth of 80 feet and extended about 0.5-mile downgradient. The impacted area included a neighborhood with many wells used for irrigation. To reduce investigation impact and the client's overall costs, Ms. Zemo successfully educated and convinced the regulators that groundwater screening results were representative; this was one of the first large-scale screening programs in Northern California (1990-1991). An innovative, multiple-zone, discrete-depth groundwater survey using CPT and BAT/Hydropunch sampling methods was used to delineate the lateral and vertical extent of groundwater contamination. A targeted, cost-effective monitoring well network was installed. Ms. Zemo designed and implemented the installation, aquifer testing, and hydrogeologic evaluation of an on-site and off-site extraction well network for hydraulic containment. She evaluated off-site sources of VOCs and provided extensive interaction with regulatory agencies on behalf of the client and its legal counsel.

- *Soil and Groundwater Assessment and Remediation, Former Paint Thinner Facility.* Ms. Zemo managed this project for a private client in which ketones and other non-chlorinated VOCs had leaked from an underground storage tank and affected soil and groundwater. Site characterization included reassessment of the previous consultant's interpretation of site groundwater contamination, resulting in a significant decrease in project scope and cleanup costs. Site remediation included an in-situ enhanced biodegradation pilot study and the excavation and aeration of approximately 3700 cubic yards of VOC-affected soil.
- *Hydrogeological Assessment, Electronics Manufacturing Facility.* Ms. Zemo managed this project in which groundwater was affected by chlorinated VOCs emanating from a former underground storage tank. Site characterization included a discrete-depth groundwater survey using CPT and BAT/Hydropunch sampling methods to delineate the lateral and vertical extent of affected groundwater and to assess the influence of site stratigraphy on direction of groundwater flow and distribution of chemical concentrations. She negotiated successfully with the regulatory agency to modify the previous monitoring program, giving the client a cost savings of 70 percent. After aggressive source removal in shallower groundwater zones, Ms. Zemo also successfully negotiated a natural attenuation remedial solution for deeper zones.
- *CERCLA Site Assessments.* Ms. Zemo conducted numerous investigations at pre-remedial CERCLA/SARA hazardous waste sites (such as dry cleaners, metal plating facilities, machine shops, and hazardous waste disposal facilities) as a contractor for USEPA Region 9. She evaluated site operations, waste streams, and waste disposal practices using historical records. She assessed stratigraphy, hydrogeology, and soil and groundwater quality using soil borings and monitoring wells. Assessment results determined site eligibility for the National Priorities List.

AFFILIATIONS

International Society of Environmental Forensics
ASTM: Subcommittee member E50 "Forensic Environmental Investigations"
Association of Environmental Health and Sciences; Scientific Advisory Board member
California Groundwater Resources Association
National Ground Water Association (AGWSE)
Editorial Review Board, *Journal of Environmental Forensics*
Editorial Review Board, *Ground Water Monitoring & Remediation*

PUBLICATIONS AND CONFERENCE PRESENTATIONS (PEER-REVIEWED PUBLICATIONS IN BOLD)

Site Characterization

"Suggested Methods to Mitigate Bias from Nondissolved Petroleum in Groundwater Samples Collected from the Smear Zone", Zemo, D.A., *Ground Water Monitoring & Remediation*, Summer 2009, pp. 77-83.

"Suggested Methods to Mitigate Bias from Non-Dissolved Petroleum in Groundwater Samples", Zemo, D.A., Abstract in *Proceedings of the Eighteenth Annual AEHS West Coast Conference on Soils, Sediments and Water*, March 2008.

"Is it Petroleum? More Lessons Learned about "TPH" False Positives", Foote, G.R. and D.A. Zemo, Abstract in *Proceedings of the Eighteenth Annual AEHS West Coast Conference on Soils, Sediments and Water*, March 2008.

"Use of Laboratory Partitioning Tests to Evaluate the Dissolved Phase in Groundwater Beneath Floating Product", Zemo, D.A., R.L. Miller, R. Gardner and T.E. Graf. Abstract in *Proceedings of the Seventeenth Annual AEHS West Coast Conference on Soils, Sediments and Water*, March 2007.

"Toward a Better Measurement of Mobile Petroleum Hydrocarbon Concentrations in Ground Water Systems", Foote, G.R., D.A. Zemo, K. Johnson, J.E. Bruya and C Morrow. Abstract in *Proceedings of the 2006 Petroleum Hydrocarbons and Organic Chemicals in Groundwater Conference*, NGWA/API.

"Sampling in the Smear Zone: Evaluation of Nondissolved Bias and Associated BTEX, MTBE, and TPH Concentrations in Ground Water Samples", Zemo, D.A., *Ground Water Monitoring & Remediation*, Summer 2006, pp. 125-133.

"Evaluation of Non-Dissolved Bias in Groundwater Samples Collected from Monitoring Wells and Direct-Push Borings within the Smear Zone at Gasoline Release Sites", Zemo, D.A., *Proceedings of the 2006 North American Environmental Field Conference: Nielsen Environmental Field School*.

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"Assessment of Filtering and Centrifuging on Dissolved Semi-Volatile Petroleum Hydrocarbons", Foote, G.R., K. Johnson, D.A. Zemo, J.E. Bruya and C. Morrow. Abstract in *Proceedings of the Fifteenth Annual AEHS West Coast Conference on Soils, Sediments and Water*, March 2005.

"The Technical Case for Eliminating the Use of the TPH Analysis in Assessing and Regulating Dissolved Petroleum Hydrocarbons in Groundwater," Zemo, D.A and G.R. Foote. *Ground Water Monitoring & Remediation*, Summer 2003, pp. 95-104.

"Hydrochemical Changes in a DNAPL Source Area from Enhancing Microbiologically-Mediated Degradation of VOCs," Honniball, J.H., D.A. Zemo, T.A. Delfino, S.D. Warner, and J.A. Mescher. *Proceedings of the Eleventh Annual West Coast Conference on Contaminated Soils, Sediments and Water*, The Association for Environmental Health and Sciences, March 2001.

"Reality Check? Soil Vapor Data Applied to Evaluation of Chemical Migration from Groundwater to Air," Holbrow, A.M., G.P. Brorby, and D.A. Zemo. Abstract in *Proceedings of the Tenth Annual West Coast Conference on Contaminated Soils, Sediments and Water*, AEHS, March 2000.

"Do Your Extractable TPH Concentrations Represent Dissolved Petroleum? An Update on Applied Research," Zemo, D.A. *Proceedings of the 1997 Petroleum Hydrocarbons and Organic Chemicals in Ground Water Conference*, NGWA/API, pp. 640-654.

"Measurement of Dissolved Petroleum in Groundwater: Pitfalls of TPH Analyses," Zemo, D.A. In: *Contaminated Soils, Vol. 2*; Amherst Scientific Publishers, 1997, pp. 41-50.

"Case Study: Interferences with TPH Analyses of Grab Groundwater Samples," Foote, G.R., D.A. Zemo, S.M. Gallardo, M.J. Grant, B.T. Benson, and J.E. Bruya. In: *Principles and Practices for Diesel Contaminated Soils, Vol. 6*; Amherst Scientific Publishers, 1997, pp. 27-39.

"White Paper: Recommended Analytical Requirements for Soil and Groundwater Affected by Petroleum Hydrocarbons," Zemo, D.A., T.E. Graf, J.W. Embree, J.E. Bruya, and K.L. Graves. Submitted to the California State Water Resources Control Board, LUFT Revision Technical Advisory Committee, June 1995.

"TPH Detections in Groundwater: Identification and Elimination of Positive Interferences," Zemo, D.A. and K.A. Synowiec. *Proceedings of the 1995 Petroleum Hydrocarbons and Organic Chemicals in Ground Water Conference*, NGWA/API, pp. 257-271.

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"Cone Penetrometer Testing and Discrete-Depth Groundwater Sampling Techniques: A Cost-Effective Method of Site Characterization in a Multiple Aquifer Setting," Zemo, D.A., Y.G. Pierce, and J.D. Gallinatti. *Ground Water Monitoring & Remediation*, Fall 1994, pp. 176-182

"Methodology for the In-Field Design of Monitoring Wells in Heterogeneous Fine-Grained Formations." Reynolds, S.D. and D.A. Zemo. In: *Current Practices in Ground Water and Vadose Zone Investigations: ASTM Special Technical Publication No. 1118*, 1992.

"Methodology for the In-Field Design of Monitoring Wells". Abstract in *AAPG Pacific Section Annual Meeting*, May 1992.

Forensics

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"Use of Parent PAH Proportions to Attribute Source of PAHs in Sediments", Zemo, D.A., Abstract in *Proceedings of the Eighteenth Annual AEHS West Coast Conference on Soils, Sediments and Water*, March 2008.

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"Practical Challenges to Developing Forensic Interpretations Using 'Real-World' Data Typically Available at Petroleum Hydrocarbon Release Sites", Zemo, D.A. *Proceedings of the 2002 Petroleum Hydrocarbons and Organic Chemicals in Ground Water Conference*, NGWA/API, pp. 425-433.

"Challenges in Developing Forensic Interpretations Using Only Existing Site Data". Abstract in *Proceedings of the Eleventh Annual West Coast Conference on Contaminated Soils, Sediments and Water*, AEHS, March 2001.

"Use of Forensic Chemistry in Petroleum Investigations: Case Studies" (with J.E. Bruya). Abstract in *Proceedings of the Annual Meeting of the American Academy of Forensic Sciences*, 1999 Conference.

"Applications of Forensic Chemistry for Petroleum Cases". Abstract in *Program of the 1999 American Association of Petroleum Geologists Annual Convention*.

"Winning with Forensic Chemistry: An Environmental Consultant's Perspective on Petroleum Cases". Abstract in *Proceedings of the Annual Meeting of the American Academy of Forensic Sciences*, 1998 Conference.

"An Environmental Consultant's Perspective on the Successful Use of Forensic Chemistry for Petroleum Cases," Zemo, D.A. *Proceedings of the Fifth Annual International Petroleum Environmental Conference*, October 1998.

"The Application of Petroleum Hydrocarbon Fingerprint Characterization in Site Investigation and Remediation," Zemo, D.A., J.E. Bruya, and T.E. Graf. *Ground Water Monitoring & Remediation*, Spring 1995, pp. 147-156.

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"What's My Risk? An Innovative Approach to Assessing Health Risks in an Established Neighborhood", Brorby, G.P. and D.A. Zemo. *Proceedings of the 1999 Petroleum Hydrocarbons and Organic Chemicals in Ground Water Conference*, NGWA/API, p. 283.

"Cutting Through the Regulatory Maze Toward Site Closure," Brorby, G.P. and D.A. Zemo. In: *Contaminated Soils, Vol. 3*, Amherst Scientific Publishers, 1998, pp 1-9.

"An Argument Against Developing TPH-based Tier 1 Ecological Screening Values to Evaluate Petroleum Hydrocarbon Releases to Soil and Groundwater," Brorby, G.P., L.B. Job, A.L. Spencer, and D.A. Zemo. *Proceedings of the 1998 Petroleum Hydrocarbons and Organic Chemicals in Groundwater Conference*, NGWA/API, pp. 334-338.

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Other

Investigation of the Geochemistry and Consolidation Properties of the Cretaceous -Tertiary Boundary in Alabama, Mississippi and Tennessee," [Master's Thesis], Zemo, D.A. Abstract in *GSA Abstracts with Programs*, Vol. 15, No. 2, 1983, p.57.

"Delineation and Description of the Regional Aquifer Systems of Tennessee: Cumberland Plateau Aquifer System," Brahana, J.V., J. Macy, D. Mulderind, and D.A. Zemo. U.S. Geological Survey - Water Resources Division *Open File Report 82-338*, 1982.

WORKSHOPS AND SHORT COURSE PRESENTATIONS

Site Characterization

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Forensics

"Forensic Interpretation of *Typical* Petroleum Hydrocarbon and Oxygenate Analytical Data". Lecture and notes for International Society of Environmental Forensics workshop titled *Overview and Application of Environmental Forensics in Soil and Groundwater*, November 2003.

"Challenges in Developing Forensic Interpretations Using Only Existing Site Data". Lecture and notes for University of Wisconsin Madison Extension Short Course titled *Environmental Litigation: Advanced Forensics and Legal Strategies*, April 2000 and April 2001.

"Petroleum Hydrocarbons: Chemistry, Fingerprinting, and Emerging Analytical Methods" (with J.E. Bruya). Workshop presented at the *Tenth and Eleventh National Outdoor Action Conference(s)*; NGWA, May 1996 and May 1997 and the *1997 and 1998 Petroleum Hydrocarbons and Organic Chemicals in Ground Water Conference(s)*; NGWA/API.

"Use of Petroleum Fingerprinting in the Development of Remedial Strategies" (with J.E. Bruya). Workshop presented at the *Eighth and Ninth National Outdoor Action Conference(s)*; NGWA, May 1994 and May 1995.

Risk Evaluation/Regulatory Closure

"Update on Petroleum Hydrocarbon Issues in California and Implications for Site Closure" (with G.R. Foote, G.P. Brorby, A. Holbrow, and K. Graves). Workshop presented at *Tenth and Eleventh Annual West Coast Conference(s) on Contaminated Soils, Sediments and Water*, AEHS, March 2000 and March 2001.

"Practical Guidance for Risk-Based Closure of Sites Impacted by Diesel Fuel and Other Petroleum Hydrocarbons" (with G.P. Brorby, G.R. Foote, and A.C. Nye). Workshop presented at the *Seventh Annual West Coast Conference on Contaminated Soils and Groundwater*, AEHS, March 1997 and the *Twelfth Annual Conference on Contaminated Soils*; AEHS, October 1997.

"Application of Petroleum Hydrocarbon Fingerprinting in Regulatory Decision-Making" (with J.E. Bruya). Workshop presented at *California State Water Resources Control Board UST Roundtable*, October 1994.

**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION**

**Amendment to:
Revised Cleanup & Abatement Order No. R4-2008-0006 (Issued April 9, 2008)
Requiring
Kinder Morgan Inc., Chevron Corporation, ConocoPhillips, and the City of Los Angeles,
Harbor Department (a.k.a. Port of Los Angeles)
To
Assess, Cleanup and Abate the Effects of Contaminants
Discharged to Soil, Groundwater, and Seawater
(File No. 90-006)**

By and through its Executive Officer, the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) herein finds as follows:

1. On April 9, 2008, revised Cleanup and Abatement Order No. R4-2008-0006 (Order) was issued to Kinder Morgan Inc., Chevron Corporation, ConocoPhillips, and the City of Los Angeles Harbor Department (a.k.a. Port of Los Angeles) (collectively Responsible Parties), directing them an assessment and cleanup of the former GATX Los Angeles Marine Terminal (Site).
2. In pertinent part, the Order required the Responsible Parties to "work together with the Port of Los Angeles, so that submittals are coordinated in order to avoid multiple submissions or proposals for assessment, monitoring, and/or remediation of the site." (Order, p. 6, ¶1.) It also required the Responsible Parties to assess, cleanup, and abate the effects of contamination discharged at the Site, to soil, groundwater, and seawater. Among other things, the Order set deadlines to submit and implement a Remedial Action Plan (RAP). While the Order did not set numerical cleanup goals for the Site, it did identify certain information to be considered by the Responsible Parties when establishing Preliminary Cleanup Goals for the Site.
3. Over the next six months, the Responsible Parties were unable to agree amongst themselves and the Port of Los Angeles on proposed Preliminary Cleanup Goals. They so advised the Regional Board in writing on September 26, 2008, and requested that the Regional Board determine the cleanup goals for the Site.
4. Therefore, on November 14, 2008, the Regional Board issued a letter regarding cleanup goals for the soil and groundwater at the Site. The letter included a table with specific cleanup goals identified for 71 constituents, and it was accompanied by a fact sheet explaining how the goals were derived. The letter also summarized the Responsible Parties' existing obligations under the Order with respect to the cleanup goals.
5. On December 15, 2008 Chevron Corporation, Kinder Morgan Inc., and Kinder Morgan Energy Partners, L.P., filed a petition with the State Water Resources Control Board (State Board), pursuant to Water Code section 13320, purporting to challenge the November 14, 2008 letter respecting cleanup goals. On December 18, 2008, the State Board issued a letter rejecting the petition on the basis that the November 14, 2008 letter constituted neither new nor final agency action by the Regional Board, and therefore, was not subject to review under section 13320.

6. Also on December 18, 2008, Kinder Morgan and Texaco Inc. requested an evidentiary hearing before the Regional Board to:
 - a. "Present information provided to the Regional Water Board but not properly recognized or adequately considered by the Regional Water Board in its development of the Clean-up Goals,
 - b. "Present Clean-up Goals and remediation approaches that are alternatives to those specified in the November 14, 2008 letter and similarly protect beneficial use of surface water."

(Dec. 15, 2008 Letter from AMEC Geomatrix, Inc. to Tracy Egoscue.)

7. On January 30, 2009, the Executive Officer granted the request for a hearing, and invited the parties to present any information they believed was not properly recognized or adequately considered by the Regional Board in its development of the cleanup goals set forth in the November 14, 2008 letter. Parties supportive of the cleanup goals were likewise invited to submit additional relevant information that had not yet been included in the administrative record. All parties were invited to present any alternative cleanup goals and remediation approaches that they believed were alternatives to those specified, that similarly protect beneficial uses of surface water. All submittals were required to be delivered to the Regional Board by February 27, 2009.
8. The Regional Board received timely submittals on behalf of Kinder Morgan, Texaco Inc., and the Port of Los Angeles on or about February 27, 2009.
9. On August 17, 2009, technical staff submitted a memorandum to the Executive Officer, entitled *Final Recommendation for Site-Specific Soil and Groundwater Cleanup Goals*. On September 15, 2009, the Executive Officer determined that the responses to comments submitted with the August 19, 2009 memorandum were inadequate to evaluate the technical staff's recommendations on the cleanup goals, and directed staff to submit a revised response to comments. She also directed that if in generating the revised responses, staff determined that a modified proposal was warranted, staff should make such a proposal.
10. On January 19, 2010, technical staff submitted to the Executive Officer a memorandum bearing the subject line: "Revised Responses to Stakeholder's (sic) Comments[:] Former GATX Los Angeles Marine Terminal (LAMT), Port of Los Angeles, Berths 171 through 173, Wilmington, California (Cleanup and Abatement Order No. R4-2008-006, Site ID No. 2040107, Site Cleanup Program No. 621A)." That memorandum contains revised responses to comments, responses to additional submittals by the Responsible Parties that were submitted in response to the August 19, 2009 memorandum, and a revised list of proposed cleanup goals. The memorandum (including Attachments I through III thereof) is attached hereto as **Exhibit A**, and incorporated herein by reference.¹
11. Upon review of the various submittals of the Responsible Parties and the Port of Los Angeles, the written recommendations of technical staff contained in the above-

¹ Attachment IV to the memorandum consists of supplemental filings by Responsible Parties. Attachment IV is not included in Exhibit A, and is not part of this order. The contents of Attachment IV, however, have been considered, and are included in the administrative record of this proceeding as additional arguments of the Responsible Parties.

referenced memoranda and the responses to comments, I find that cleanup goals described in Exhibit A, Attachment I, Table 2A (Groundwater) and Table 3A (Soil) are appropriate for the reasons specified in Exhibit A.

WHEREFORE, IT IS HEREBY ORDERED that Cleanup and Abatement Order No. R4-2008-006 is amended as follows:

1. The Responsible Parties shall employ the Cleanup Goals set forth in Exhibit A, Attachment I, Table 2A for groundwater, and Exhibit A, Attachment I, Table 2B for soil, which are hereby established for the remediation that is required by the Order.
2. The order suspending the due date for the Remedial Action Plan and other deliverables, issued on February 13, 2009, is hereby vacated. The Responsible Parties shall submit a revised RAP not later than March 29, 2010. The relevant deadlines set forth in the Order are hereby revised as follows:

REQUIREMENT		DUE DATE
1	Assessment of Petroleum Hydrocarbons, VOCs, PAHs, metals in the soil, and groundwater	
A	Assessment report of petroleum hydrocarbons, VOCs, PAHs, and metals in the soil and groundwater	August 30, 2006
B	Work plan for Marine Sediments and Seawater assessment and delineation	Work Plan was approved on September 4, 2008
C	Assessment report and Remedial Action Plan of petroleum hydrocarbons, VOCs, PAHs, and metals in the sediment/seawater	December 15, 2008 ²
2	Groundwater Monitoring	
A	Site-Wide Monitoring Report: <u>Monitoring Period</u> January to March April to June July to September October to December	Quarterly each year (The first report under this CAO is due June 15, 2008.) <u>Report Due Date</u> April 15 July 15 October 15 January 15
3	Soil Remediation	
A	Submit Revised Remedial Action Plan (RAP)	March 29, 2010
B	Implement the RAP	To be determined

² Based on the December 2008 Assessment report, Remedial Action Plan for sediment/seawater is not required (February 13, 2009).

REQUIREMENT		DUE DATE
C	Submit Progress report	Quarterly each year (Due date for the first report under this CAO is to be determined.)
	<u>Report Period</u> January to March April to June July to September October to December	<u>Due Date</u> April 15 July 15 October 15 January 15
D	Submit Soil Remediation Completion Report	To be determined
4	Groundwater Remediation	
A	LNAPL recovery system report	Quarterly each year (The first report under this CAO is due July 15, 2008)
	<u>Monitoring Period</u> January to March April to June July to September October to December	<u>Report Due Date</u> April 15 July 15 October 15 January 15
B	Submit Revised Remedial Action Plan (RAP)	March 29, 2010
C	Implement the Groundwater Remediation Systems	To be determined
D	Submit Quarterly Remediation Progress Report.	Quarterly each year (Due date for the first report under this CAO is to be determined.)
	<u>Report Period</u> January to March April to June July to September October to December	<u>Due Date</u> April 15 July 15 October 15 January 15
E	Submit Groundwater Remediation Completion Report	To be determined

This order shall constitute final agency action. Any person aggrieved by this action of the Regional Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must *receive* the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday,

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Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

Technical staff is hereby directed to circulate this order forthwith to each Responsible Party and interested person.

IT IS SO ORDERED.


Tracy J. Egoscue
Executive Officer

Date: January 28, 2010