



C O R P O A T I O N

CONSTRUCTION | ENGINEERING | SCIENCE | FINANCE

EXPERIENCE AND QUALIFICATIONS

## ERS Services and Experience

Environmental Risk Services Corporation (ERS) is a multidisciplinary international environmental consulting and engineering firm with headquarters located in the San Francisco Bay area of California, United States. Together with our sister organization, the Global Restoration Foundation (GRF), we provide expert technical and strategic services to private and public entities seeking to identify, evaluate, manage, reduce, and/or leverage environmental risks and liabilities. Our project experience includes:

- Superfund investigations, remediation, and liability closure (CERCLA)
- Dredge project design, permitting, and material management
- Landfill investigation and liability management
- Oil/Gas and mining investigation and remediation
- Water resource planning and land use planning
- Natural Resource Damage Assessment (NRDA)
- Real estate redevelopment (e.g., Brownfields)
- Base Realignment and Closure (BRAC)
- Resource equivalency analysis (REA)
- Aquifer storage and recovery (ASR)
- Property transaction support
- Permitting



These projects require a wide variety of technical expertise and professional experience that can be distilled into a few general core services including:

- Investigation and remediation of contaminated soil and ground water
- Environmental liability identification and resolution
- Risk assessment and insurance acquisition support
- Regulatory negotiations and public representation
- Remediation engineering and construction management.



## ERS Technical Expertise

Strategically, our approach to problem resolution may incorporate regulatory and technical analysis, technical stakeholder management and negotiation, public communications, and innovative technologies. We will recommend pre-emptive or pro-active investigations to redirect regulator and public inquiry along a more sensible and reasonable path.

We are always sensitive and responsive to our client's schedule and financial constraints.

Our technical services and skills encompass:

- Hydrology
- Geography
- Geophysics
- Geochemistry
- Hydrogeology
- Land use planning
- Ecological risk assessment
- Human health risk assessment
- Remediation engineering and construction management
- Property Transaction Assessment



Related support services include:

- Permitting
- Public communications
- Expert witness and testimony
- Bench scale and pilot scale testing
- Ground water, surface water, and chemistry modeling
- Graphic Information Systems (GIS), database design, digital library



## Philosophy

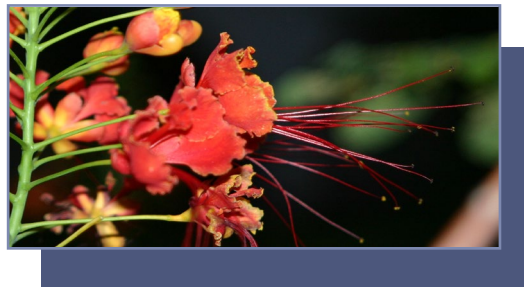
By design, we combine high-level environmental consulting services to identify, manage, and resolve risk. We help our clients minimize risk and maximize opportunities via strategic management and resolution of environmental liabilities.

We know there are several ways to solve a problem and that our clients may serve coordinated as well as competing goals and interests. By working closely with our clients, we help the project proceed and evolve, in a way that optimizes economic and political success.

We employ innovative, technically excellent, and experienced people focused on solving our clients' problems in a manner sensitive to financial, schedule, and political constraints.

We understand that problem resolution requires much more than a solid technical approach. Lasting problem resolution must minimize risk and uncertainty, incorporate economic and political sensitivity, and recognize the needs of significant stakeholders.

We provide our clients with technical environmental services and major asset redevelopment services throughout the United States. Our clients include industry, municipalities, real estate developers, attorneys, government, and quasi-governmental organizations such as ports.



## Development Support Services

ERS personnel have participated in the permitting and redevelopment of environmentally impaired properties for revitalization as new industrial, commercial, and residential land-use operations. Our clients include real estate developers, municipalities, ports, and industrial corporations.

Typically, our services began with facilitating the real estate transaction, continue with the remediation of the property, permitting, and, at times, construction management of the development. Real estate transaction support services include:

- Environmental liability assessment (Phase I and II evaluations – USEPA and ASTM compliant),
- Remediation cost and schedule estimations to achieve closure and ready the property for development,
- Negotiation of environmental conditions, remedies, costs, etc with the seller and regulatory agencies,
- Insurance negotiation and acquisition to reduce uncertainty.



Remediation / closure of environmental liabilities, services include:

- Characterization of contaminant sources and impacts to soil and water,
- Quantification of risks to human health and the environment,
- Development of remedial action plans (RAP),
- Closure of the environmental liability with cleanup and negotiated land use controls with the regulatory agencies.



## Borehole Sampling and Well Design

ERS brings considerable experience in specialized drilling technologies, sampling, design, installation, and abandonment of groundwater supply, monitoring, extraction, and injection wells including:



- Dual-phase extraction;
- Soil vapor extraction;
- Bioremediation;
- Bioventing;
- Air sparging;
- Nutrient augmentation;
- Groundwater pump and treat;
- In-situ chemical oxidation;
- Aquifer storage and recovery
- Well sealing and integrity testing; and
- Borehole Geophysics.

Examples of projects carried out by ERS personnel include:

- Installed a network of monitoring wells in fractured rock utilizing air and mud rotary drilling to depths up to 600 feet. Interpreted geophysical logs, including acoustic borehole televiewer data, to characterize and model fracture permeability and contaminant transport through multi-scale faults. Constructed and interpreted geologic sections and fence diagrams to determine aquifer characteristics as member of technical team performing a groundwater study in the Coast Ranges of central California.
- Characterized stratigraphy and hydrogeology at a large aerospace test facility through installation of over 100 monitoring wells employing air and mud rotary and hollow stem auger drilling. Used specialized sampling techniques with wireline coring system to collect soil samples from multiple water-bearing zones for VOC analysis in a single borehole.
- Analyzed observation well pressure changes caused by geothermal production well testing. Determined regional values of reservoir transmissivity and storativity. Analyzed several well production and interference tests at East Mesa (Imperial Valley) geothermal field.
- Geophysical well location and abandonment - Managed geophysical surveys at site with chlorinated solvent-contaminated groundwater. Conducted ground penetrating radar and magnetic surveys on three properties to locate historical ground water supply wells and buried drums and conducted well destruction and integrity testing.

## Permitting Services

ERS personnel offer significant expertise in the permitting of various industrial operations and property development. Our experience includes:

- Major development-related permits, such as those required for:
  - CEQA - Environmental Impact Report
  - NEPA - Environmental Impact Statement
  - Dredging
- Focused water quality permits, such as those required for:
  - Clean Water Act sections 401 and 404
  - Storm water and Wetlands
- Focused waste discharge to water and land permits, such as:
  - Waste Discharge Requirements (WDRs)
- Focused biological and ecological permits, such as:
  - Biological Opinion and Section 10 consultations
  - Streambed Alteration Agreement
- Focused air quality permits, such as those required for:
  - New sources
  - Asbestos and lead based paint removal / abatement
  - Construction and dust controls.



Our experience includes the permitting to redevelop 19 miles of shoreline along the San Francisco Bay, dredging the San Joaquin River, redeveloping 44-acres under the California Polanco Act.



## Dredging Services

ERS personnel have substantial expertise supporting a variety of dredging projects ranging from large seaports to smaller freshwater ports. These dredging projects include a variety of objectives, including deepening, maintenance, and remediation.

Dredging is a complicated endeavor with multiple potential risks that require careful, thoughtful, and expert analysis. These risks begin with managing public and regulator concerns and extend to EIR/EIS compliance, in-water work, sediment handling and treatment, water management and discharge, and monitoring sediment placement.



We also prepare permit applications incorporating specific dredging, material management, and remediation methodologies. We bring experience with dredge remediation efforts at Navy and Port dock operations involving metals, pesticides, dioxins, debris, and salinity issues.

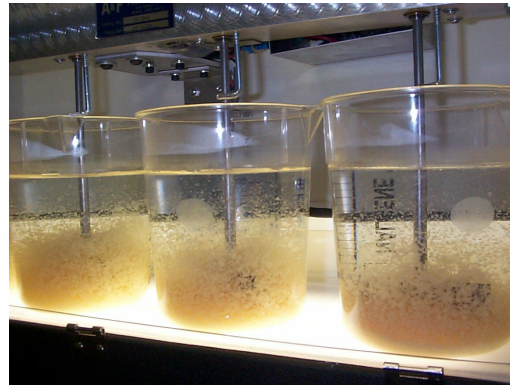
We have evaluated the environmental impacts, benefits, and costs of bucket and hydraulic dredging, and debris recovery technologies. We employ our hydrology, geochemistry, and hydrogeology expertise to evaluate threats to surface and ground water posed by dredging and upland placement and reuse of sediments.



## Waste Water Treatment Engineering Services

ERS project experience concerning waste water treatment engineering includes almost all aspects from initial project scoping through prefeasibility studies, feasibility studies, detailed engineering design, equipment fabrication and procurement, construction management, system startup, operation, and maintenance, as well as project/strategic management. ERS retains licensed professional engineers in the United States and have designed and approved various remediation/treatment engineering plans based on contaminants physical, chemical, and biological properties, site conditions, and local and national environmental regulations that must be met for discharge.

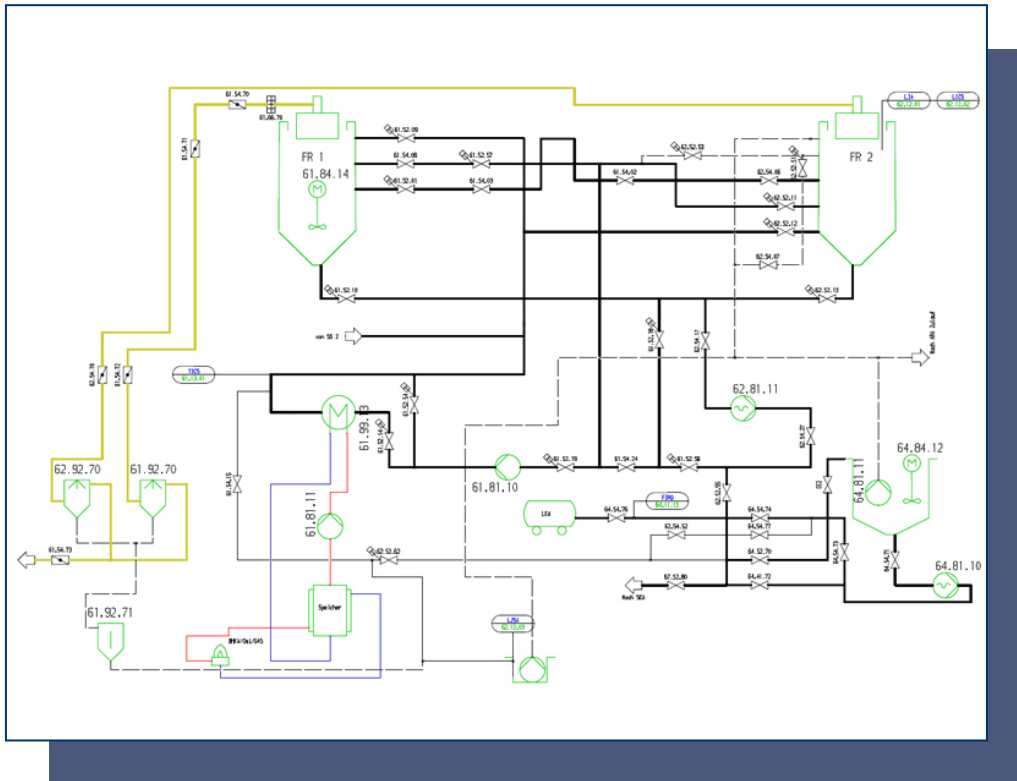
ERS staff has expertise with treatment of various types of water and waste water, including industrial, municipal, mining as well as surface water, groundwater, and process water. The contaminants the company has treated include solids (settleable, suspended/turbidity), inorganic constituents (heavy/light/transition metals, metalloids, anions, nutrients, acidity, cyanide, TDS, salinity), organic constituents (TOC, VOCs, SVOCs, PCB, PCE, TCE, BOD, COD, oil and grease), and biological constituents (E. coli, total coliforms, fecal coliforms).



## Waste Water Treatment Engineering Services, Continued

ERS staff use a variety of engineering approaches to identify the best technologies based on applicability, feasibility, operability, reliability, and cost effectiveness. Major experience includes site investigation and design basis establishment, numerical (modeling) and physical simulations (bench tests), pilot testing, mass balance calculations and flow analysis, PFD and P&IDs, and AutoCAD drafting. Technologies designed and applied include physical processes (flow equalization, mixing, screening, gravity settling, sedimentation/clarification, flotation, aeration and air stripping, sand filtration, membrane filtration, distillation), chemical processes (neutralization, oxidation, precipitation, coagulation, flocculation, adsorption, ion exchange, electric deionization, chemical softening), biological processes (aerobic, anaerobic, anoxic, facultative, suspended/attached/hybrid growth, lagoon, disinfection), solids handling, stabilization, and disposal, water reuse and recycling, and engineering control (tanks, piping, pumping, pumping, chemical dosing, operation condition monitoring, automatic system control/SCADA, plant upgrading, energy efficiency).

ERS provides technically excellent solutions for today's environment!



## Landfill Closure and Design Services

ERS has substantial experience working with the closure and design of landfills throughout the United States and internationally. Our experience includes:

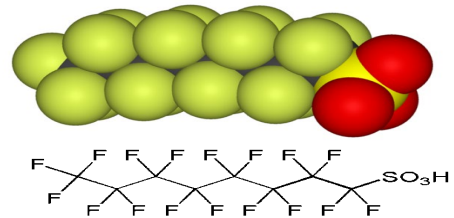
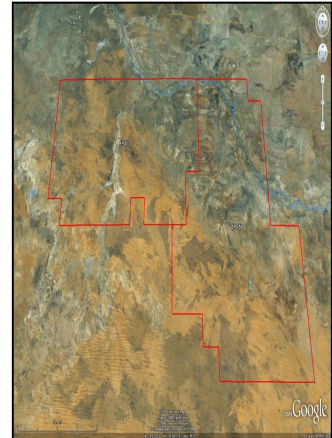
- Department of Defense:
  - Characterization and closure of 16 former Department of Defense (DoD) landfills in Stockton, California
  - Development of several remediation scenarios compatible with planned residential and commercial redevelopment.
- Port of Oakland:
  - Remedial design and containment of a superfund site landfill.
- Mare Island:
  - Providing technical oversight in the closure of a large landfill at Mare Island in Vallejo, California.
- Concord:
  - Engineering design of landfills at former Concord Naval Weapons Station.
- Department of Energy:
  - Technical evaluation of landfills at multiple proposed development sites at Lawrence Berkeley National Laboratory.
- Quevedo, Ecuador:
  - Remedial design and closure of open dump.
  - Engineering design of new landfill, including waste water treatment systems, off gassing systems, and capping.



## Oil/Gas and Mining Remediation Services

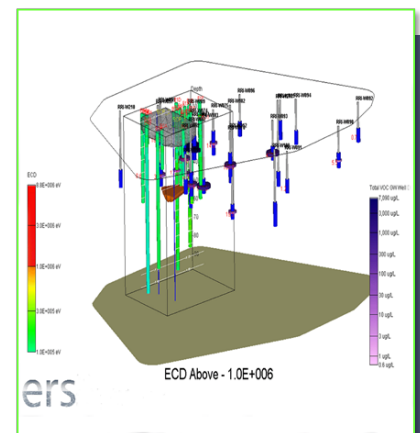
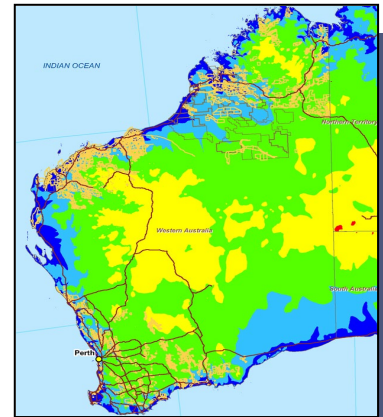
ERS personnel have extensive expertise supporting a variety of remediation projects of sites impacted by petroleum, hydrocarbons, mine tailings, gas pipelines, and metals. These remediation projects include:

- U.S. Department of Defense: 50 plus petroleum sites involving:
  - Investigations, ground water monitoring, data analysis, remediation, and regulatory closure at 50+ petroleum sites.
- British Petroleum: multiple sites including:
  - Investigation, corrective action, soil excavation, dewatering, risk assessment, ground water monitoring.
- Shell Oil Company: Shell Stockton Terminal Project:
  - Technical advisors: remediation and ground water monitoring of hydrocarbon impacted soil and water.
- TOSCO Oil Company and Conoco Phillips Oil Company: Tosco Bulk Terminal Project:
  - Technical advisors: remediation of TPHd, TPHg, BTEX, TBA, ETBE, and MTBE in soil and ground water.
- UNOCAL Oil Company: Northern California Project:
  - Emergency response and remediation to an oil spill in a coastal area.
- Southern Pacific Transportation Co: San Francisco Project:
  - Excavation, backfill, and capping of metal contaminated soils.
- Consortium of Provincial Governments of Ecuador Project:
  - Development of remediation practices related to mining and oil activities.



## Oil/Gas and Mining Remediation Services, Continued

- City of San Jose: San Jose Project:
  - Repair damaged retaining walls, relocate endangered fish species.
- Santa Clara Valley Water District: Almaden Valley Project:
  - Excavation of mercury calcine, import, placement, and shoring
- East Bay Regional Parks: Hayward Project:
  - Demolition, dewatering, and excavation of metals contaminated soil and ground water.
- FMC Bradley: San Jose Project:
  - Demolition/remediation of hydrocarbon and metal impacted soil, treated 1m gallons of pond water.
- Homestake Mining Corporation: Lake County Project:
  - NRDA claim assessment and site investigation.
- Santa Clara County: Almaden Valley Project
  - Remediation of mercury mine tailings and site restoration
- Learner Company: Stockton Project:
  - Excavation, removal, and remediation of 4,400 tons of metal and debris, and 6,000 tons of soil.
- Time Oil Company/NuStar Energy: San Joaquin County Project:
  - Technical advisors: investigation and remediation of hydrocarbon impacted soil/ground water
- Kinder Morgan Company: Stockton Gas Project:
  - Technical advisors: impacts from gas pipeline project and risk assessment



## CERCLA / Superfund Services

ERS personnel bring considerable experience working on state and federal Superfund sites throughout the country. We have performed, supported, and/or produced remedial investigation and feasibility studies (RI/FS), human and ecological risk assessments, remedial action plans (RAP), records of decision (ROD), remedial design plans, and remediation completion reports.

We understand that Superfund sites typically involve increased public scrutiny and media exposure. We have investigated and/or remediated a variety of sites, such as U.S. military installations (Army, Navy, Air Force), U.S. DOE facilities, industry (manufacturing, petrochemical, wood-treating, high-tech, plating, etc.), and mines (gold, uranium).

Chemicals of concern range from organics (e.g., chlorinated solvents and pesticides), to metals (e.g., mercury, lead, arsenic), to radioactive substances (e.g., technologically enhanced naturally-occurring radioactive material, radium dials), to chemical warfare agents and unexploded ordinance (UXO).

ERS also prepares NCP-compliant documents for the investigation, remediation, and closure of properties transacted under the Polanco Act and early-transferred Base Realignment and Closure (BRAC) sites.



## Natural Resource Damage Assessment Services

Given our experience with natural resource damage assessments, we provide critical analysis of NRDA liability in parallel with the investigation and remediation of chemical impacts. In many cases, NRDA liabilities may represent by far the larger financial liability.

ERS personnel originally developed ground water equivalency analysis to help resolve Natural Resource Damage liabilities. We supported the first NRDA settlement for ground water resource injuries in the country.

We also employ resource equivalency analysis to identify and scale reasonable and appropriate Supplemental Environmental Projects, negotiate alternative settlements of violations, and design mitigation measures.

Our experience includes working closely with resource economists, biologists, ecologists, and attorneys with considerable NRDA expertise. NRDA projects include:

- Univar - South Valley Superfund Site, NM
- UNOCAL - Guadalupe Oil Field, CA
- UNOCAL at Avila Beach, CA
- Chevron - South Valley Superfund Site, NM
- Guadalupe River and South San Francisco Bay
- Homestake Mining - Grants, NM
- Chevron - Martinez, CA



## Base Realignment/Transfer and Closure Services

ERS specializes in Local Reuse Authority (LRA) support in the conveyance and reuse of military installations. ERS has supported the conveyance of military installations across the country. We can provide legal, environmental, planning, administration, and insurance services, as well as assistance in obtaining grants for the LRA.

In fact, we were involved in the USA's first finding of suitability for early transfer (FOSET) with privatized cleanup and insurance placement - at the Fleet Industrial Supply Center (FISC) in Oakland, California. We developed many of the components now used for early transfers and liability coverage.

ERS continues to prepare and negotiate the documents needed to convey military property to the public sector. Our experience representing LRAs in negotiations with the military regulatory agencies, insurance companies, and the governor's office, is without equal.

We offer substantial expertise facilitating transfer of military installations, including remediation cost estimates, liability assessment, and risk analyses. ERS coordinates these assessments and negotiations with the LRA's land-use planning, redevelopment efforts, and public outreach. ERS has also remediated transferred military bases and has successfully closed environmental liabilities.

By design, ERS only represents LRAs. Consistent with our corporate policy, ERS has never contracted with or represented the military in any project involving environmental liabilities at BRAC installations.





## Global Restoration Foundation

Global Restoration Foundation (GRF) is the only scientifically-based environmental remediation foundation in the world.

GRF provides specialized technical and strategic services throughout the world to identify, assess, manage, reduce and/or eliminate environmental liabilities and risks. GRF currently employs geologists, geophysicists, hydrologists, environmental engineers, civil engineers, and more. Project experience includes the areas of health, environment, prevention and control of pollution, solid and hazardous waste, infectious medical waste management, remediation, and environmental restoration, among others.

GRFs clients include the most prestigious private corporations in the United States, United States Department of Defense - Pentagon, United States Department of Energy, the Department of State, Lawrence Berkeley National Laboratory and other North American public entities, in addition to several Governmental Ministries in various South American countries and throughout the world.

