MARK A. DAGEL, LHG

Hydrogeologist

EDUCATION

MS, Geology, University of Maine, 1985

BA, Geology, University of Wisconsin, 1980

REGISTRATIONS

Licensed Geologist/ Hydrogeologist, WA

Registered Professional Geologist, OR

Mark has 30 years of experience with a wide range of environmental studies, including remedial investigations (RI), feasibility studies (FS), preliminary assessments, and site investigations. Facilities include petroleum-contaminated sites, landfills, military installations, industrial facilities, and abandoned mining, milling, and smelting sites. These projects have been conducted under Superfund (CERCLA), Washington's Model Toxics Control Act (MTCA), and Resource Conservation and Recovery Act (RCRA). Mark is also responsible for water resource projects, including groundwater source studies, water quality investigations, and evaluation of water right applications under Washington State's contract reimbursement program. In addition, Mark prepares environmental impact statements (EISs) and other environmental planning and permitting studies under NEPA, SEPA, and other laws and regulations. Mark's clients have included ChevronTexaco, the Washington State Department of Ecology (Ecology), U.S. Forest Service, U.S. Army Corps of Engineers (USACE), and the U.S. Navy, Air Force, and National Guard.

REPRESENTATIVE PROJECT EXPERIENCE

Environmental Investigation and Independent Soil Cleanup of Parcel 88, Tacoma, WA. Mark managed the environmental aspects of this project for the Port of Tacoma. This project involved a 255,000-ton soil clean-up while also fulfilling five separate mitigation obligations by providing nearly 30 acres of habitat along Hylebos Creek. Contaminated soil removed from the site contained petroleum hydrocarbons, arsenic and lead. Investigations revealed contaminants had entered groundwater and threatened to discharge to Hylebos Creek. The design required balancing a large number of conflicting environmental, geotechnical, civil engineering, landscape, and regulatory criteria. The project team utilized an iterative design process, balancing remedial excavation limits and geotechnical constraints to maximize high value intertidal habitat while minimizing construction costs. The project received regulatory closure under Washington's Model Toxics Control Act (MTCA) while providing over 40% more habitat area than the original concept plan; all while meeting the required completion schedule for individual habitat mitigation components.

Holden Mine Remedial Action, Okanogan-Wenatchee National Forest, WA. Project Manager supporting the Forest Service on CERCLA remedial action of large former copper mine/mill complex. Prepared risk assessments, supplemental feasibility studies, Proposed Plan, and ROD. Reviewed remedial design. Currently providing oversight of remedial action and performance standards verification monitoring. For over 10 years, Hart Crowser has supported the USFS on the CERCA/MTCA investigation and $400-million cleanup of this large, remote, abandoned underground copper mine site Chelan County.

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PFN: 11-101457-LU, et. al

We are also supporting the Trustees in developing and negotiating a NRDA claim.

Soil Cleanup at Elementary Schools, Washington State Department of Ecology, Yakima County, WA. Managed two task orders involving cost-effective cleanup of six elementary schools affected by area-wide arsenic and lead contaminated soil associated with historic, widespread pesticide application. The work for the Washington State Department of Ecology included preparing plans, specifications, engineering cost estimates, and other bid documents.

Bulk Fuel Terminal Remedial Investigation, Shelton, WA. Provided technical oversight for Chevron of a RI of soil, groundwater, and marine sediment contamination at a petroleum bulk facility under Agreed Order with Ecology. The site involved petroleum contamination from USTs and included marine sediment-contamination issues.

Former Bulk Fuel Terminal Remedial Investigation, Morton, WA. Conducted RI of soil and groundwater contamination for Chevron at a petroleum bulk facility under an Enforcement Order from Ecology. The site involved petroleum contamination from above-ground storage tanks (ASTs) and underground storage tanks (USTs).

Marine Bulk Fuel Terminal Supplemental RI and Cleanup Action Plan, Port Townsend, WA. Managed project involving the evaluation of over 20 years of past environmental investigations and interim actions for Chevron at a former bulk terminal on Port Townsend Bay. Developed a conceptual site model, identified data gaps, and conducted additional investigation activities.

Former Bulk Fuel Terminal Feasibility Study and Cleanup Action Plan, Bremerton, WA. Evaluated remedial alternatives to address deep soil and groundwater contamination for Chevron at a former bulk terminal site on Port Washington Narrows. Remediation will address contaminated soil, seep discharge, and potential vapor intrusion issues and must be coordinated with future site development plans. Cleanup will involve a combination of soil removal, *in situ* groundwater remediation (e.g., biosparging), and monitored natural attenuation.

Lower Duwamish Waterway Early Action Area 2 (Trotsky and Douglas Management Company Sites) Environmental Investigations, Seattle, WA. Managed this $250,000 work assignment to characterize potential soil and groundwater contamination at two adjacent industrial sites and to assess to assess the potential to recontaminate adjacent sediments in Lower Duwamish Superfund Site. The scope included reviewing historical information; preparing work plans (field sampling plans and quality assurance project plans) for approval by Ecology; sampling and analysis of soil, groundwater, seep, and intertidal sediments; data validation and management; data interpretation; and report preparation. The primary contaminants at this site were polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH).

Lower Duwamish Waterway South Park Marina Site Environmental Investigation, Seattle, WA. Managed this $100,000 project to characterize potential soil and groundwater contamination, to assess the potential contribution to sediment contamination in the adjacent LDW Superfund Site, and to evaluate potential contaminant contributions from an adjacent property. Scope included reviewing historical information, preparing work plans (field sampling plans and quality assurance project plans) for approval by Ecology, sampling and analysis of soil, groundwater, seep, and intertidal sediments, data validation and management, data interpretation and report preparation. The primary contaminants at this site were PAHs, TPH, and metals.

Irondale Smelter Site Upland and Sediment Remedial Investigation/Feasibility Study, Irondale, WA. Managed upland components and marine component of this $200,000 RI/FS for Ecology at a historic iron smelter site on Port Townsend Bay. Primary contaminants were TPH and metals. The project included significant sediment and ecological risk assessment components, and had significant subcontractor participation.

Elementary School Soil Cleanup, Yakima, WA. Mark assisted Ecology with the preparation of plans, specifications, and other bid documents for cleanup of soil at two elementary schools in Yakima contaminated by arsenic and lead.

Most Western Laundry Site Remedial Investigation, Hoquiam, WA. Mark conducted soil and groundwater investigations for Ecology at this former commercial dry-cleaning site. Primary contaminants were chlorinated solvents and TPH.

Department of Ecology, Most Western Laundry Site Remedial Investigation, Hoquiam, WA. Mark conducted soil and groundwater investigations for Ecology at this former commercial dry-cleaning site. Primary contaminants were chlorinated solvents and TPH.

Vehicle Fueling and Maintenance Facility Site Investigation (SI), Wilbur, WA. Conducted SI of petroleum contamination in soil, groundwater, and surface water under MTCA for Ecology. Contamination sources included USTs, ASTs, vehicle maintenance shops, and equipment storage yard. Investigation involved use of geoprobe technology and field and laboratory analyses.

Waste Oil "Tar Pits" Site Investigation, Montesano, WA. Conducted SI of uncontrolled petroleum disposal site under MTCA for Ecology. The project included preparing project plans, conducting a field investigation, and preparing a SI report.

Schools Preliminary Assessments (PAs)/Site Investigations, Eastern WA. Performed PAs/SIs of petroleum contamination for Ecology at four schools in eastern Washington. Contaminant sources included USTs, ASTs, and vehicle maintenance shops. The project included literature review, site reconnaissance, developing sampling and analysis plans, surface and subsurface soil sampling, installation and sampling of monitoring wells and preparation of reports.

Unocal Bulk Fuel Terminal Groundwater Study in Support of Site-Specific Cleanup Levels, Edmonds, WA. This investigation involved collecting groundwater samples from six existing monitoring wells for Ecology at the Unocal Edmonds former bulk fuel terminal. Sampling locations were selected to represent the variability in product composition at the site. Performed toxicity (bioassay) testing using 7-day tests and multiple organisms. In addition, samples were chemically analyzed for petroleum hydrocarbons and various petroleum constituents.

Pesticide Contamination Groundwater Investigation, Whatcom County, WA. Responsible for planning and conducting a large-scale domestic well sampling program for Ecology to study agricultural contamination in a shallow, regional aquifer in northwestern Washington.

Red Shirt Mill Remedial Investigation and Feasibility Study, WA. Conducted RI/FS under MTCA for Ecology at an abandoned gold and silver mill in northcentral Washington. Characterized the nature and extent of contaminants

(toxic metals) in tailings and groundwater using geoprobe, auger borings, and monitoring wells. Characterized site hydrogeology. Conducted terrestrial ecological evaluation. Evaluated contaminant pathways to the adjacent Methow River (surface water and sediment). Evaluated potential human-health risks from airborne contaminants from exposed tailings using dispersion plume modeling and risk analyses of metal loadings in settled house dust. Developed and evaluated remedial alternatives, including removal, capping, stabilization, and "soft" streambank protection.

Tacoma Smelter Plume Soil Investigation, Tacoma, WA. Provided senior technical review of project plans and reports, and oversight of field sampling activities for Ecology. The project involved sampling and analyzing shallow soils over a wide area in southern King County, downwind from the former Asarco Tacoma Smelter. Sampling was focused on child-use areas.

Everett Asarco Smelter Plume Soil Investigation, Everett, WA. Conducted a multi-year project for Ecology to characterize soil in an extensive residential area adjacent to the former Asarco Everett smelter. The project included sampling soil at over 50 homes using geoprobe technology and analyzing for lead and arsenic using compositing and a tiered analytical approach.

American Plating Site Cleanup Action Plan, Tacoma, WA. Mark was responsible for preparing the CAP for remediation of former metal plating operation under MTCA for Ecology. The site had soil, groundwater, and surface water contaminated by toxic metals, chlorinated solvents, and petroleum hydrocarbons.

Industrial Landfill, Naval Undersea Warfare Center, Remedial Investigation/Feasibility Study and Record of Decision, Keyport, WA. This site was a former base landfill, adjacent to aquatic and marine environments, investigated under CERCLA and MTCA. Prepared RI work plans and conducted three phases of field investigations over a 2-year period for the U.S. Navy. The work included soil gas surveys, ambient air sampling, soil and groundwater sampling, aquifer testing, hydrogeologic analyses, and an extensive marine survey including water, sediment, and biota sampling, and sediment bioassay testing. Procured special analytical services to obtain risk-based detection limits as well as analysis of non-routine media (marine water, air, tissue) and analytes (torpedo fuel and its breakdown products). Developed a database for analysis and reporting of analytical data, field and laboratory QA results, and data validation information. Prepared reports including RI, human health and ecological risk assessments, FS, proposed plan, and ROD. Participated in negotiations with EPA and Ecology regarding the preferred alternative, development of pre-ROD planning documents and supplemental monitoring plans, and participated in public involvement activities, including giving presentations and workshops to public groups, Technical Review Community (TRC), and the Restoration Advisory Board (RAB). Carried out a post-RI sampling program designed to supplement the RI data and to provide additional information for selecting a remedy acceptable to the Ecology and the public.

Operable Unit 2 (OU 2) Sites, Naval Undersea Warfare Center (NUWC), Remedial Investigation/Feasibility Study and Record of Decision. Keyport, WA. OU 2 encompassed five remedial sites investigated under CERCLA and MTCA: A plating shop adjacent to Liberty Bay, a former hazardous waste management area, a sludge disposal area, a former torpedo-fuel sump and disposal area, and the marine environment bordering the NUWC facility. Prepared RI work plans and led the field investigation and preparation of the RI report for the U.S. Navy. Provided technical input to the FS and played a major role in remedial decision-making activities, including negotiations with regulatory agencies regarding the preferred alternatives, and participating in preparation of the proposed plan and ROD for these sites.

Provided support to the Navy in public involvement activities, including giving presentations and workshops to the public, the TRC, and RAB, preparing fact sheets, and developing public presentations for Navy personnel.

Industrial Landfill Remedial Investigation, Naval Air Station Whidbey Island, WA. This site was a former base landfill investigated under CERCLA and MTCA cleanup regulations. Prepared RI work plans, including Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), and Health and Safety (H&S) Plan for this site for the U.S. Navy. Led RI field investigation, installed monitoring wells, sampled groundwater and soil, and conducted aquifer tests, including pumping and slug tests. Responsible for on-site supervision of two field teams during two phases of field investigation. Slug and pumping tests were conducted using submersible pumps and Hermit multichannel dataloggers. As health and safety officer, performed air monitoring to assure proper level of personal protection. Interpreted aquifer tests, hydrostratigraphy, groundwater flow directions and rates, and chemical data; and prepared the Site Characterization Summary and RI report.

National Guard Armory Site Investigation, Crete, NE. Conducted investigation for Nebraska Army National Guard at a former truck maintenance facility. Contamination at the site involved petroleum hydrocarbons from leaking underground storage tanks (USTs) and hydraulic vehicle lifts and heavy metals from discharges of lead-acid wastes from a battery room sink drain. The investigation was carried out in accordance with Nebraska Department of Environmental Quality (NDEQ) voluntary cleanup program LUST/ER guidance. Prepared project plans and oversaw field investigation which included collecting soil samples using a hollow-stem auger rig (including work inside buildings using a limited-access rig), performing field screening of soil samples using a photoionization detector (PID), installing and developing monitoring wells, and collecting groundwater samples. Prepared SI report which included development of a conceptual hydrogeologic site model, analysis of soil and groundwater chemistry data, and identification of potential groundwater receptors.

Groundwater and Soil Investigation, Hart Oil Refinery, Missoula, MT. Reviewed and evaluated groundwater and soil data collected over a ten-year period, identified data gaps developed additional sampling requirements in support of a human-health risk assessment for Montana Department of Health and Environmental Sciences. Contaminants included arsenic, lead, PAHs, and petroleum hydrocarbons. The plume of the contaminated groundwater at the former refinery had traveled offsite in the direction of domestic water wells and posed a potentially significant future threat to area residents.