

PROJECT EXPERIENCE
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EXPERTISE Hydrogeologic Evaluation
Groundwater Monitoring and Aquifer Testing
Groundwater Management Planning & Implementation
Contaminant Hydrogeology & Groundwater Remediation
Special Project Research, Design and Management

2005 - 2009: Schlumberger Water Services, Sacramento, California.

- **MWH Global, Inc./AWWARF** - Study on Potential Groundwater Quality Impacts Resulting from Geologic Carbon Sequestration - This was a Rapid Research Study jointly funded by the Water Research Foundation and the AWWA under Cooperative Agreement conducted jointly with MWH Global, Inc. The objectives of this study were (1) document and assess the technology and understanding of the GCS process, (2) identify and characterize potential impacts of GCS on quality of groundwater supplies, (3) review existing approaches and recommendations for assessing and mitigating these impacts, and develop a monitoring guideline, and (4) perform a comprehensive evaluation of this information to ascertain knowledge gaps and research priorities. The report is in print, and should be published in mid-2009.
- **Sonoma County Water Agency** - Groundwater Management Planning, Program Implementation, and Technical Support – Sonoma county currently uses considerable groundwater for residential and predominantly agriculture (grape growing for the wine industry), but had no groundwater management program. The area faces several groundwater management challenges including: groundwater quality degradation; localized groundwater overdraft; saline water intrusion; and population increase accompanied by increasing groundwater demands.
 - *Sonoma Valley Groundwater Management Program* - The project involved assembling and assisting in facilitating a group of groundwater stakeholders to develop a comprehensive groundwater management plan for the Sonoma Valley and included modeling various scenarios to assess water management options for

increasing the supply and reliability. The current assignment involves implementing the groundwater management plan and includes optimizing the groundwater monitoring program and installing additional wells, updating the groundwater model, and pursuing other studies as described in the Plan.

- *Sonoma Valley Groundwater Monitoring Well Installations* - a work plan was developed and grant application prepared for the installation of additional groundwater monitoring wells in the Sonoma Valley for groundwater quality evaluations. The grant has been approved for \$250,000 and, pending funding, wells will be installed in 2009.
- **Water Replenishment District of Southern California** - The project involves geophysical logging of multiple boreholes ranging in depth from 1,000 feet to 2,000 feet below ground surface. Logging suites include the array induction tool, micro-cylindrically focused log, magnetic resonance, natural gamma ray, scintillation gamma ray, fullbore formation micro-imager, and sonic scanner. Services include interpretation of geophysical logs and consultation on monitoring well design.
- **Nobis Engineering, Inc.** - Focused technical review of a groundwater flow model developed for the OLIN Chemical Superfund Site, Wilmington, Massachusetts – This site involves dense aqueous phase liquid (similar to brine) contamination of a local glacial drift drinking water aquifer, with some drinking water wells shut down and a remedial program initiated. A finite element groundwater flow model, intended to be used in the future to support contaminant transport and remediation simulations, was developed and calibrated for the site by the RP consultant. The project involved detailed review of model documentation on behalf of US EPA to (1) identify potential documentation gaps, (2) identify potential flaws in the site conceptualization and, (3) identify possible problems with implementation of the numerical model.
- **MWH Global, Inc. - City of Roseville Aquifer Storage and Recovery Program** - The city is growing rapidly with 20,000 housing units being added over the next 10 years. The city plans to meet the future water demand so the growing population with a conjunctive use program involving a 10 to 15 well aquifer storage recovery program. The project involved providing advanced geophysical logging of ASR

and monitoring wells, consultation on monitoring well design, and technical support for the city in development of the ASR well field.

- **Schlumberger Remediation - MEW Superfund Site, San Jose, California** - The MEW Superfund Site is a Silicon Valley semiconductor facilities, multi-site solvent-contaminated groundwater project. The current program involves assessing and assimilating 25 years of groundwater monitoring and remedial data, developing a refined 3D hydrogeologic conceptual model, developing a revised groundwater flow model, and developing a fate and transport model. The data have been evaluated and assimilated, conceptual and flow model completed and fate and transport model in process.
- **Mojave Water Agency** - Mojave Water Agency Groundwater Model Development and Advanced Geophysical Logging – The project is to conduct advanced geophysical logging of one to two 1200-foot boreholes through a thick unsaturated zone (~600 feet), develop a conceptual site model using Petrel, and develop a groundwater flow model using Eclipse. The assignment is to provide hydrogeologic consulting on an as-needed basis.
- **City of Corona** - HydroGeoAnalyst project development. Involved bringing limited groundwater and surface water data sets into HydrGeoAnalyst, installing the software and preliminary training of staff.
- **Confidential Client** - Beneficial Use of Coal Bed Methane Produced Water, Wyoming. Project involved field inspection, geophysical log evaluation, preliminary Petrel model development, water resources, legal and regulatory assessment, groundwater monitoring review and evaluation, treatment options and cost analysis, and recommendations for CBM produced water use and reuse.

2001 - Present: California Department of Water Resources, Division of Planning and Local Assistance, Conjunctive Water Management Branch, Sacramento, California

- **Sacramento Groundwater Authority (SGA)/American River Basin Cooperating Agencies Partnership Projects.** Technical

oversight on Proposition 13 \$21 million grant regional conjunctive use program involving aquifer-storage-recovery wells, and infrastructure expansion. Provided technical input and assistance on SGA groundwater monitoring program, groundwater data management system development and banking & exchange pilot project, working closely with contractor MWH. Other tasks consisted of review of technical reports, interface with SGA and CWMB, coordination on source water assessment, coordination on multi-agency VOC and ambient monitoring programs.

- **Central Sacramento County Groundwater Forum – (Sacramento) Water Forum Successor Effort.** Worked with (Sacramento) Water Forum Successor Effort and Groundwater Forum through facilitated, consensus-based approach involving a group of 30 stakeholders charged with the assignment of selecting groundwater management governance in the Central Sacramento County area. Worked with the Center for Collaborative Policy facilitator, Water Forum Successor Effort and Contractor to conduct stakeholder identification, stakeholder assessment, and develop and implement educational program for Groundwater Forum. Outreach and public education activities ongoing; interest-based negotiations in progress.
- **San Joaquin County.** Worked with San Joaquin County, local water districts and agencies, CCP facilitator and Contractor to facilitate conjunctive water management projects in the San Joaquin County area. Activities included attendance of coordinating committee meetings and public meetings, and assisting in development of stakeholder assessment. Worked with San Joaquin County to develop approach and managed installation of six groundwater-monitoring wells in Stockton area for salinity evaluation. Involved LLNL and USGS in initial well sampling and analysis. Developed cooperative approach with local agencies, USGS, and DWR for five year \$2.6 million salinity assessment, groundwater monitoring, groundwater flowpath and geochemical conceptualization. Also assisted in developing approach for preparation of groundwater management objectives and a groundwater management plan.
- **Stockton East Water District Proposition 13 Project.** Worked with the SEWD to implement a \$7M pipeline and injection/extraction well program I the northeast San Joaquin County area, to be completed under a \$3.5M Proposition 13 grant.

- **California State University of Sacramento Groundwater Monitoring Well Installation for Groundwater and Stream-Aquifer Interaction Evaluations.** Cooperative effort involving CSUS, LLNL, USGS, SGA, and SAFCA. Developed approach and managed installation of 12-groundwater monitoring wells at CSUS. Well installation funded by CWMB. Wells are used for assessment of groundwater flow and stream-aquifer interaction by CSUS and DWR, with data provided to SGA and SAFCA.
- **Yolo County Integrated Storage Investigation Project.** Worked with the water Resources Association of Yolo County technical group to prepare a preliminary white paper to summarize adequacy of the data for completing a basin analysis and the level of effort necessary to compile, organize, and interpret the data. The main emphasis of the basin analysis was potential conjunctive use project development in Yolo County, and evaluation of groundwater monitoring program in Yolo.
- **Proposition 13 and AB 303 Groundwater Grant Application Review and Ranking.** Reviewed and ranked Proposition 13 and AB 303 groundwater grant applications, including groundwater monitoring well installations, groundwater monitoring program reviews, groundwater management planning and recharge evaluations. Worked closely with the CWMB to complete the screening and ranking of groundwater grant applications submitted within the Central District.
- **Bulletin 118.** Provided technical support for Central District geographic coverage Bulletin 118 update, a “state of the data approach” to develop a revised groundwater budget for each basin including review and summary of boundaries and hydrographic features, hydrogeologic units, yield data, water budgets, well production characteristics, water quality and monitoring data.

2000 - 2001: California Department of Conservation, Division of Mines and Geology, Watershed Assessment/Restoration, Sacramento, California.

- **Co-Founder of the Watersheds of the DMG's Component of the Interagency North Coast Watersheds Assessment Program (NCWAP).** Assisted with budget change proposals, program work plans and budgets; acquisition of capital support items, response to questions from the Legislature and Resources Agency; attended interagency management meetings; helped develop presentations on landslide and fluvial geomorphology issues; participated watershed pilot studies; developed and tested GIS mapping and database protocols.
- **Researched methods and approach for on-screen mapping of landslides from stereo photographs.** Standard practice involved mapping landslides from stereo imagery on plastic overlays. Proposed approach involved use of software and high-end graphics workstation with stereo-analyst application to conduct the work on-screen, to reduce time required and improve work quality.
- **Responsible for aerial photograph review of a portion of the Noyo River Watershed, and field reconnaissance of geology.** Provided a quality control review of portions of the Noyo River watershed, through aerial photo review, and field geologic reconnaissance and landslide mapping.
- **Review of timber harvest plans for potential soil erosion and slope stability issues related to engineering geology, and proposed timber harvest activities.** Provided comments and recommendations to the California Department of Forestry and Fire Protection (CDF). Attended pre-harvest inspections on as-needed basis, and prepared reports describing the engineering geologic conditions observed and recommendations when warranted.
- **Responsible for review of multiple CEQA type documents for engineering geologic issues related to public safety.** Reviewed negative declarations, mitigated negative declarations, environmental impact statements, and environmental impact reports on various types

of projects for engineering geologic issues relating to public safety and conformance with CEQA.

- **Review of Sustained Yield Plan, Red River Forests.** Responsible for review and comment on soil erosion and slope stability issues regarding forest harvesting practices, forest road construction and maintenance in relation to timber harvesting in the Modoc Plateau.
- **Review of Option A, Hawthorne Forests.** Responsible for review and comment on soil erosion and slope stability issues regarding forest harvesting practices, forest road construction and maintenance in relation to timber harvesting in the Northern California.

1997-2000: Cal EPA Department of Toxic Substances Control, Stringfellow Branch, Sacramento, California.

- **Task Manager for preparing an approach to develop a Stringfellow site revised hydrogeologic conceptual model.** Responsible for in-house preparation of a work plan for a revised hydrogeologic conceptual model of the Stringfellow site, utilizing oriented core, well installation, aquifer testing data, and other existing pertinent geohydrochemical data.
- **Task Manager for providing a comprehensive environmental data management system.** Established need, gained support and sponsorship from management, prepared scope and managed the development of a Stringfellow comprehensive environmental data management system for hydrologic, geologic, chemical, meteorologic, geographic information. Established the need to develop standard operating procedures for data input into the data management system as the data are generated, which includes specifications for electronic data deliverables format. A variety of approaches were considered including acquiring Earth Visions. The approach taken was to have one of our Zone Contractors provide an existing, customizable data management system. The system utilized Map Info Professional as a platform and links with software applications such as MS Access and DBASE, EXCEL, SURFER, provides a 2-D and 3-D statistical geospatial interpolation module, and could write various groundwater modeling and visualization file formats including MODFLOW and AVS.

- **Task Manager for assembling a panel of experts and getting them on-board and contracts in-place.** . Established need, gained support and sponsorship from management, prepared scope and managed the development of a panel of experts to provide technical support on the Stringfellow project. Contracted with Lawrence Livermore National Laboratory (LLNL) to obtain public and private sector industry expertise. Worked with LLNL to put together a panel of experts for technical support on the various aspects of the projects including regional and local geology and structure; fractured rock media characterization; hydrogeologic conceptualization; contaminant fate & transport; remedial design and cleanup optimization.
- **Task Manager for 3-D visualization of 3-D seismic and electronic goniometer fracture data.** Data collected at the site include 3-D seismic and oriented core electronic goniometer fracture data. Responsible for developing approach to evaluate the two sets of corresponding fracture data. The approach involved overlaying the fracture data into a 3-D visualization model utilizing Advanced Visualization Systems software. Developed scope and managed project through a Contract with Lawrence Berkeley National Laboratory to complete the work.
- **Task Manager to re-evaluate and photo-document all Stringfellow site core.** Geological investigations had been conducted at the site for nearly two decades, and involved many different geologists and correspondingly dissimilar interpretations of the geology. The objective was to evaluate all of the core and geology consistently, in order to provide a uniform understanding of the site geology in the hydrogeologic conceptualization. The cores were also photographed in digital and 35mm slide format to provide electronic as well as standard film record of the core for database storage and readily available future review.
- **Task Manager for 2-Phase Extraction Treatability Test.** Responsible for oversight and direction of Contractors to develop approach and work plans to perform a 2-Phase Extraction (TPE) treatability test at the site. A treatability test consisting of the Xerox TPE technology was conducted to support the Supplemental Feasibility Study. The objective of the tests was to collect the data necessary to assess if TPE is a viable remedial solution for the site. The test involved extraction from nine existing wells and monitoring eight to ten wells at each extraction point.

- **Task Manager for Soil Flushing Treatability Test.** Responsible for oversight and direction of Contractors to develop approach and work plans to perform a Soil Flushing treatability test at the site. A treatability test consisting of a variety of bench-scale tests was conducted to support the Supplemental Feasibility Study. The objective of the testing was to assess if natural soil flushing will enhance the remediation of the site. The testing involved soil physical and chemical analysis, bench-scale soil column flushing, and sequential extraction tests in a laboratory setting.
- **Responsible for groundwater modeling.** Responsible for: (1) technical review of existing MODFLOW porous media groundwater flow model; and (2) developing options and providing a recommended approach for a groundwater flow and fate & transport model utilizing the revised hydrogeologic conceptual model.
- **Responsible for oversight of coring and well installation activities/oriented core electronic goniometer data collection.** One of four geologists responsible for oversight of Contractor field activities at the Stringfellow site involving: (1) completion of 31 oriented core holes using rotary wash drilling methods; design and installation of 72 groundwater monitoring and extraction wells using dual tube percussion and air rotary casing hammer drilling methods; development and sampling of the new wells. Also provided options and recommended approach for obtaining electronic goniometer data (versus mechanical with hard copy data) for the fracture information from the oriented core holes.

1993 – 1997: Law Engineering & Environmental Services, Inc., Sacramento, California

- **Delivery Order (D.O.) 4 Manager for Site and Basewide Investigations, Beale Air Force Base, California.** The D.O. 4 project consisted of conducting a basewide groundwater operable unit hydrogeologic evaluation; basewide groundwater monitoring program; basewide groundwater flow/fate & transport modeling; conducting a basewide background soil evaluation; developing/negotiating a risk consensus statement; conducting remedial investigation, feasibility study and remedial action plan on six sites; engineering evaluation/cost analysis on four sites; and supplementary remedial investigation of three sites. The sites included an aircraft ground equipment maintenance area,

a bulk fuel storage area, a transportation refueling vehicle maintenance shop, vehicle fuel station, a fire protection training area, a jet test cell, an inactive hazardous waste landfill, and an inactive non-hazardous waste landfill. Contaminants included fuel hydrocarbons, metals, aromatic and chlorinated volatile organic compounds.

- **D.O. 16 Manager for Site 13 Investigations, Beale Air Force Base, California.** The D.O. 16 project consisted of the remedial investigation, feasibility study, preparation of the remedial action plan, design and implementation of a groundwater interim removal action at a 13 acre inactive hazardous waste landfill site. Site contaminants include chlorinated volatile organics, heavy metals, diesel- and jet-fuel range hydrocarbons, semivolatile organic compounds, and M-5 ointment. The soil and groundwater investigation included the completion of approximately 60 exploratory test pits, 30 soil borings, 20 soil boring/Hydropunch sample locations, 30 groundwater monitoring well installations and sampling, and aquifer testing. The groundwater removal action consisted of extracting TCE-impacted groundwater from nine wells, filtering and treating the water by air stripping, and discharging to the base waste water treatment facility.
- **D.O. 21 Manager for Site 13 Remedial Design, Beale Air Force Base, California.** The D.O. 21 project consisted of the preparation of the remedial design for soil remedial action at Site 13. The project also included a soil treatability test, and one year of operation & maintenance of the Site 13 groundwater interim removal action system.

1988 - 1993: Dames & Moore, Sacramento and Los Angeles, California

- **Senior Geologist and Project Manager for the Remedial Investigation (RI), Feasibility Study (FS), and preparation of the Remedial Action Plan (RAP) for the Union Pacific Railroad Yard Superfund site in Sacramento, California.** The former railroad maintenance yard is a 90-acre site consisting of an inactive area and active switching yard, situated on weakly consolidated fluvial sediments. Managed geological and hydrogeological evaluations, ancillary investigations, removal actions, interim remedial measures, and quarterly groundwater monitoring at the site. The soil and groundwater investigation included the completion of approximately 300 exploratory test pits, 26 soil borings, and 42 groundwater monitoring wells.

Groundwater investigations also included the completion of more than 100 cone penetration test/Hydropunch in-situ groundwater sampling locations to assess the extent of off-site groundwater contamination and development of a MODFLOW groundwater flow and fate & transport model to effectively locate long-term groundwater monitoring wells, and refine the understanding of on-site groundwater contamination and potential sources. Additional evaluations/actions at the site have included:

- Speciation and dissolution kinetics evaluation of selected samples - mineralogy and chemistry by X-ray fluorescence (XRF), X-ray diffraction (XRD), scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), and surface analyses by laser ionization (SALI), phase association of metals by sequential extraction, and dissolution kinetics of metals by column rate studies at five different pH - results of the evaluation were utilized to assess potential environmental and human health impacts associated with slag present at the site.
- Ambient air assessment for total suspended particulates, arsenic, lead, and asbestos by low volume samplers, and analysis for metals by XRF and for asbestos by transmission electron microscopy (TEM)
- Removal of 1,000 yards of metal impacted soil from vacant and residential lots adjacent to the site
- Classification and removal of 2,500 yards of non-hazardous material from the site
- Removal of a 72,000 gallon concrete underground storage tank
- Abandonment of a former yard water supply well which included an underground concrete water storage vault
- Installation of dedicated sampling systems in selected quarterly groundwater monitoring wells
- Preparation of Final RI/FS and submittal to the Cal EPA in 1991
- Preparation of Draft RAP and submittal to Cal EPA in 1991
- Preparation of Revised Draft RAP and submittal to Cal EPA in 1993
- Implementation of on-site groundwater interim remedial measure to minimize off-site migration of impacted groundwater in 1993. Shallow groundwater is extracted from two existing groundwater monitoring wells, treated by a shallow-tray air stripper on site, and treated water discharged to the sanitary sewer. Effluent air from the shallow-tray unit is scrubbed through liquid-phase carbon.

- Planning and implementation of an extensive community relations effort, including numerous public meetings, quarterly reports, issuing fact sheets on all site related activities to approximately 3,000 surrounding neighbors
- **Technical Support on two railyard investigation and remediation projects involving hydrocarbons, heavy metals and asbestos.** The projects involved development and implementation of site investigation work plans, groundwater monitoring programs, remedial action plans, impoundment closure plans, risk assessment hazardous waste characterization and regulatory compliance. Field activities included mitigation and impoundment closure activities, air, soil, and groundwater investigations.
- **Project Manager for the Defense Fuel Supply Point Ozol facility, (near) Martinez, California, Follow-on Investigation.** The facility is a jet fuel bulk storage and transfer terminal situated on complexly folded and faulted marine sediments. The California Regional Water Quality Control Board is the lead agency for the project. Managed preparation of work plans to complete additional soil borings, install additional groundwater monitoring wells, conduct groundwater monitoring and free product removal assessments, and evaluate site hydrogeology.
- **Technical Support on confidential truck stop leaking underground fuel tank site.** Provided litigation support for multiple responsible party cost apportionment based on review of existing documents, groundwater monitoring program data, and hydrogeological and contaminant fate and transport assessment.
- **Task Manager for a confidential evaluation of a former mining site.** Speciation and dissolution kinetics evaluation ongoing to assess form of arsenic in mine tailings, soil, and bedrock to preliminarily assess potential environmental and human health impacts from arsenic in mine tailings. Microanalytical testing by XRD to evaluate mineralogy; SEM and EMPA to evaluate micromorphology, microchemistry, metal distribution within particles, and evidence of weathering on particle surfaces; XPS and SALI to evaluate metal distribution and form on particle surfaces. Chemical analysis by XRF for total metal concentrations; sequential extractions in a series of progressively more aggressive solvents to assess major metal phase associations; dissolution rate studies to

evaluate dissolution kinetics and solubility of metals at several different pH levels.

- **Project Manager for a confidential site evaluation involving slag utilized as sandblasting material.** Initial evaluation to preliminarily assess type of slag, and to identify presence and distribution of metals in the slag. Speciation of metals in slag by XRF to evaluate chemistry and SEM to assess micromorphology, microchemistry, metal distribution within particles, and evidence of weathering on particle surfaces.
- **Project Manager for a confidential residential site evaluation involving lead contamination.** Evaluation conducted to characterize lead contamination, assess source of lead contamination, and to provide litigation support disputing claim that a nearby state Superfund had impacted the residential site. Speciation of soil, dust, and paint samples by XRF to evaluate chemistry, and SEM to assess micromorphology, microchemistry, and metal source distribution in dust and soil samples.
- **Project Manager for second party review of United Heckathorn, Federal Superfund Site, Richmond, CA,** former pesticide formulating and packaging facility located on Richmond Inner Harbor. Soils, sediments and biota in channels and the San Francisco Bay contaminated by DDT, dieldrin, aldrin and other pesticides. Reviewed RI/FS and provided interpretation of contaminant distribution, recommendations regarding suggested remedial strategies, proposed alternatives, interim remedial measures, and final remedial action for the site.
- **Project Manager for evaluation of potential for waste re-classification of molybdenum waste produced at the Cyprus Mine.** The molybdenum waste was classified as hazardous by the standard waste classification approach. However, the material was largely inert, available chemical data suggested the waste should not necessarily be classified as hazardous, and cost and other waste re-classifications supported additional testing and literature searches to assess the potential to re-classify the waste as non-hazardous. This project involved specialized chemical testing, including evaluation of the solubility of the waste at various pH and in a variety of solutions. Additionally, the project included speciation of the waste to determine what species the molybdenum and associated trace chemicals were present as, and a literature search of the DTSC files to assess what successful waste re-classifications had been completed.

- **Project Manager** for numerous preliminary **site assessments for property transfers**.
- **Site Field Manager** for **aquifer testing and water quality investigation and groundwater monitoring** of a leaking underground storage tank site in Los Angeles, California.
- **Site Field Manager** for **aquifer testing and water quality investigation and groundwater monitoring** of a former manufactured gas plant Superfund site in Venice, California.
- **Field Geologist** for a **remedial investigation of a former manufactured gas plant** Superfund site in Venice, California.
- **Task Manager** for preparation of Work Plans for Remedial Investigations at hazardous waste sites in Norwalk and Dinuba, California.

1986 - 1988: California Department of Health Services, Toxic Substances Control Division, Southern California Region, Assessment and Mitigation Unit, Los Angeles, California

- **Geologist on Burmah Castrol, Inc., Richmond**, a petroleum lubricant storage and transfer facility. Reviewed hydrogeological evaluation and groundwater monitoring program of the proposed remedial action for the site.
- **Geologist on Chem Clear, Los Angeles**, a hazardous waste treatment facility. Reviewed seismic risk evaluation for the facility.
- **Geologist on Lockheed, Burbank**, an aircraft manufacturing facility. Reviewed groundwater monitoring program report for the site.
- **Geologist on Los Angeles Air Force Station, Los Angeles**, an aerospace research and development facility. Reviewed RI Work Plan.
- **Geologist on McColl, Fullerton**, an acid petroleum sludge waste site. Provided contractor oversight of well installation and groundwater sampling activities, and reviewed groundwater monitoring reports.

- **Geologist on McKesson, Santa Fe Springs**, a former chemical-blending and packaging facility. Reviewed site investigation work plan and groundwater monitoring program.
- **Geologist on Orange County Steel, Anaheim**, an auto shredder facility. Reviewed RI Work Plan and groundwater monitoring program.
- **Geologist on San Fernando Valley Ground Water Basin**, a 20,000-acre groundwater basin impacted by solvents. Provided oversight of contractor well installations and reviewed and groundwater monitoring program, and groundwater remedial action design documents.
- **Geologist on Thomas Ranch, Corona**, an acid petroleum sludge waste site. Provided oversight of RI/FS activities and review of groundwater monitoring program and other documents.
- **Geologist on Marine Corps Air Stations, Tustin and El Toro**. Provided oversight of RI/FS activities, groundwater monitoring program and review of documents.
- **Project Manager on Boortz Oil Company, Los Angeles**, a former solvent-blending and packaging facility. Provided oversight of RI/FS activities, groundwater monitoring program and review of documents.
- **Project Manager on Chem-O-Lene, Ventura**, a specialty oil-drilling products blending and packaging facility. Provided oversight of RI/FS activities, groundwater monitoring program and review of documents.
- **Project Manager on Facet Energy, Long Beach**, a former oil recycling facility. Provided oversight of RI/FS activities, groundwater monitoring program and review of documents.
- **Project Manager on Southland Oil, Los Angeles**, a former oil recycling facility. Provided oversight of RI/FS activities, groundwater monitoring program and review of documents.

1982: Gasch & Associates, Sacramento, California

Geologic Assistant on various shallow seismic surveys in the northern Sierra Nevada providing geologic research and geologic field mapping, geophone placement and removal.

1981-1982: Geologic Assistant, Sacramento, California

Geologic Assistant on various field studies including gravity and magnetic surveys in the North Coast Range and Avawatz Mountains, landslide mapping in the Coast Range, and geologic mapping in the Coast Range, White Mountains, and Kinston Peak Range. Work involved providing geologic research and geologic field mapping, and surveying with gravity and magnetic instrumentation.