

Brian Giroux, P.G., C.Hg., C.E.M.
Principal Hydrogeologist

Professional Experience

Mr. Giroux is a Professional Geologist, Certified Hydrogeologist and Certified Environmental Manager with 23 years of professional experience in site and resource investigations and environmental consulting, serving the public and multiple government and business sectors. He has substantial experience with environmental investigations, groundwater and air monitoring, and remediation program management for projects throughout the western US. He has received specialized training for management of hazardous materials and waste. He has performed numerous Human Health Risk Assessments for petroleum sites in California and Nevada. He has also conducted program management for numerous public water supply systems in California and Nevada.

Project Experience

Select Environmental Site Assessment and Remediation Projects

- **Jerritt Canyon Mine, Elko NV** – Principal Hydrogeologist responsible for mill site work plan preparation and implementation, aquifer testing, data analysis, soil and groundwater characterization, remedial alternatives evaluation, remedial strategy development, and corrective action plan preparation. Project challenges include conducting environmental assessment on an active mine mill site, and determining background arsenic and antimony concentrations to arrive at elevated action levels.
- **Comstock Mining, Inc., Silver City NV** – Principal Hydrogeologist responsible for the development and implementation of an environmental site assessment and remediation project in the historic Comstock mining district. Site assessment included sampling from a nominal 1,000 soil borings and the collection of over 3,000 samples for analysis of mercury, lead and arsenic. The project is high profile, publically sensitive, and is impacted by the only USEPA Superfund site in the State of Nevada.
- **The Boeing Company, Reno NV** – Principal Hydrogeologist responsible for the Former Nevada Field Laboratory (NFL), hydrogeological and contaminant characterization in complex bedrock settings at a former rocket testing facility, database management and compliance reporting for three separate trichloroethylene (TCE) and perchlorate plume sites. Projects involve large scale groundwater pump and treat remediation systems, ground injection of treated water and large groundwater monitoring network operations. Technical project aspects include degradation of dense non-aqueous phase liquid (DNAPL) TCE contamination deeply emplaced in fractured bedrock, design and maintenance of digital data stream for support of rapid decision support and complex reporting requirements, incidental conceptual and analytical modeling, and remediation system optimization. One site was closed by the NDEP following 12 years of active remediation and optimization; this was the first groundwater site closure in the client's history, and included the State's first environmental covenant for contaminated groundwater.
- **BMI Complex and Common Areas for the State of Nevada, Henderson NV** – Principal Hydrogeologist responsible for multiple groundwater flow and contaminant transport modeling projects, and Senior Project Manager responsible for management of a third-party review team, and remedial operations oversight for the State's largest and most complex soil and groundwater

contamination “site”. The 5,000 acre complex has been occupied by multiple responsible parties since 1941, including Pioneer, Olin, Stauffer, Syngenta, Montrose, the Nevada Environmental Response Trust (NERT; former Kerr-McGee/TRONOX), TIMET, and Basic Remediation Company (formerly Basic Magnesium Incorporated/Black Mountain Industrial).

As the BMI Complex Oversight Consultant, responsible for provisioning third-party review and management of a subject matter expert (SME) team including geotechnical and remediation engineering, statistics, toxicology, risk assessment, data management and quality assurance, ensuring the highest quality of operations and deliverables for the State. Reviewed documents include sampling and analysis plans (SAP); Project and Program Quality Assurance Plans (QAPP and QAPrP); remedial alternative studies (RAS); environmental assessment, monitoring and modeling reports; and a wide array of CERCLA- and RCRA-based compliance documents. Also coordinated stakeholder management and outreach.

Remedial operations oversight is provided to ensure the highest level of performance in the removal of approximately 4 million cubic yards of multiple-hazardous waste materials, transport and placement into an on-site corrective actions management unit (CAMU) landfill.

The Las Vegas Wash Perchlorate Investigation included development of a water budget, and groundwater flow/solute transport model set to evaluate the plausibility of remediation. The results of stochastic modeling and sensitivity analyses predicted that concentrations of perchlorate would decline to near background levels within approximately 3 years; the recommendation to stem active remediation efforts in the Wash saved the State and several responsible parties’ years of effort and multiple millions of dollars. Several years of post-prediction monitoring data have validated the enormous cost saving recommendation.

- **Florida Canyon Mine, Imlay NV** – Principal Hydrogeologist responsible for mill site plume mitigation plan preparation and implementation, including high resolution hydraulic survey, source identification, and field-scale remediation pilot testing. Value creation included taking the project from a six month project lag, to delivering the project two months ahead of the original one-year schedule.
- **American Pacific Corporation (AMPAC), Henderson NV** – Senior Project Manager responsible for third-party hydrogeologic review and management of a review team of statisticians and risk assessors for the State of Nevada. Combined with the BMI Complex described above, these sites represent the largest perchlorate contaminant plumes and remediation systems (both recovery- and destructive-types) on Earth. Technical review and guidance of the groundwater flow and contaminant transport modeling projects for this site is ensuring the highest level of contaminant mass recovery, and reducing the risk profile for the State (vis-a-vis interstate trespass) to the greatest degree practicable.
- **Berry-Hinckley Industries, >50 Sites, CA and NV** – Project Manager responsible for assessment and characterization of hydrocarbon contamination as the result of leaking Underground Storage Tanks (USTs). Responsible for work plan development, regulatory liaison, field activities coordination, drilling investigations and monitoring well network design and construction, soil and groundwater sampling program design, contaminant fate and transport (analytical) model development, field pilot testing and analysis, and report generation. MGA has achieved closure for the vast majority of these sites.
- **Nevada Division of Environmental Protection (NDEP) Landfill Closures, Smith Valley and Jarbidge NV** – Project Manager responsible for hydrogeologic characterization and groundwater detection monitoring for contamination as the result of landfill leaching.

Responsible for regulatory liaison, monitoring well field design and construction, groundwater sampling activities coordination, data review and interpretation, and report preparation.

- **Squaw Valley Ski Corporation, Olympic Valley CA** – Project Manager in charge of hydrocarbon-contaminated site assessment for multiple sites at the ski resort. Challenging project aspects included characterization of fracture-controlled flow and transport pathways developed in volcanic and granitic rock environments under extreme and variable climatic conditions and large vertical gradients.
- **Rocket and Missile Propulsion Manufacturer, Rancho Cordova CA** – Staff Hydrogeologist responsible for conceptual and numerical model development of vertical-circulation well component of a proposed in-situ remediation system. Challenging project aspects included the sensitivity analysis and optimization of well screen lengths, screen separations, and pumping/treatment rates for vertical-circulation groundwater flow cell curtain development and plume capture.

Select Environmental and Water Resource Permitting Projects

- **Tesla Gigafactory, Storey County NV** – Principal responsible for full environmental partnership consulting services, including acquisition of Air Quality Operating Permit, hazardous material storage permit, stormwater pollution prevention (SWPP) consulting, and all manner of materials management plans and implementation.
- **Clean Dried Processing, Silver Springs NV** – Principal involved with air quality operating permit application for a dried pet food manufacturing facility. In response to the issuance of a stop order from NDEP Bureau of Air Pollution Control, this project involved an immediate turn-around time in order to minimize facility down time. A Class III permit was acquired in less than one week, allowing the factory to return to operational status, and a Class II permit was subsequently produced to satisfy the long term operations requirement.
- **Northern Nevada Milk Processors, Yerington NV** – Senior Project Manager responsible for dual discharge permit applications for a dried milk processing plant. A National Pollution Discharge Elimination System (NPDES) permit and a “groundwater discharge” permit application were strategically applied in parallel, in order to optimize permitting time frames in conjunction with facility development and operations. Pending completion, the project will bring a cubic foot per second of extra-basin water into the Walker River Basin, which may help to mitigate environmental degradation in the terminal lake.
- **Florida Canyon Mine, Imlay NV** – Principal Hydrogeologist responsible for groundwater and surface water disciplines for a National Environmental Policy Act (NEPA) environmental assessment (EA) and production well assessment, including Geographical Information Systems (GIS) management, to support an amended mining plan of operations (POO).
- **Winnemucca Farms, Inc., Winnemucca NV** – Senior Hydrogeologist responsible for permitting negotiations and permit portfolio compliance at three farm sites and a food processing plant site. Farm sites’ activities include groundwater appropriations strategic planning, permit compliance and resource evaluation and management in a “designated” basin. Plant site activities include drinking water permit and discharge permit compliance. Technical challenges at the plant site include managing optics in the midst of a regional non-point source nitrate plume.
- **Idahoan Foods LLC, Winnemucca NV** – Senior Project Manager responsible for permitting negotiations and compliance at a potato processing plant site. As with the neighboring facility

described above, technical challenges at the plant site include managing optics in the midst of a regional non-point source nitrate plume.

- **Two Separate Private Community Water Companies, Soda Springs CA** – Senior Hydrogeologist responsible for acquisition of two separate community water system permits, including development of operations and maintenance manuals, emergency response plans, and other supporting documentation. Unique project aspects included combined artesian well, diagonal borehole and ground source spring collection points, and design/implementation of an arsenic treatment system.
- **Lockwood Regional Landfill, Sparks NV** – Senior Hydrogeologist responsible for hydrogeologic characterization for landfill expansion permitting. Responsible for deep unsaturated zone lithologic and hydraulic characterization methods development, data review and interpretation, previous studies and literature review, and hydrogeologic characterization report preparation. One important project aspect was the pursuit of an alternative landfill design with limited liner coverage, to reduce overall project time schedules and costs.
- **Wabuska Geothermal Power Plant, Yerington NV** – Senior hydrogeologist responsible for technical evaluation of surface water and geothermal process discharge data, and preparation of a mixing model to support the permit application for discharge to the politically sensitive Walker River. Wabuska is the first, smallest and coolest geothermal power plant in Nevada. Successful completion of this project will ultimately benefit Walker Lake, a terminal lake in which salinity has increased to levels dangerous for aquatic life, due to consumptive water use along upstream reaches.

Select Human Health Risk Assessments at Petroleum Sites

- **Churchill County School District, Fallon NV** – Senior Project Manager and risk assessor responsible for work plan development, regulatory negotiations, conceptual model development, indoor air sample analytical data evaluation, risk assessment, and report preparation.
- **Human Health Risk Assessments for Three Separate Petroleum Sites, Plumas and Sierra Counties, CA** – Project Manager and risk assessor responsible for work plan development, regulatory liaison, field activities coordination, soil vapor probe design and construction, soil and soil vapor sampling program implementation, risk assessment, and report generation. MGA has achieved closure for soil dermal absorption and ingestion, and soil vapor inhalation routes of exposure at each of these sites.

Select Groundwater Resource Projects

- **Nevada Energy, Las Vegas NV** – Project Hydrogeologist involved with the Silverhawk Water Supply Project groundwater resource assessment, water rights application and transfer, and groundwater production well drilling, testing, and construction. This project resulted in the completion of a nominal 700 foot deep industrial water supply well in karst carbonate sedimentary rock – one of the highest producing well in the State of Nevada.
- **National Water Quality Assessment (NAWQA) Program, Carson and Truckee River Basins, NV** – Hydrologist responsible for the placement and development of more than 20 groundwater monitoring wells for the study of surface water nutrient loading distributions throughout Northern Nevada's two dominant river drainage basins. The NAWQA Program was the first large-scale national water resources project, and standardized rigorous parts-per-billion sampling protocols for a large suite of analytes.

- **Regional Aquifer Systems Analysis (RASA) Project, Mojave River Basin and Santa Clara River Basin, CA** – Hydrologist responsible for the placement, development and sampling of more than 30 deep-basin nested groundwater monitoring wells. The purpose of this project was to define the regional geohydrology and establish a framework of background information on geology, hydrology, and geochemistry of the nation's typical alluvial and coastal basins. Also responsible for a database QA/QC program for approximately 300 wells located within the Mojave River Basin, and instrumentation and analysis of aquifer testing in the Rialto-Colton Basin.
- **Nevada Test Site, Nye County NV** – Research Assistant in charge of numerical groundwater flow model development for the purposes of examining the regional hydraulic effects of groundwater production in various sub-basins of the Nevada Test Site.
- **White Pine County Schools, NV** – Project Hydrogeologist responsible for the assimilation of hydrogeologic and water rights data, water rights application and transfers, generation of a site-specific conceptual hydrogeologic model, assessment of groundwater production potential, and design of public water supply wells.

Publications and Presentations

Path to Closure: Conceptual Site Models and Trend Analysis, Nevada Department of Environmental Protection, Bureau of Corrective Actions Retreat, 2014. (Presenter)

Optimization Pump and Treat to Closure, Battelle Conference on Recalcitrant Chlorinated Compounds, May 2010. (Presenter)

Groundwater/Surface Water Interactions and Perchlorate Transport along the Las Vegas Wash, Henderson, Nevada, November 2007, U.S. Environmental Protection Agency, Technical Support Project Biannual Meeting. (Invited Presenter)

Expanding Las Vegas Wash Perchlorate Modeling, National Groundwater Association (NGWA) Conference on Perchlorate and MTBE, Costa Mesa California, June 2004. (Keynote Presenter)

Las Vegas Wash Perchlorate Investigation, Battelle Conference on Recalcitrant Chlorinated Compounds, May 2004. (Poster Presenter)

Evaluation of a Two-Dimensional Telescopic Grid Refinement Technique, M.S. Thesis, University of Reno, Nevada, 1998.

Numerical Simulation of Groundwater Withdrawal within the Nevada Test Site. DOE Report No. DOE/NV/11508-36. Desert Research Institute, Water Resources Center, Publication No. 45163, 1998. (Co-author)

Groundwater Production Assessment at the Nevada Test Site: Results of Telescopic Mesh Refinement. Eos, Transactions, American Geophysical Union, 1997 Fall Meeting, Vol. 78, No. 46/Supplement, 1997. (Poster Presenter)

Total slip across the San Miguel Fault, Northern Baja California: Implications for the Initial Age of Faulting, Geological Society of America, Cordilleran Section Meeting Abstracts with Programs, Vol. 26, No. 2, 1994. (Poster Presenter)

Education

M.S., Hydrogeology, University of Nevada, Reno, 1998.

B.S., Geological Sciences, San Diego State University, 1993.

Certifications and Registrations

California Certified Hydrogeologist, #784.

California Professional Geologist, #7246.

Nevada Certified Environmental Manager, #1742.

OSHA, 29 CFR 1910, 40-Hour and Annual 8-hour, Hazardous Waste Operations and Emergency Response (HAZWOPER).

MSHA Part 46, New Miner Training.

MSHA Part 48, 40-Hour and Annual 8-hour, Surface Miner Training.

Affiliations, Participation and Training

Certified Hazardous Materials Management, Southern California Education and Research Center (2015).

Water Rights in Nevada, Nevada Water Resources Association (2014).

Conference on Remediation of Chlorinated and Recalcitrant Compounds, Battelle Chlorcon (2006, 2008, 2010, 2012, 2014).

American Exploration & Mining Association (Member since 2013).

Mining Environmental Compliance Workshop, EPA Alliance (2013).

Nevada Water Resource Association (Member since 2012).

Nevada Mining Association (Environmental Committee; Member since 2012).

Human Health Risk Assessment, EOS Alliance (2010).

Natural Attenuation of Chlorinated Solvents: Recent Developments and Practical Tools, Battelle Chlorcon (2008).

Risk-Based Corrective Action at Petroleum Release Sites, American Society for Testing and Materials (ASTM; 2007).

National Ground Water Association (Member since 1999).

Principles of Water Quality, USGS Water Resources Division (1993).