

Pamela H. Rey, P.E.
Managing Engineer

Professional Profile

Ms. Pamela H. Rey is a Managing Engineer in Exponent's Health Sciences Center for Occupational and Environmental Health. Ms. Rey conducts evaluations of water intrusion, fungal growth, and chemical compounds in structures, including sampling, specifying laboratory analytical requirements, developing remediation protocols, conducting post-remediation air evaluations, and preparing reports. Ms. Rey assists in conducting inspections as part of the discovery process for construction defect litigation. Structures include residential, commercial, industrial, medical, and airport terminals.

Ms. Rey provides litigation support for cases where exposure to asbestos, benzene, solvents, and other compounds are alleged to have caused personal injury. Ms. Rey has been responsible for compiling industrial hygiene data, timelines, and available information for these cases in preparation for litigation.

Ms. Rey has more than 25 years of experience in conducting environmental engineering studies, and designing and implementing corrective actions at CERCLA, RCRA, and state-oversight sites. She provides strategic and scientific regulatory compliance, design, and construction/remediation cost-estimating services to her industrial, insurance, and public-sector clients, and their counsel.

Ms. Rey has conducted forensic evaluations related to the management and oversight of remedial activities to address pesticides, organic compounds, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), dioxins, and metals such as arsenic, chromium, copper, lead, mercury, nickel, and zinc, in all environmental media.

Academic Credentials and Professional Honors

M.S., Civil Engineering, University of California, Berkeley, 1980
A.B., Geology, Dartmouth College, 1978

Licenses and Certifications

Registered Professional Civil Engineer, California, #C35348

40-Hour Hazardous Waste Health and Safety Training Course; Eight-Hour Hazardous Waste Health and Safety Supervision Course

Publications

O'Rourke JE, Rey PH. Design guidelines and instrumentation for in-situ stress and rock discontinuity conditions in coal mines. *International Journal of Coal Geology* 1987; 8:325–338.

Book Chapters

Johnson GD, Rey PH, Ardrey RH, Visser CF, Opdyke ND, Khan Tahirkheli RA. Paleoenvironments of the Siwalik Group, Pakistan and India. In: *Hominid Sites: Their Geologic Settings*. Rapp, Jr. G, and Vondra CF (eds), American Association for the Advancement of Science, Selected Symposium 63; based on a symposium at the 1980 AAAS National Annual Meeting in San Francisco, CA, 1981.

Presentations

Hicks J, Rey P. Airborne mold types and concentrations in indoor environments with mold growth occurring in exterior wall cavities. *Indoor Air 2008*, Paper ID: 326, Copenhagen, Denmark, August 17–22, 2008.

Hicks J, Rey P, Fowler P. The impact of plug-in air cleaners on airborne particle concentrations in office and residential settings. *Indoor Air 2008*, Paper ID: 323, Copenhagen, Denmark, August 17–22, 2008.

Hicks J, Rey P, Granger H. An alternative method to mold remediation of gypsum wallboard. *American Industrial Hygiene Conference & Exposition*, 2007.

Rey PH. Environmental impacts on real estate transactions—Buying and selling distressed properties. *The Real Estate Round Table*, San Francisco, February 12, 1997.

Firestone EA, Simpson TS, Rey PH. Technologies for development of contaminated sites. *Environmental Breakfast*, Orange County Business Journal, February 1, 1996.

Firestone EA, Rey PH, Jimson ER. Remedy selection in the 1990s—From Superfund to Brownfields. *Environmental Law Institute at Yosemite*, October 1995.

Hines RL, Rey PH. Hot topics in environmental law—Closure alternatives. *San Francisco, CA*, 1994.

Project Experience

Water Damage and Fungal Evaluations

Evaluation of Fungal Growth and Water Intrusion in a Multi-Building Apartment Complex

As part of the forensic team for the plaintiffs, worked with the architect and other building specialists during an extensive destructive testing and inspection program at this 15-

building/500-unit apartment complex in the San Francisco Bay Area of California, which suffered from several construction defects that led to water intrusion into the occupiable spaces and degradation of exterior and interior building components. Headed up the field effort to identify the extent of fungal growth within apartment units selected for destructive testing and inspection, as well as in exterior components of the three-story buildings. Conducted fungal clearance evaluations following completion of destructive testing. Exponent's compilation of fungal growth and water damage to interiors of the apartment units and estimate of costs of repair were incorporated into the overall damage claim, which led to settlement.

Fungal Evaluation in a Medical Office/Surgery Center

For this fungal evaluation in a medical office/surgery center that sustained water damage immediately following construction, inspected exposed wall components following removal of stucco facing and conducted air sampling using standard non-viable methods as well as molecular fungal detection methods (DNA-polymerase chain reaction technology). Due to the nature of the facility, the owner was very concerned about the potential damage to the occupied spaces within the building. Occupancy of the building continued to increase during replacement and repair of the exterior.

Construction Warranty Support

For a builder/developer of single-family homes in the Central Valley, manages Exponent's provision of warranty support on water intrusion and fungal growth issues. Exponent conducts fungal evaluations, writes protocols for remediation where required, provides oversight, and conducts clearance evaluations. In some cases, these projects involve litigation support.

Fungal Evaluation and Remediation Oversight for an Airport Terminal

During construction of a 2-story, 400-foot-long terminal expansion building at an international airport, water damage resulted in mold growth on gypsum wallboard surfaces within the building, including walls and soffit and parapet areas. Conducted an extensive visual evaluation of water damage of the gypsum wallboard, which included use of a remote camera to access the parapet and other areas where building features limited access for observation. Following completion of this evaluation and documentation of areas where fungal growth was observed, Exponent recommended a combination of removal/replacement of the most damaged areas of the gypsum wallboard, and a method of detergent cleaning of fungal-affected gypsum wallboard coupled with encapsulation using a latex paint with an added biostatic agent. When substantially completed, Ms. Rey tested the structure to ensure normal air quality. The terminal is currently in full operation.

Environmental Site Assessment, Remediation, and Forensics

Petroleum and Polynuclear Aromatic Hydrocarbons (PAHs)

Managed several projects that involved tank removal, site characterization, and remediation of diesel, gasoline, and other organic compounds in soil and groundwater at facilities that used or

stored petroleum hydrocarbons. Directed the design and implementation of remedial action alternatives that would be compatible with requirements of the State (California Regional Water Quality Control Board [RWQCB]) and local regulatory agencies. Remedial actions implemented include time-critical excavation of affected soil and groundwater pump-and-treat systems for hydraulic containment of dissolved groundwater contamination, followed by in-situ bioremediation to reduce diesel concentrations. Remedial actions required application of appropriate waste management and discharge permit requirements, including those imposed by publicly owned treatment works (POTWs) and federal National Pollution Discharge Elimination System (NPDES) regulations.

Coordinated engineering activities related to mitigating the effects of a 20,000-gallon spill from a pipeline conveying unleaded gasoline, diesel, and jet fuel. The leak intersected a California Central Valley town's network of sewer lines, municipal water distribution lines, and other utilities. Directed work that included defining the extent of fuel in soil, groundwater, and along the backfill of utility lines; designing and implementing measures to mitigate the effects of fuel in utility backfill, including installing grout collars and vapor monitoring systems; installing and operating a vapor/product/groundwater extraction trench and treatment system; preparing work plans, remediation plans, sampling plans, and summary reports to document remediation activities; and coordinating and negotiating with state and local regulatory agencies, including the RWQCB, city, local water district, and county entities.

Managed, coordinated, and tracked costs for a multi-party technical team that assisted a major Bay Area oil company with removal of 2 million gallons of heterogeneous petroleum waste contained in an above-ground storage tank in the Central Valley. The work was conducted as part of an emergency removal action under RCRA and Superfund (CERCLA §106) orders, with U.S. Environmental Protection Agency (EPA) Region IX oversight, and included extensive regulatory review to assist in evaluating and selecting waste management and disposal alternatives for all waste phases. Following the RI and FS, provided construction oversight services.

Directed a series of environmental site assessments of petroleum, oil, and lubricant (POL) storage and distribution facilities for Navy/Air Force Fuel Facilities and Fuel Pipeline Replacement Design in Guam. Identified past waste disposal practices and operating procedures and evaluated whether soil or groundwater remediation was required. Supervised review of facility files, interviews of operations personnel, work performed under the Installation Restoration (IR) Program, site reconnaissance of past waste disposal areas and historical leak and spill sites, development of remediation alternatives and associated costs, and environmental compliance audits. Studies included a pipeline replacement project, which included management of environmental, geological, geotechnical, and seismic studies for design of a new, 16-mile-long, 10-inch-diameter pipeline and replacement of existing, dual, 8-inch above-ground pipelines. Participated in Functional Analysis Concept Design (FACD) process. Prepared specifications related to environmental permitting and regulatory requirements, mitigation of potential environmental effects, and earthwork requirements associated with the planned construction and demolition.

Directed a construction project consisting of removal of 32 underground former fuel-supply tanks, ranging in capacity from 1,000 to 12,000 gallons, at 15 different locations within a 3500-unit residential development in a Northern California municipality. Difficult subsurface flowing-sand conditions required the use of shoring at 11 locations. Directed project staff in preparing plans and specifications, and oversaw tank removal, backfilling, and site restoration. Served as primary contact with the local regulatory agency, which, because of tight coordination, reviewed and approved the closure report for the 32 tanks within 30 days of receipt.

PCBs and Dioxins

Prepared estimates of environmental liabilities for an equity committee in a United States Bankruptcy Court proceeding following a corporate spin-off that included transfer of environmental liability. Developed estimates of long-term remedial costs of environmental liabilities at three industrial sites in Alabama, Illinois, and West Virginia, where PCBs were released to the environment, including nearby rivers and/or residential areas, over an extended period of time. Included development and assessment of known pre-spin-off environmental conditions, precedents of remedial action selection and costs at similar sites in the United States, and evaluation of emerging federal and state regulatory guidance related to PCB congeners and Toxic Equivalency Factors (TEFs) for dioxins and related compounds.

Metals

Reviewed and analyzed information related to source-area investigation and remediation at an operating copper mine in Arizona to develop an expert opinion for insurance claimants, and cost allocation for investigation and remediation.

Managed a California Superfund project at a chemical manufacturing site in the South San Francisco Bay that was affected by approximately 100 tons of arsenic and related compounds. Responsible for documenting historical site practices, preparing the remedial investigation/feasibility study (RI/FS) work plan, directing extensive hydrogeologic and soil investigations, preparing a risk assessment, and reporting the results of long-term groundwater monitoring required by the RWQCB. Major elements of this work included evaluating arsenic chemistry and toxicity, evaluating ecological exposure near a sensitive tidal environment, and performing soil treatability studies.

Pesticides

Managed environmental oversight and groundwater monitoring at approximately 22 sites in California and four sites in Oregon for an agrichemical company. The project included budget management and cost tracking; investigation, remediation, and monitoring of the sites as appropriate; and management of investigation-derived and remediation wastes at these sites, where the chemicals of concern included nitrate, pesticides, and organic solvents. Acted as liaison among the civil designers, municipal permitting agencies, and the client for two sites that were paved to prevent infiltration of precipitation through soil that contains pesticides, and migration of the chemicals to groundwater.

Chlorinated Solvents

Managed investigation and remediation of the subsurface area around four former underground fuel storage tanks at a regional electric utility center in Northern California, under the oversight of the RWQCB. The investigation to characterize site hydrogeology and the distribution of fuel hydrocarbons and volatile organic compounds (VOCs) in soil and groundwater included design, implementation, laboratory analysis, reporting, and quality assurance documentation for an RI, FS, remedial action plan (RAP) and remedial design (RD) program. The investigation included both traditional and expedited methods (e.g., onsite mobile laboratories) to cost-effectively characterize the site for regulatory approval and selection of design parameters. Directed a feasibility study to evaluate alternative remedies, and managed construction, startup, and operation of an enhanced in-situ bioremediation system in the diesel-affected area, and a groundwater extraction and treatment system for the VOC-affected area.

Directed preparation of a feasibility study and remedial action plan that allowed in-place management of compounds detected in soil (total chromium, hexavalent chromium, copper, lead, nickel, chlorinated solvents, petroleum hydrocarbons) attributed to historical manufacture of small appliances at this industrial facility, and was compatible with the site's planned future use as a train station. The field program included drilling 75 soil borings and analyzing more than 140 samples for metals, volatile organic compounds, semi-volatile compounds, PCBs, and cyanide. Directed a risk assessment in accordance with U.S. and California EPA guidance, and the remedial action plan based on the statistical evaluation of the soil data and the planned future use of the site. This project involved interaction with the RWQCB, California Department of Toxic Substances Control (DTSC), several local government agencies, current industrial and commercial tenants and landowners. Received training in addressing the media and public.

Directed remediation of tetrachloroethene (PCE) and trichloroethene (TCE) in soil using vapor extraction and vapor-phase granular activated carbon treatment at an industrial site in southern California. Work included preparing a removal action plan and a Negative Declaration to comply with the California Environmental Quality Act (CEQA), and installing and operating the remediation system. Interacted with agency personnel from the DTSC to develop and implement the Voluntary Cleanup Agreement.

Coordinated review of technical documentation of remediation at a federal Superfund hazardous waste disposal site in Texas that is on the National Priority List (NPL). Addressed sufficiency and accuracy of waste volume, composition, viscosity, and heat content data presented in the Request for Proposal (RFP), which required remediation of pit water, organic liquids, sludges/tars, and soil by onsite incineration in a 54-month time frame under a lump-sum contract. Identified inconsistencies in viscosities, heat content, measurement, and volumes of different waste phases and soil to be incinerated, as described by contours, cross sections, and tables in the RFP. Trial by jury found for the client and awarded actual damages, attorneys' fees, and punitive damages.

Solid Waste

Prepared a Joint Technical Document and closure plan for a landfill in Alameda County, California. Completed a project description for construction of a composting facility to assist the Alameda County Waste Authority in conducting its CEQA studies.

Prepared closure and post-closure maintenance plans for former municipal solid waste landfills in Alameda and Calaveras counties, California, in accordance with Title 27 of the California Code of Regulations (CCR) and Subtitle D of RCRA.

For a compliance review of 180 active and 60 closed Class II and III landfills in California, prepared a summary of federal and state regulations regarding municipal solid waste landfill siting, permitting, construction, operation, closure, monitoring, and reporting. This effort included review of federal regulations contained in Parts 257 and 258 of Title 40 of the Code of Federal Regulations (CFR), Part 122 of the CFR (stormwater), and Title 27 of the CCR, as well as RWQCB stormwater requirements for landfills.

Building and Site Demolition Projects

Directed demolition projects, including preparation of bid packages and demolition oversight, at several California sites with environmental concerns such as asbestos-containing materials, lead-based paint, PCBs, and soil and debris affected by metals, volatile organic compounds, pentachlorophenol, and dioxins. Incorporated into contract documents consideration of classification and disposal of demolition debris, construction worker health and safety, required environmental permits and regulatory notification, and environmental protection during construction.

Additional Experience

Responsible for foundation studies, settlement analyses, slope stability analyses, development of remedial measures for mitigating landslide hazards, field instrumentation, drainage studies, and analyses of retaining structures.

Planned, installed, monitored, and analyzed data from field instrumentation programs for mines, underground works, slopes, and construction projects.

Worked as an exploration geologist and consulting engineer in underground coal and molybdenum mines in Colorado and Utah. Studies of coal-mine subsidence phenomena in Utah were funded by the United States Department of Energy (DOE) to advance understanding of surface behavior in mining areas in the western United States.

At the American Land Conservancy, researched and prepared grants for funding land conservation projects from the Mississippi River to Alaska, including obtaining a \$400,000 grant for Afognak Island in Alaska; tracked legislation that affects conservation funding and tax incentives; researched science-related aspects for project funding, such as carbon sequestration and climate change; monitored conservation easements; coordinated tax exemption applications,

tax payments, and other reporting requirements for owned property; prepared project descriptions, including biological values; and prepared management agreements and interacted with conservation group and agency representatives to advance conservation projects.

Professional Affiliations

- American Industrial Hygiene Association, member, 2007–present
- American Society of Civil Engineers—Served in offices from treasurer to president and past president of the Golden Gate Branch, 1987–1992. Initiated a scholarship program for students at the University of California at Berkeley and San Francisco State University in 1991 while president of the Golden Gate Branch. Served as director of the Bay Area Engineering Societies (1992), chair of the Sembler Trust (1992–1997), and on a committee of past presidents to judge the 1997 Outstanding Civil Engineering Project of the Year Award for the Golden Gate Branch of American Society of Civil Engineers, 1998.