

# Angela Liang Cutting, Ph.D., P.E. (CA), QISP (CA)

## Industrial Practice Area Leader/Principal Engineer

### TECHNICAL SPECIALTIES

Dr. Angela Liang Cutting is a Principal Engineer with over 20 years of experience managing and implementing environmental remediation projects in various types of soil, soil vapor, groundwater and wastewater/groundwater treatment technologies, especially in-situ remediation technologies. In addition, she has extensive experience in drinking water and process water treatment technologies and has designed, sized, and optimized water treatment systems for potable water use in compliance with California Title 22 Drinking Water Standards. She has consulted with industrial and municipal clients regarding the impacts of emerging contaminants to drinking water and potential treatment options.

Dr. Cutting is recognized as a California storm water expert and has extensive experience in best management practices (BMPs), Storm Water Pollution Prevention Plans (SWPPP), and specifically the newly adopted California Industrial General Permit. She is a California Qualified SWPPP Developer (QSD). She has consulted with many industrial clients regarding the impacts of the New General Permit and assisted the clients obtain exemptions from storm water permitting for the industrial facilities and filing Notices of Non-Applicability (NONA).

Dr. Cutting specializes in the development and implementation of alternative storm water best management designs that utilize the low impact approach, producing significant cost savings to clients, while minimizing the impact of storm water runoff. The low impact approach focuses on controlling and treating runoff as it is being generated, thus reducing or even potentially eliminating the need for downgradient detention. Dr. Cutting has utilized bioretention ponds, water quality swales, vegetation filter strips, and porous pavements as source management alternatives. In addition, Dr. Cutting is an expert in Roux's sustainable, low-cost "Green" Engineered Natural Systems (ENS) treatment technologies. The efficient and effective use of ENS technologies, such as Constructed Treatment Wetlands (CTW), Phytotechnologies, and other passive natural technologies (e.g., natural media filtration) has resulted in significant cost savings for our clients versus conventional storm water treatment alternatives.

### EXPERIENCE SUMMARY

Roux Associates, Inc. CA, Industrial Practice Area Leader/Principal Engineer 2011 - Present

Geosyntec Consultants, CA, Senior Engineer, 2007 - 2011

URS, CA, Project Engineer, 2001 - 2007

IWR, CA, Thermal Engineer, 2000.

Berkeley Environmental Restoration Center, CA, Project Engineer, 1995 - 1999

### CREDENTIALS

Ph.D., Mechanical Engineering, University of California, Berkeley, 1999

M.S., Mechanical Engineering, University of California, Berkeley, 1994

B.S., Power Mechanical Engineering, National Tsing-Hua University, 1992

California Civil Engineer (PE), Number C67309

### PUBLICATIONS

Co-Author, *Engineering Manual (EM) on In Situ Thermal Remediation (ISTR)*, US Army Corps of Engineers, Alexandria, Virginia. Co-authored the Steam Injection section of the ISTR EM, which provides guidance and background for the appropriate screening and selection of ISTR technologies including steam injection, electrical resistivity heating, and thermal conduction heating. The EM is intended for use by engineers, geologists, soil scientists, hydrogeologists, chemists, project managers, and others who possess a technical education but only the broadest familiarity with ISTR technologies.

"*Experimental and Theoretical Investigation of Vaporization of Liquid Hydrocarbon Mixtures from Water-wetted Porous Media.*" Water Resources Research, Vol. 35, No. 3, 635-649, 1999.

"*Evaporation of Multicomponent Liquid Hydrocarbons in Water-Wet Porous Media.*" Proceedings of the ASME Heat Transfer and Fluids Engineering, Vol. 321, 1995.

### KEY PROJECTS

#### Testifying Expert

*Orange Redevelopment Agency v. City of Orange, Orange, CA.* Provided deposition testimony regarding the cause of the ongoing differential settlement ("subsidence") and associated damage, prepared an engineer's cost estimate to address the damages, and the characteristics of landfill gas at the Yorba Park Landfill, formally known as the Orange County Disposal Station No. 12 (SWIS No. 30-CR-0024), in the City of Orange, California.

*The Estuary Owners Association v. Signature at the Estuary, LLC, et al., Oakland, CA.* Designated expert to provide opinions regarding the alleged insufficient environmental clean-up of soil contaminants, specifically the vapor intrusion concerns associated with the soil contaminants. The expert opinion included a human health risk assessment that evaluated potential risks to onsite receptors under current and future land use scenarios, identified exposure pathways and the route of potential intake, and quantified exposure assessment, which supported RWQCB's approval of the proposed and implemented sub-slab vapor barrier.

### Litigation Support

*Housing Authority of the City of Los Angeles (HACL A) v. PCC Industrial Inc., et al. (Case No. CV 11-01626), United States District Court, Central District of California – Western Division.* Provided litigation support to the designated expert, Patrick C. Lucia, Ph.D., P.E., G.E., on the expert report and rebuttal report regarding the releases of hazardous substances and petroleum hydrocarbons, damages, acts, transactions and occurrences alleged at the site. Specifically, Dr. Cutting worked with the Roux team to develop a three-dimensional representation that overlays the historical grading/backfill operations and the impacted soils, using a Graphical Information System (GIS) computer program. The GIS simulation supported the expert's opinion on the limited impact of the historical grading/backfill operations on site contamination.

### Water Treatment

*Potable Water Treatment System Design and Implementation, Confidential Client, California.* Principal Engineer for designing a potable water treatment system to address 1,2,3-Trichloropropane (1,2,3-TCP) detections above the California drinking water limit of 0.005 micrograms per liter ( $\mu\text{g/L}$ ) in the two potable/process water supply wells at the client's facility. The proposed treatment system would provide up to 50,000 gallons per day (GPD) for potable water use. Evaluated available treatment technologies including granular activated carbon, advanced oxidation, air stripping, reverse osmosis, and biological treatment. Conducted treatment option analysis based on effectiveness, costs, and implementability. Identified short-term and long-term treatment options and developed conceptual implementation plan. Performed bench-scale treatability studies to size the treatment system. Provided engineering support in permitting, design drawings, request for bids, construction oversight, and operation and maintenance of the treatment system.

*Water Treatment System Upgrade to Potable Water Use, Confidential Client, California.* Principal Engineer for upgrading a process water treatment system to a potable water treatment system. The water supply for the facility is pumped from the Merced River. The existing treatment system consists of a sand filter, softeners, and a deaerator. Upgrade to the treatment system is required to provide potable quality feed water for culinary steam. The peak flow requirement for the system is 200,000 gallons per day (GPD). Multiple rounds of river water samples were collected and analyzed, as well as process water samples at various stage of treatment. The recommended treatment system upgrades included an ultraviolet (UV) disinfection system and a replacement of existing sand filter. Provided technical specifications for request for bids and will assist system construction and installation.

*Process Water Treatment Plant Upgrade, Stockton, California.* Principal engineer for the process water treatment plant upgrade for a 75-acre tomato packing facility. Evaluated the existing water treatment plant and provide options for replacement. The treatment basin provides pretreatment of the process water prior to discharge to the City of Modesto sanitary system. Conducted a thorough review of the existing Primary Paste Unloading Flume Line and the Main Wastewater Treatment Line. A hydrodynamic separation system utilizing centrifugal forces was selected to separate debris, sediment, and oil and grease from process water. In addition, screens were incorporated in the pretreatment unit to physically separate solids from the process water stream. Provided schedule and cost estimate for the replacement options including appropriately sized laminar separator and filter press. Conducted treatability studies and provide engineering support for design and procurement.

*Wastewater Treatment Design and Construction, Los Banos, California.* Served as the Principal Engineer for engineering design and construction of a wastewater conveyance and treatment plant for a 3,000-acre tomato processing facility. The design utilized three existing settling ponds and four aquatic macrophyte ponds and incorporated a media filtration system as a pretreatment unit for physical separation of the total suspended solids from the wastewater process stream.

*Groundwater Treatment System Optimization, Mountain View, California.* Senior engineer for the groundwater treatment system optimization to more effectively and efficiently treat chlorinated hydrocarbon impacted groundwater. The treatment plant consists of five treatment system utilizing granular active carbon vessels in parallel and series for over 100 groundwater extraction wells with average flow rates ranging from 25 to 150 gallons per minute (GPM). Performed comprehensive analysis of the groundwater extraction well network and existing treatment system. Redesigned and optimized the treatment system to lower annual operation and maintenance costs.

*Wellhead Arsenic Treatment System Technology Review and Recommendation, Riverdale, California.* Project engineer for the review and selection of a wellhead arsenic treatment system for three drinking water wells. Technologies considered include Oxidation/Filtration, Sorption, and Ion Exchange.

*Wellhead Arsenic Treatment Pilot Study, Confidential Client, California.* Project engineer for the pilot study of a wellhead arsenic treatment system. The sorption system reduced the arsenic concentrations from 40 micrograms per liter ( $\mu\text{g/L}$ ) to less than 10  $\mu\text{g/L}$ .

*Potable Water Blowoff Treatment System, San Jose, California.* Principal engineer for the potable water blowoff treatment system for up to 5,000 gallons per minute (GPM) for a

National Pollutant Discharge Elimination System (NPDES) permit.

**Stormwater Compliance**

*Environmental Compliance Audit and SWPPP Evaluation at Industrial Facility for U. S. Department of Justice. Confidential location, California.* Leader for the audit team working on behalf of the U. S. Department of Justice (USDOJ) in accordance with a consent agreement between a concrete production facility and the USDOJ. The consent agreement required that an independent third-party audit team approved by the USDOJ conduct an audit to confirm compliance with the Facility Environmental Compliance Plan. Dr. Cutting evaluated compliance with the industrial storm water NPDES permit, BMP implementations, and authored the audit report.

*Facility Storm Water System Modification, Produce Processing Plant, Modesto, California.* Principal Engineer for facility storm water assessment, including hydraulic/run-off, conveyance, collection, and retention adequacy analyses. Designed storm water system modifications to adequately contain maximum historical precipitation events, including storm water containment basin and 1,200-foot-long conveyance trench. Prepared Notice of Non-Applicability and No Discharge Technical Report to RWQCB on behalf of the client. The facility was granted Non-Applicability status in June 2015.

*Facility Storm Water System Modification, Produce Processing Plant, Hanford, California.* Principal Engineer for facility storm water assessment, including hydraulic/run-off, conveyance, collection, and retention adequacy analyses. Recommended limited grading in portions of the facility to address potential storm water runoff. Prepared Notice of Non-Applicability and No Discharge Technical Report to RWQCB on behalf of the client. The facility was granted Non-Applicability status in June 2015.

*Facility Storm Water System Modification, Food Packaging Plant, Los Banos, California.* Principal Engineer for storm water assessment for the 2,700-acre facility, including hydraulic/run-off, conveyance, collection, and retention adequacy analyses. Designed storm water system modifications to adequately contain maximum historical precipitation events, including two storm water containment basins, facility perimeter berms, storm water conveyance channel, and grading to address potential runoffs. Prepared Notice of Non-Applicability and No Discharge Technical Report to RWQCB on behalf of the client. The facility was granted Non-Applicability status in June 2015.

*SWPPP and Assessment for Storm Water System Modification, Fruit Processing Plant, Modesto, California.* Principal Engineer for the preparation of the SWPPP in 2015 for the new California Industrial Permit. Performed the storm water assessment for the 45-acre facility, including hydraulic/run-

off, conveyance, collection, and retention adequacy analyses.

*SWPPP and Assessment for Storm Water System Modification, Tomato Processing Plant, Huron, California.* Principal Engineer for the preparation of the SWPPP in 2015 for the California Industrial Permit. Performed the storm water assessment for the 53-acre facility, including hydraulic/run-off, conveyance, collection, and retention adequacy analyses.

*Storm Water Assessment for No Exposure Certification, Winery, Napa, California.* Principal Engineer for the site assessment and preparation of No Exposure Certification (NEC). The winery was granted the NEC status in 2015 under the new California Industrial Permit.

*Storm Water Assessment for No Exposure Certification, Winery, Monterey, California.* Principal Engineer for the site assessment and preparation of No Exposure Certification (NEC). The winery was granted the NEC status in 2015 under the new California Industrial Permit

*SWPPP Update, Plastic Recycling Plant, Modesto, California.* Principal Engineer for the preparation of the SWPPP and storm water assessment for the 10-acre facility, including hydraulic/run-off, conveyance, collection, and retention adequacy analyses.

**Chlorinated Solvent Remediation**

*Chlorinated Solvent Plume Remediation, Santa Rosa, California.* Principal engineer for the remediation of shallow groundwater plume beneath a commercial property. The contaminant of concern (COC) is trichloroethylene (TCE) in groundwater and soil vapor. Re-designed the Enhanced Reductive Dechlorination (ERD) remedial alternative with Emulsified Vegetable Oil (EVO) and Sodium Lactate injections to enhance TCE degradation. After ERD implementation and one year of groundwater monitoring, the site is expected to be certified closed by DTSC in March 2016.

*Chlorinated Solvent Plume Remediation, Fremont, California.* Principal engineer for the remediation of shallow groundwater plume beneath a commercial property. The COCs include tetrachloroethylene (PCE) and TCE, in groundwater and soil vapor. Soil vapor extraction and ERD have been selected as the remedial technologies and remediation is ongoing. The lead agency for the site is Alameda County Water District.

*Chlorinated Solvent Source and Plume Investigation and Remediation, Pleasanton, California.* Project manager and lead engineer for the remedial investigation and the remedial system design at an active dry cleaner. The COCs are tetrachloroethylene (PCE) and TCE. Conducted shallow and deeper groundwater zone investigation. Designed and implemented a soil vapor extraction system to address the residual source in the soil and associated VI issues.

Conducted bench-scale and pilot studies for the groundwater remediation alternatives. Designed and implemented full-scale ERD to address shallow groundwater impacts. The lead agency for the site is RWQCB.

*Chlorinated Solvent Plume Remediation, Taoyuan, Taiwan.* Principal engineer for the remediation of shallow groundwater plume at a former television manufacturing facility in Taoyuan, Taiwan. The COCs include PCE and TCE in groundwater. ERD injections were designed and implemented with over 2,700 meters of aboveground PVC piping; 143 injection wells and associated appurtenances; two 20,000-liter polyethylene mixing tanks; and a 6-metric ton polyethylene molasses storage tank.

*Engineering Oversight, Remediation of Chlorinated Solvent Site, Newark, California.* Serving as the client's technical expert to provide critical review for the ongoing PCE and TCE remediation in soil and groundwater at the site, aid in the development of alternative approaches for VI issues at neighboring residential development. Provided review on remedial approaches, design, costs, and implementation of thermal remediation, in-situ chemical oxidation (ISCO), and ERD.

*Chlorinated Solvent Source and Plume Remediation, Mountain View, California.* Lead Engineer responsible for all technical aspects of the remediation program. The COCs are PCE and TCE. Optimized the groundwater treatment system and designed ERD to enhance groundwater remediation. Evaluated alternative technologies and treatment to address VI concerns. Developed an ERD field demonstration program for treatment of PCE and TCE in groundwater.

### Groundwater Remediation

*Enhanced Bioremediation with Oxygen Release Compounds (ORC), Oil Refinery, San Francisco Bay Area, California.* Served as the lead project engineer for a remediation project involving ORC. Developed the Remedial Action Design and Operation Plans and supervised ORC injections at the site. The first phase of ORC injection consisted of 5,790 pounds of ORC with 182 injection points. The second phase of ORC injection consisted of 3,725 pounds of ORC with 76 injection points. The third phase consisted of 1,375 pounds of ORC with 28 injection points. Reviewed the groundwater monitoring data and evaluated the performance of enhanced bioremediation.

*Dual-Phase Extraction System Operation, City of Oakland, California.* Served as the project engineer for a dual-phase extraction system design and operation project in the City of Oakland. Supervised the construction of the remediation system and conducted system operation and maintenance.

*Guadalupe Restoration Project, Steam Enhanced Extraction, Guadalupe, California.* Served as technical advisor on the Unocal Guadalupe Restoration Project for enhanced oil

recovery. Performed a vital role on this project, reviewing technical documents and evaluating the effectiveness of the proposed in situ thermal enhanced oil recovery system. Evaluated the steam/hot water injection methods for the recovery of a million gallons of diluent fuel (a diesel range hydrocarbon), optimized the design and construction of the system, and reduced the overall remediation cost.

*Interagency DNAPL Consortium Demonstration, Launch Complex 34, Cape Canaveral Air Station, Cape Canaveral, Florida.* Served as the project engineer for the project. Conducted thermal modeling and engineering calculations; designed in situ steam injection system with co-air injection and the effluent treatment system; prepared cost estimates; assisted in the development of documents for regulators; authored the operation plans; supervised the field operations; and coordinated with staff, consulting engineers, equipment vendors, and subcontractors.

### Soil Vapor/Methane Mitigation

*Residential Development, San Jose, CA.* The development consisted of 648 units in two five-story building. The lead agency was the DTSC. As the principal engineer, Dr. Cutting designed an active sub-slab vapor mitigation system (System) to mitigate potential vapor intrusion concerns. The components of the System include a vapor barrier beneath the post-tension concrete slab and a vapor extraction system immediately below the vapor barrier; and Dr. Cutting performed pertinent calculations to obtain the air permit exemption from the Bay Area Air Quality Management District for the "Authority to Construct" and "Permit to Operate" for the active system. She also coordinated communications with the project owner, architects, geotechnical engineers, structural engineers, and contractors during design and construction phases.

*Commercial and Residential Development, Palo Alto, CA.* The 8-acre development consisted of an inter-generational community center with an independent and assisted living facility for seniors. The project involved the construction of the Family Residences, the Cultural Arts Center, the Sports & Wellness Center, the Early Childhood & Family Education Program/Preschool, and other structures, all constructed over a one-level podium parking structure. Some commercial areas, such as office space and reception areas for the Family Residences, were constructed on a slab-on-grade foundation. The lead agency was the San Francisco Bay RWQCB. As the project manager and lead design engineer, Dr. Cutting designed a sub-slab vapor mitigation and monitoring system (System) to control and monitor vapors that may accumulate beneath the building structures. The components of the System include: (1) Vapor barrier beneath the concrete slab-on-grade; (2) Vapor extraction system immediately below the vapor barrier; and (3) Manual vapor monitoring system beneath the buildings to monitor for the presence of volatile chemicals. Dr. Cutting

performed pertinent calculations to obtain the air permit exemption from the Bay Area Air Quality Management District for the passive system and the “Authority to Construct” and “Permit to Operate” for the active system. She also coordinated communications with the project owner, architects, geotechnical engineers, structural engineers, and contractors during design and construction phases, and she served as the liaison for the client for regulatory interactions.

*Residential Development, Mountain View, CA.* The development consisted of 108 units of condominium homes. The building design was a mix of two- and three-bedroom three story units located in 18 buildings. The buildings were constructed on structural slab on-grade foundations, comprised of post-tensioned concrete. The USEPA placed the site on the National Priority List (NPL) in 1990. Dr. Cutting designed the vapor control system that that was employed to address potential risks associated with impacted soil vapor at this Superfund site. She also supervised the system construction and issued the construction completion report.

*Commercial Development, Brisbane, CA.* The 23-acre development included two three-story buildings, three four-story buildings, a multilevel above ground parking garage, surface parking, as well as miscellaneous site improvements including pavements, landscaping, and utilities. The site was a closed landfill and the lead agencies are the San Mateo County Environmental Health Department (SMCEHD) and the San Francisco Bay RWQCB. As the project manager and the lead engineer for the environmental aspect of the development, Dr. Cutting negotiated with the SMCEHD regarding the requirements on pre-development landfill gas investigation and the required components of the gas mitigation and monitoring system. The standards and protocols used in the system design were based on the regulatory requirements of the California Integrated Waste Management Board (CIWMB), outlined in the California Code of Regulations (CCR) Title 27, Section 21190, Post Closure Land Use, as enforced by the SMCEHD. The design employed a gas extraction system, a gas barrier system, and a gas monitoring system. The gas monitoring system was designed to monitor for the presence of combustible gas beneath the foundation, as well as within the first floor of the building and was equipped with various alarms to notify appropriate individuals and fire department, if necessary.

#### **Waste Management Units/Landfill**

*Landfill E Closure, Presidio of San Francisco, California.* Project manager and Technical Lead for the Presidio Trust for the remediation and closure of the US Department of Army (Army) era waste disposal site, Landfill E (LFE), at the Presidio of San Francisco, California. LFE is approximately 4.6 acres and contained approximately 107,500 cubic yards

of soil mixed with building debris, municipal solid waste (MSW), and chemical waste. The selected remedy considered the future use of LFE as a baseball field and included the placement of an engineered soil cover over LFE and incorporates a landfill gas (LFG) venting system, surface water drainage system, long-term monitoring, and land use controls. The primary elements required to design closure of LFE were excavation and final grading plans, supported by slope stability analyses, long term landfill settlement evaluations, landfill gas control, and drainage and erosion control systems. The remedial construction was completed in November 2011. The DTSC certified the closure of LFE on December 5, 2012. The baseball field will be constructed in 2015.

*Baker Beach Disturbed Area 2 Closure, Presidio of San Francisco, California.* Project Manager and Technical Lead for the Presidio Trust for the remediation and closure of the Army era waste site Baker Beach Disturbed Area 2 (BBDA 2) at the Presidio, California. BBDA 2 was a debris fill and was characterized by a mixture of soil, construction debris, landscaping debris, and other miscellaneous debris (e.g., cans, bottles, glass, etc.). The debris extended to depths ranging from 2 to approximately 17 feet below ground surface (bgs). The remedial action for BBDA 2 included excavation and offsite disposal of soil and debris containing concentrations of contaminants of concern (COCs) above applicable cleanup levels. The primary elements required to design remediation of BBDA 2 were excavation and final grading plans, supported by slope stability analyses, long term landfill settlement evaluations, drainage and erosion control systems, and structural evaluation of Battery Godfrey and the Magazines located in the vicinity of this battery. Remedial construction was completed in September 2013. The DTSC certified the closure of BBDA 2 on February 13, 2014. The National Park Service (NPS) will construct an outlook area, picnic area, parking lot, and connect the Pacific Coastal Trail through BBDA 2 in 2015.

*Fill Site 1 and Landfill 2 Closure, Presidio of San Francisco, California.* Project Manager and Technical Lead for the Presidio Trust for the remediation and closure of the Army era landfills Fill Site 1 (FS1) and Landfill 2 (LF2) at the Presidio of San Francisco, California. FS1 and LF2 occupy approximately 2.8 acres and 1.5 acres of open land, respectively. Both landfills contained soil and debris fill (consisting of refuse and construction debris) overlying fill without debris and native soil. Incinerator waste was included in a portion of the debris fill at LF2. The remedial action for FS1 and LF2 entailed excavation and offsite disposal of soil and debris containing concentrations of COCs above applicable cleanup levels. The excavation was based on the excavation limits proposed in the Remedial Action Plan (RAP) approved by the DTSC, following site characterization activities and subsequent data and risk

evaluation. The DTSC certified the closure of FS1 and LF2 on May 10, 2012.

*Waste Management Units (WMUs) – Former Landfills Closure, Tesoro Refinery, Martinez, California.* The WMUs are regulated by applicable sections of California Code of Regulations, Title 27 and directives presented in Waste Discharge Requirements No. R2-2004-0056 (WDR) issued by the San Francisco RWQCB.

*WMU 1 (Petroleum Sludge Disposal Area) Closure.* Project manager for the Avon Remediation Group (ART) for the remediation and closure of WMU 1 at the Tesoro Refinery. The WMU 1 waste disposal area encompassed an area of approximately 1.25 acres and was comprised of two adjacent areas bisected by a trapezoidal drainage channel. The approved remedial action included the construction and installation of an engineered cap, which consisted of a 40-mil linear low-density polyethylene (LLDPE) geomembrane (textured on both sides) to provide the barrier layer, a geocomposite drainage layer, and a 24-inches of aggregate base. The closure was approved by the RWQCB in 2009.

*WMU 2 (Former Arsenic Trioxide Landfill) Closure.* Project Manager for ART for the remediation and closure of WMU 2 at the Tesoro Refinery. The WMU 2 waste disposal area encompassed an area of less than 0.1 acre. The approved remedial action included the construction and installation of an engineered cap, which consisted of 24 inches of compacted foundation, 18 inches of clay with a hydraulic conductivity less than or equal to  $1 \times 10^{-5}$  centimeters per second (cm/sec) and 6 inches of topsoil. The closure was approved by the RWQCB in 2009.

*WMU 3 (Tetraethyl Lead and Arsenic Trioxide Landfill) Closure.* Project Manager for ART for the remediation and closure of WMU 3 at the Tesoro Refinery. The WMU 3 waste disposal area encompassed an area of less than 0.2 acres, with a centerline ridge generally running east to west across WMU 3. The approved remedial action included the construction and installation of an engineered cap, which consisted of 12 inches of compacted structural leveling sand, a geocomposite layer to allow collection and passive venting of gas, a 40-mil LLDPE geomembrane liner (textured on both sides) to provide the barrier layer, a geocomposite drainage layer, and a protective layer consisting of a minimum of 12 inches of crushed aggregate base. The closure was approved by the RWQCB in 2009.

*WMU 8 (Former Oily Sludge Landfill) Closure.* Project Manager for the remediation and closure of WMU 8 at the Tesoro Refinery. The WMU 8 waste disposal area encompassed an area of approximately 2.5 acres. The approved remedial action included excavation and consolidation of 1,000 cubic yards of soils from the northern portion of the site and the construction and installation of an engineered cap in the southern portion of the site. The cap consisted of 24 inches

of compacted leveling base, 12 inches of clay with a hydraulic conductivity less than or equal to  $1 \times 10^{-6}$  cm/sec, a nonwoven, smooth geotextile separation layer, and a protective layer consisting of a minimum of 12 inches of crushed aggregate base. The closure was approved by the RWQCB in 2010.

*WMU 9 (Former Antimony Trichloride Landfill) Closure.* Project Manager for ART for the remediation and closure of WMU 9 at the Tesoro Refinery. The WMU 9 waste disposal area encompassed an area of approximately 2 acres. The approved remedial action included the construction and installation of an engineered cap which consisted of 24 inches of compacted leveling base, a nonwoven geotextile separation layer, 40-mil linear LLDPE geomembrane secondary (lower) barrier layer, the geosynthetic clay liner, 40-mil LLDPE geomembrane primary (upper) barrier layer, a nonwoven geotextile cushion layer, and 12 inches of crushed aggregate base layer. The closure was approved by the RWQCB in 2010.

#### **Building Demolition**

*Miscellaneous Sites, Presidio of San Francisco, California.* Served as the Presidio Trust project manager for the hazardous material assessment for over 100 sites, including buildings and former military structures. Developed plans to decommission and demolish non-historical structures under DTSC oversight. Prepared construction documents issued requests for bids. Interviewed potential bidders and documented the selection process for procurement.

*Facility Decommission, Oakland, California.* Served as the project engineer for the decommissioning of a former manufacturing facility. Prepared hazardous material assessment plans and conducted the assessment. Prepared decommission plans for DTSC review and approval.

*Building Demolition, San Leandro, California.* Served as the project engineer for soil remediation that included partial building demolition and soil removal for a commercial redevelopment under DTSC oversight. Prepared remedial action plan and associated construction drawings.

#### **Remediation Program Management**

*Project Manager for Presidio Trust (Trust), San Francisco, California.* Served as the project manager and technical lead for remediation, risk assessment, air permitting, and sustainability at the Presidio. Managed site investigation, Feasibility Study, Remedial Action Plan, and Remedial System Design per Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements, environmental documentation per California Environmental Quality Act (CEQA) requirements, construction documents, and procurements for bid. Prepared and issued requests for proposal (RFPs), reviewed consultant proposals, and documented selection of consultant(s). Scheduled, prepared for, and completed

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### Industrial Practice Area Leader/Principal Engineer

required National Park Service (NPS) reviews. Attended monthly meetings with the Golden Gate National Parks Conservancy (Conservancy) on trails and overlooks and coordinated remediation work with these other projects. Coordinated remediation work with other Presidio Trust/NPS/Conservancy programs and projects as needed. Attended regular meetings with the lead agencies, DTSC and RWQCB, to ensure timely review and approval process.

*Deputy Program Coordinator for Refinery PRP Group, San Francisco Bay Area, California.* Served as the Deputy Program Coordinator for a Bay Area oil refinery Potential Responsible Party (PRP) group. The program involved a very wide range of disciplines and services, including site investigations, human health and ecological risk assessments, wetlands and endangered species permitting, soil and groundwater remediation, closure of waste management units and impoundments, LNAPL assessment and remediation, groundwater monitoring utilizing hundreds of monitoring wells and a sophisticated decision-making model for assessing its results, compliance with hazardous waste management regulations, legal consultations, and public outreach. Reviewed and commented on various investigation work plans, design drawings, and closure and post-closure maintenance plans.

#### **SPEAKING ENGAGEMENTS**

*Groundwater Resources Association of California (GRA).* As the invited speaker for the web seminar on June 11, 2014, Dr. Cutting presented the engineering perspective for the approach relating to vapor intrusion mitigation measures for a residential development in Silicon Valley. The client acted upon legal advice to incorporate proactive VI mitigation measures at the proposed development when it was not mandated by the lead agency DTSC. Dr. Cutting also discussed the key aspect of succeeding in implementing cost-effective vapor mitigation is communicating effectively across multiple disciplines, with the client and the development team (architect, civil engineer, general contractor, and various subcontractors) regarding the VI mitigation system design and incorporating the system into the Building Plan and Schedule. In addition, the different components of a mitigation system were explained. She concluded the talk with the legal/regulatory setting, as well as the operation, maintenance, and monitoring of the system.