



Environmental Services

Since its founding in 1988, E2 Consulting Engineers, Inc. (E2) has provided environmental engineering services to the Environmental Protection Agency (EPA) in Region IX. E2's EPA support has expanded to include contract work in EPA Regions VI, VIII, IX, and X. E2 offers clients a full spectrum of environmental services, from site investigation to engineering design to construction and operations. Our multidisciplinary team of engineers, geologists, environmental scientists, and technical specialists has the experience to address the most complex of environmental projects.

Our environmental investigation and remediation services include:

- Remedial Investigation / Feasibility Study (RI/FS)
- RCRA Facilities Investigation / Corrective Measures Study (RFI/CMS)
- Data Management / GIS
- Environmental Investigation and Characterization (including radiological)
- Environmental Monitoring
- Air Quality Monitoring
- Community Involvement
- Project Management and Project Controls
- Construction Oversight

Recent Projects

EPA Remedial Action Contracts (RAC)

E2 is a team subcontractor on RACs in Regions VI, VIII, and IX. On these contracts,



Fluvial Deposit Treatment at OU11

E2 provides support for RI/FS, EE/CA, RD/RA, data management, GIS support, and community relations activities. Brief project descriptions under these three RACs follow:

California Gulch Operable Unit 11 Remedial Action Project (EPA Region VIII)

The California Gulch Operable Unit 11 (OU11) Remedial Action project in Leadville, Colorado involved remediation of nearly 150 acres of pasture land and 50+ river front locations that had been contaminated with mine tailings, as well as stabilizing over 3000 feet of eroding streambanks along the Arkansas River. E2's Project Manager led the project team through work plan and cost estimate development, and procurement and management of subcontractors; prepared monthly status reports to the EPA; reviewed and approved of all technical project documents; and managed construction oversight staff. Construction oversight activities included quality control reviews of all surveying, conformance to remedial design specifications, conducting



independent verification sampling (over 1200 samples), and preparation of as-built GIS drawings.

Sulphur Bank Mercury Mine Superfund Site (EPA Region IX / USACE LA District)

E2 has been supporting the remedial investigation at the Sulphur Bank Mercury Mine (SBMM) Superfund Site for EPA Region IX as a team subcontractor since 2005. E2 has conducted storm water and sediment sampling as well as wet and dry weather inspections. The project involved sampling storm water from six tributaries to the Oaks Arm of Clear Lake. Water samples were collected for low-level mercury and methyl mercury analysis, as well as total dissolved / suspended solids. The team also determined stream flow and rainfall rates during the event. The goal of the project was to be able to predict sediment and mercury loading rates to that part of Clear Lake based on observed rainfall totals. E2 personnel also made recommendations for replacing or improving storm water best management practices control features and were responsible for the sampling of the proposed dredge material in the Keys Area of the SBMM.

In January 2011, E2 was awarded a prime contract from the US Army Corps of Engineers (USACE) Los Angeles District to continue the Remedial Investigation / Feasibility Study (RI/FS) activities at the SBMM. This work scope includes additional environmental sampling, analytical support and data validation, data evaluation, risk assessment, remedial alternatives analysis, finalization of the construction plan for the sediment pilot cap, community involvement support, and management of the administrative record.

San Fernando Valley Superfund Site (EPA Region IX)

The San Fernando Valley (SFV) Superfund Site, which includes 5 Operable Units (OUs), is currently being managed by EPA as one large Superfund Site. For the SFV site, E2's Senior Hydrogeologist is responsible for project management, subcontract administration, client coordination, cost estimates, and oversight of quarterly SFV field activities, including all subcontractors and field personnel. E2 assists with the development and provides senior technical review of required CERCLA planning documents, including Sampling and Analysis Plans (SAPs), Quality Assurance Project Plans (QAPPs), Waste Management Plans, and Data Management Plans. E2 provides Senior Technical Review for design reports, OU Technical Memoranda and Five-Year Review support, assisting EPA with four separate OU-specific Records of Decision (RODs) and Settlement Agreements within the SFV Superfund Site. These include North Hollywood OU, Burbank OU and the Glendale North and South OUs. E2 worked closely with the EPA Work Assignment Manager and EPA Community Involvement specialists for preparation of Proposed Plan / ROD for de-listing a former National Priorities List Site



Sulphur Bank Mercury Mine



within the SFV Superfund Site.

E2 also communicates and coordinates with the Senior Chemist and EPA Quality Assurance Office ensuring environmental sample collection and laboratory analyses are performed according to proper protocol and meet the Data Quality Objectives and needs of the project. E2 is also responsible for the EPA's SFV GIS database through coordination/collection/integration of all available water quality data from numerous sources within the SFV Basin.



San Fernando Valley Superfund Site

United Heckathorn Superfund Site (EPA Region IX)

At the United Heckathorn Superfund site located in Richmond Harbor in the San Francisco Bay, E2 personnel have been responsible for preparing field sampling plans; conducting sediment, surface water, storm drain, biota (fish & mussels) sampling; and preparing summary analytical data reports for this former pesticide distribution facility.

As part of the Focused Feasibility Study, our personnel are evaluating the use of passive samplers as an alternative to traditional sampling methods. Clean mussels imported from Bodega Head were deployed in duplicate at the surface of the nine stations sampled for

water in 2009. At the same time, two different types of passive samplers (Polyethylene devices – PEDs, and Solid Phase Microextraction – SPMEs) were deployed alongside the clean imported mussels at the surface, and when the depth was greater than 10 feet, mussels were also deployed approximately 1 foot above the sediment interface.

After 30 days, the mussel tissue concentrations were compared to PED and SPME concentrations to provide information on the viability of using passive samplers as surrogates for mussels in future monitoring activity. The comparison of the water concentrations derived from a 30 day deployment of SPMEs and clean mussels to filtered water, suggested that passive samplers are a good surrogate for live mussels when measuring DDT and dieldrin. The SPMEs survived the 30 day deployment better than the PED (some PEDs seemed to be nibbled away), possibly due to better armoring of the fragile fibers. The results suggest that the use of a performance reference compound (PRC) could possibly decrease the deployment time from 30 days to 10 to 14 days. Further studies are planned to further define the time frame for deployment, re-engineer the PED deployment structure, and to use passive samplers to



United Heckathorn Superfund Site



measure the pore water availability in the channel sediments.

Klau Buena Vista Mercury Mine Superfund Site (EPA Region IX)

For the Klau Buena Vista Mercury Mine Superfund Site, E2 provided task management and field support for the ongoing Remedial Investigation (RI). E2 personnel implemented the sampling plans for collection of soil, sediment, biota, groundwater, surface water, and storm water samples. This included implementing an XRF survey of surface soil at the mine, which included over 450 X-Ray Fluorescence (XRF) points across 317 acres and collecting confirmation samples at each location, approximately half of which were submitted for additional laboratory analysis. E2 utilized the FORMS II Lite software for data management of the samples submitted to CLP laboratories and conducted quality control reviews of the field data collection efforts. E2 also directed database development, including a review of historical analytical and operational data for the two abandoned adjacent mercury mines. These tasks also involve coordination with GIS staff for development of figures to assist with spatial and temporal evaluations of historical environmental sampling data.



Acid mine drainage from the Klau Buena Vista Mine

Remedial Action Project at a Former Mining Site (EPA Region VI)

Since 2008, E2 has been supporting the remedial action (RA) for two operable units at a former lead and zinc mining area that covers approximately 40 square miles. E2 programmed and installed pressure transducers in the monitoring wells, downloaded data and re-programmed pressure transducers for future data collection, and collected groundwater quality parameters and groundwater samples for laboratory analysis. Additionally, E2 staff supported the development of a mine waste reuse facilitation and tracking plan, researched potential waste material reuse options, and identified potential buyers for the waste material. E2 also developed confirmation sampling grids; conducted confirmation and enforcement sampling; prepared cleanup status reports for the properties where remedial action was completed; conducted reconnaissance of the alleyways and driveways for potential waste material; coordinated access with the property owners; and conducted residential sampling.



Former lead and zinc mining site

EPA Region IX Superfund Technical Assessment & Response Team Contract

Since 2008, E2 has been supporting EPA Region IX as a team subcontractor on the Superfund Technical Assessment &



Response Team (START) contract providing technical support to EPA's site assessment activities and response, prevention and preparedness activities. Brief project descriptions under the START contract follow:

Mariano Lake Abandoned Uranium Mine Site

EPA tasked START to provide technical assistance in conducting a human health assessment of the roads, structures, and residences within 1/4-mile radius of the Mariano Lake Abandoned Uranium Mine (AUM) site in the Mariano Lake chapter of Navajo Nation. E2 assisted the START prime contractor in 1) Preparing a Site Specific Health and Safety Plan and a Quality Assurance and Sampling Plan prior to mobilization, 2) Performing home site assessments for radioactive materials using EPA's Rapid Assessment Tool (RAT) system and a pressurized ion chamber; including, estimated dose rate and gamma activity analysis in surface soils and home construction materials. While in the field, E2 personnel designed, assembled, and deployed a custom version of the RAT system that reduced the estimated assessment time for the 5-person team from 4-5 days to less than 2 days.

Peter Pan Cleaners Air Sampling

During this project, the START team was tasked to manage and perform time-critical indoor and ambient air monitoring and sampling at the Peter Pan site in an attempt to determine if acute or long-term health risks to nearby school children, business people, or residents were present. E2 personnel participated in several meetings between local (Sonoma County Public Health Services), state (Regional Water Quality Control Board and Department of Toxic Substances Control), and

federal (EPA) agencies and educated teachers and school administrators in regard to the potential threat and proposed sampling. E2 personnel directly supervised the collection of ambient, indoor, and crawl space air samples into Summa Canisters which were analyzed for selected VOCs by EPA Method TO-15 SIM (i.e. ultra low-level analysis). Additional air monitoring for VOCs were performed using portable hand-held field monitoring equipment. Based on the results, the EPA installed vapor intrusion mitigation systems in several residences.



Installing air sampling equipment in a crawl space

Tafuna Air Sampling

E2 personnel managed a time-critical response to reports of a strong chemical odor in a residential neighborhood in Tafuna, American Samoa. E2 personnel prepared a Time-Critical Emergency Response Quality Assurance and Sampling Plan and a health and safety plan. Upon mobilization, E2 personnel oversaw drilling and air, surface water, and groundwater sampling operations, and determined the source of the release within 5 days. This information resulted in the PRP installing a new fuel system, which stopped the release.



North East Church Rock Step-Out Areas Soil Removal Oversight

E2 personnel conducted oversight of a radioactive soil removal project performed by the potentially responsible party (PRP). The project involved removing approximately 130,000 cubic yards of contaminated mine waste from Navajo Tribal Lands adjacent to a former uranium mine. Tasks included preparing a health and safety plan, reviewing and providing written responses to PRP work plans, SWPPP plans, restoration plans, and safety plans. E2 also reviewed air and soil monitoring and sampling data to ensure compliance with EPA guidance.



North East Church Rock soil removal project

Alameda Point (formerly Naval Air Station Alameda)

The U.S. Naval Facilities Engineering Command and the University of California at Berkeley (UCB), together with the Lawrence Livermore National Laboratory and Lawrence Berkeley National Laboratory, entered into a partnership agreement to develop innovative technologies and treatment applications for environmental remediation at the Naval Air Station Alameda. This pilot program was carried out as part of the Base Realignment and Closure (BRAC) program and included:

(i) an intrinsic bioremediation study; (ii) a study to characterize conditions and processes controlling contaminant availability in lagoon sediments; and (iii) the development and testing of a steam enhanced extraction system for removing petroleum and chlorinated hydrocarbons from the subsurface.

E2 assisted in the permitting, construction, operation, and decommissioning of a steam enhanced extraction system to remove waste oil and solvents from the subsurface. The system operated for a total of 70 days and removed 530 gallons of waste oil and solvent from the vicinity of a former underground tank. E2 also conducted pre- and post-demonstration sampling of soil, groundwater, and soil vapor before and after remediation. Prior to this study, E2 managed the planning and implementation of a treatability study to assess the intrinsic bioremediation of petroleum hydrocarbons at two sites.

On these projects, E2 worked closely with UCB professors and students within the Berkeley Environmental Restoration Center, the office responsible for administration of this contract, as well as members of the Lawrence Livermore National Laboratory and Lawrence Berkeley National Laboratory Center for Isotope Geochemistry. E2 personnel assisted with work plan preparation, analyzed existing site data to assess the distribution of contaminants in the soil and groundwater, supervised field activities using innovative site characterization technologies to fill the data gaps, procured subcontractors for field services, supervised field activities requiring the use of a subcontractor, and assisted in preparation of treatability study reports.