

# **EXHIBIT 1**

## W. Greg Hamer, PG, CHg, CEG

### Principal Hydrogeologist

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#### Professional summary

Mr. Hamer has performed and managed water-resources investigations and environmental studies for more than 37 years. His water-resources expertise includes basin studies, conjunctive use evaluations, water-quality studies, production well field analysis, litigation support for water rights issues, and geologic and hydrogeologic studies. His environmental experience includes site characterizations and assessments, remediation of contaminated soil and groundwater, and regional screening and siting studies.

Mr. Hamer has managed and performed groundwater investigations throughout Southern California, including studies of both coastal and inland basins. He has performed hydrogeologic and environmental evaluations of more than 20 groundwater basins in the eastern and northern Mojave Desert, and in Mono and Shasta Counties. His work experience also includes development of detailed groundwater basin water balances for water supply and evaluation of water uses.

Additionally, Mr. Hamer has designed and overseen the construction of hundreds of wells using multiple drilling and sampling techniques including mud-rotary, air-rotary, reverse rotary, dual-wall air hammer, and cable tool. He has managed numerous projects to evaluate and rehabilitate production wells, including design of disinfection and chemical treatment programs. He has prepared and given numerous presentations for technical advisory committees, public meetings, and regulatory agency meetings. Many of his projects have involved the development of detailed models for evaluating groundwater quality, contaminant transport, and water supply options.

#### Professional qualifications/registration(s)

Certified Hydrogeologist, CA No. 634, 1999

Certified Engineering Geologist, CA No. 1211, 1984

Professional Geologist, CA No. 3878, 1984

#### Education

M.S., Geology/Hydrogeology, California State University, Los Angeles, 1986

B.S., Geology/Hydrogeology, California State University, Los Angeles, 1978

#### Memberships/Affiliations

National Association of Groundwater Scientists and Engineers

California Groundwater Resources Association

American Water Works Association

#### Employment history

Amec Foster Wheeler, Principal Hydrogeologist, Irvine, CA 2015- present

AMEC, Senior Associate Hydrogeologist, Newport Beach, CA, 2008 to 2014

Geomatrix Consultants, Senior Hydrogeologist, Newport Beach, CA, 2002 to 2008

URS (Dames & Moore, Radian), Senior Project Manager, Hydrogeologist, 1988 to 2002

Radian Limited, Principal Hydrogeologist, London, England, 1994 to 1995

Radian GmbH, Geology Group Leader, Hannover, Germany, 1993

Harding Lawson Associates, Associate Hydrogeologist, 1983 to 1988

P.R.C. Engineering, Staff Hydrogeologist, 1981 to 1983

LeRoy Crandall & Associates, Geologist, 1977 to 1981

## Representative projects

### Water resources (U.S.)

#### *Water District Supply Evaluation, Monterey County, CA*

Project manager for feasibility studies and development of a new water supply for the community of San Lucas. Work included a Feasibility Study to evaluate existing water supply demand, projected demand, water quality, Public Health Department water system requirements, and alternatives for future supplies.

#### *Groundwater Basin Water Balance and Supply Study, San Luis Obispo County, CA*

Senior technical advisor and reviewer for a basin-wide water balance study. Work included evaluation of domestic and agricultural water uses and demands and evaluation of current and historical groundwater pumpage.

#### *Water Rights Support, Southern California*

Project manager for assistance to a city public works department in the evaluation of their water rights and potential to sell and purchase water rights in two Southern California groundwater basins.

#### *Groundwater Conjunctive Use Study, Verdugo Basin, Los Angeles County, CA*

Managed a basin hydrogeologic feasibility study for groundwater storage and artificial recharge. This project included consideration of water quality (including nitrate levels) and development of a MODFLOW groundwater flow model for use in evaluating possible recharge scenarios. Evaluated existing geologic and hydrogeologic data and developed a conceptual model and water balance including a detailed review of the water balance calculations as presented in the Report of Referee for the basin. Evaluated groundwater pumping and water demand for the basin. Worked closely throughout the project with a Technical Advisory Committee (TAC) that included the Upper Los Angeles River Area Watermaster, the City of Glendale, the California Department of Health Services, and the Regional Water Quality Control Board. The project was funded by Department of Water Resources under AB 303, and was selected in 2004 as a highlight project for the AB 303 annual report. The study provided an important framework for management of the basin and the project team received a commendation letter from the Watermaster's office.

#### *Groundwater Basin Power Plant Water Supply Evaluation, Upper Coachella Valley, CA*

Task manager for groundwater basin evaluation and environmental studies for a power plant. Work included development of a basin water balance including evaluation of groundwater pumping rates, evaluation of environmental impacts from groundwater pumping, artificial recharge of groundwater using Colorado River Aqueduct water, and use of reclaimed water for power plant cooling. Prepared environmental reports for the Regional Water Quality Control Board (RWQCB) and the California Energy Commission (CEC). The CEC report was functionally equivalent to an Environmental Impact Report (EIR).

#### *Water Supply Well Evaluation, Imperial County, CA*

Project Manager and technical lead for evaluation of an agricultural supply well and pump performance. Provided support to the California Department of Water Resources (DWR) by reviewing well and pump data and evaluating changes in well and pump performance over time and degree of wear on the pump. Findings of this study were used by DWR to support a legal position regarding the well.

#### *Conjunctive Use Study, Upper Mojave River Basin, CA*

Project Manager. Responsible for the development and use of a groundwater flow model for a large portion of the Upper Mojave River Basin (Victorville area). Reviewed and evaluated existing hydrogeologic data and produced a conceptual basin model and water balance. The model was reviewed by the U.S. Geological Survey, and with their input, a multi-layer MODFLOW groundwater flow model was prepared for the basin area. The model was used to evaluate groundwater flow

volumes in specific areas, to estimate the amount of available groundwater storage capacity, to determine future impacts of pumping under various growth scenarios, and to evaluate groundwater mounding from artificial recharge. The model was also used to estimate groundwater flow paths and travel times for recharged water.

*Power Plant Water Supply Evaluation, Shasta County, CA*

Hydrogeologist for groundwater basin evaluation for power plant water supply in basalt aquifer. Developed basin water balance, performed detailed review and analysis of oxygen 18 and carbon isotope data for regional groundwater evaluation. Worked closely with biologists to present information to state and federal agencies. Prepared reports and presented testimony before the California Energy Commission.

*Water Use and Deep Percolation Evaluation: Beverly Hills, CA*

Evaluated residential water uses for irrigation and domestic use in a landslide area to assess if over-irrigation and pipeline leaks from homes were impacting the stability of a hillslope in a residential area. Reviewed water use records, lot and landscaped area sizes and vegetative water uses.

*Water Supply MTBE Impacts Consultation, Crescenta Valley Water District, Verdugo Basin, CA*

Hydrogeologic consultant to the Crescenta Valley Water District regarding MTBE impacts to local water supply wells in the Verdugo Basin. Project work has focused on developing solutions for maintaining water supply reliability during possible contamination-related shutdown of area wells.

*Water Well Siting, Design Studies, and Pilot Hole Drilling Program, Glendale Water & Power, Los Angeles County, CA*

Project Manager. Responsible for evaluating hydrogeologic and water supply system conditions for the selection of sites for new water supply wells in the Verdugo Basin. This project includes evaluation of basin hydrogeology and local groundwater conditions, as well as construction of monitoring wells in the basin. Also evaluated the condition of older water wells in the basin.

*Basin-Wide Geophysical Study, Verdugo Basin, Los Angeles County, CA*

Managed a basin-wide geophysical study, including a micro-gravity survey, to estimate the depth to bedrock and the thickness of the alluvial aquifer system in the basin. This first-of-its-kind study for southern California included micro-seismic and resistivity surveys at specific locations to evaluate aquifer materials and their suitability for artificial recharge. Worked closely throughout the project with a Technical Advisory Committee including the ULARA Watermaster and former Watermaster. Project was funded by California Department of Water Resources under AB 303.

*Basin-Wide Groundwater Monitoring Program; San Fernando Valley, CA*

Project Manager and Basin Characterization Lead. Responsible for overseeing the development of a large groundwater monitoring program for water supply well fields in the San Fernando Valley. Project includes development of plans and specifications for installation of approximately 25 deep multi-port monitoring wells, and preparations for a large multi-year well drilling program.

*Water Balance Evaluation, Cabazon, CA*

Project Manager. Responsible for producing a white paper describing the water balance for the local groundwater basin. Also managed an initial CEQA study for water supply development in the Cabazon County Water District. Reviewed various water balances for the surrounding groundwater basin and evaluated surface and groundwater components.

*Basin-Wide Water Resources Data Base, Bunker Hill Groundwater Basin, Southern CA*

Project Manager. Oversaw development of a large well and hydrogeologic database for the Bunker Hill Groundwater Basin. Collected water-quality and water-level records and well logs for more than 3,000 wells. Interpreted logs for more than 1,000 wells and entered lithologic and well-construction data into the database. Also developed a detailed Quality Assurance Project Plan for sampling of

selected wells to further populate the database. The project also included ranking of wells for verification of field locations and well head elevations.

The database was used to generate 3-dimensional geologic views of portions of the groundwater basin using EarthVision software. A Web interface was developed as part of the project so that interested parties, including local water purveyors and water regulators, could query the data. The interface included a graphic, map-based display as well as the capability to plot charts of water level and chemical data for single or multiple wells. Made numerous presentations of the database and Web interface to local water agencies and industry groups.

*Municipal Water Supply Well and Recharge Facilities, Los Angeles County, CA*

Project Manager. Responsible for siting and designing a new well and 42-inch diameter water pipeline and recharge facilities. The project will allow for artificial recharge and spreading of surplus imported water from northern California and for extraction of the water for potable use. This project also included preparation of well and pipeline bid packages, construction management and contract administration services, and meeting California Department of Health Services permitting requirements for a municipal supply well.

*Design and Construction of Water Supply Wells, Bunker Hill Basin, CA*

Project Manager. Responsible for siting, engineering design, and construction of two deep dewatering and supply wells. Prepared a Preliminary Design Report (PDR), engineering plans, and specifications for the wells, pump and packer systems, control systems, and several thousand feet of water discharge piping. Also provided construction oversight for the project.

The wells, producing 1,600 gallons per minute each, include a unique throttling packer system to regulate flow from multiple aquifers. The wells are 20-inch diameter and more than 400 feet deep. As the wells extract and dewater high-total dissolved solids (TDS) water from a shallow aquifer, the packer system automatically adjusts the flow of low-TDS water from a deeper aquifer so that the well discharges water that meets regulatory requirements. The project included innovative down-hole water quality sampling and aquifer pumping during drilling.

*Conjunctive Use Recharge Studies, Hayfield Basin, CA*

Hydrogeologist for original Metropolitan Water District conjunctive use studies for underground storage of Colorado River Aqueduct water. Collected and evaluated available hydrogeologic data for the basin and performed groundwater recharge mound modeling.

*Spring Water Supply Studies; Benton Valley, San Bernardino Mountains, and Palomar Mountain, CA*

Managing Hydrogeologist. Provided oversight for installation of stainless steel boreholes and spring water catchment facilities. Performed detailed water quality evaluations to confirm the hydraulic connection between springs and bore holes. Also prepared spring water supply reports for regulators and CEQA initial studies.

*Salt Removal Well Design and Operation, Metropolitan Water District of Southern California, Bunker Hill Basin, CA*

Project Manager. Conducted a pilot study to address high TDS groundwater. The project included installation of a production well to remove salt-laden shallow groundwater from the basin.

*Water System Review, City of Loma Linda, CA*

Task Manager. Responsible for review of city water system operations and development of alternative approaches including water transfers, well pumping modifications, and system modifications to reduce perchlorate concentrations.

*High Groundwater Study, Rialto-Colton Basin, CA*

Project Manager and Hydrogeologist. Reviewed historic data for the basin including the relationship between groundwater levels and the 1969 basin judgment.

*Dewatering Study, Colton Quarry, CA*

Hydrogeologist for a dewatering study for a proposed quarry extension. Responsible for limestone and alluvial aquifer testing and evaluating potential drawdown during dewatering.

*Water Resource Evaluation, MolyCorp Mine, San Bernardino County, CA*

Project Hydrogeologist. Evaluated and designed a new well field to supply a source of low fluoride water to the MolyCorp Mine. Included design and construction of three water wells.

*Alamitos Seawater Intrusion Barrier, CA*

Hydrogeologist for evaluation of the west end of the Alamitos seawater intrusion barrier. Reviewed water quality, inspection, and geologic data to determine rate of intrusion and possible mitigation measures. Evaluated grout sealing problems and performance problems with several injection wells.

*Water Quality Studies, Orange County, CA*

Hydrogeologist for various basin water quality studies. Evaluated hydrologic and water quality conditions in the Irvine basin and seawater intrusion in Bolsa and Sunset gaps.

*San Bernardino Mountains, CA*

Hydrogeologist for evaluation of the impact of spring water harvesting on surface water flows. Helped develop detailed analytical model for the relationship between the rate of surface water flow and the velocity and wetted perimeter of surface streams (Strawberry Creek). Work supported an EIR.

*Well Siting, Design, and Construction, San Bernardino, CA*

Project Manager. Oversaw siting, design, and construction of two production wells and pipelines. Water quality concerns at each site included TDS and nitrate in groundwater. Prepared plans and specifications for wells, testing, pipelines, pumps, and tie-ins to existing water piping. Construction observation included contractor oversight, review of submittals, invoices, and other related tasks.

*Well Siting and Conveyance Facilities, Benton, Mono County, CA*

Project Manager. Responsible for well siting, design, construction oversight, and testing. Supervised and assisted in the design of wellhead facilities and piping. Project included installation of three water supply wells and several monitoring wells.

*Water Supply Well Design and Installation, Desert Hot Springs, CA*

Task advisor for design, installation, and testing of a water supply well for the Indigo power plant. Project included selection of drilling site and method, well design, borehole logging, testing, and selection of pumping equipment and controls.

*Water Supply Well Evaluation, Beaumont, CA*

Project Manager and Hydrogeologist. Responsible for evaluating and ameliorating water supply well encrustation problems. Work included high pressure water jetting, acid washing, biofouling treatment, high-pressure carbon dioxide treatment, videologging of wells, and other well rehabilitation methods.

*Gauge Well Field, Riverside, CA*

Task leader for evaluation of pump efficiency for the Gauge Well Field. Performed pump efficiency tests to assess costs for upgrading pumps and pump motors in city supply wells.

### **Environmental investigation, remediation, and engineering geologic studies (U.S.)**

Project Manager and hydrogeologist for a variety of environmental investigations and remediations for contaminant-impacted sites in Southern California. Work includes projects at Edwards Air Force Base in the Antelope Valley.

### **Publications and presentations**

- “The Cost of Water and Water Markets in Southern California, USA.” G. Hamer. International Water Association 2nd International Conference on Water Economics, Statistics, and Finance, Alexandroupolis, Thrace, Greece. July 3–5, 2009.
- “An Innovative Down-Hole Packer System for In-Well Water Quality Blending.” G. Hamer. National Ground Water Association 2006 Ground Water Summit, San Antonio, TX. April 22–27, 2006.
- “Water Well Drilling in Developing Countries: Only One Piece in the Community Development Puzzle.” G. Hamer. National Ground Water Association 2006 Ground Water Summit, San Antonio, TX. April 22–27, 2006.
- “How a Basin-Wide Micro Gravity Survey Helped Better Define Ground Water Conditions in the Verdugo Basin in Southern California.” G. Hamer. National Ground Water Association 2006 Ground Water Summit, San Antonio, TX. April 22–27, 2006.
- “Managing Basin-wide Groundwater Quality Changes Resulting from Enhanced Groundwater Recharge Programs.” N.T. Sheahan, W.G. Hamer, and D.E. Gould. Groundwater Quality 2004, 4th International Conference, University of Waterloo, Waterloo, Ontario, Canada. July 19–22, 2004.
- “Water Supply Tunnels or ‘Qanats’ in Southern California.” G. Hamer. International Fontinus-Symposium, Walferdange/Luxembourg. 2003.
- “Managing Water Demand for the Intensively Used Mojave Aquifer System.” G. Hamer. American Institute of Hydrology 2003 Annual Meeting & Conference, Atlanta, GA. October 19–22, 2003.
- “Meeting Water Quality and Quantity Objectives with an Innovative Well Design and Control System.” G. Hamer. American Water Resources Association. Fall 2003.
- “The Cost of Water in Southern California.” G. Hamer. California Groundwater Resources Association 11th Annual Meeting & Conference, Sustaining Groundwater Resources: The Critical Vision. September 2002.
- “Managing Water Demand for the Intensively Used Mojave Aquifer System.” G. Hamer. Symposium on Intensive Use of Groundwater, Challenges and Opportunities (SINEX), Valencia, Spain. December 10–14, 2002.
- “Historical Improvements in Groundwater-Pumping Equipment and Effects on Farming in the United States.” G. Hamer. Darcy Symposium on the History of Hydraulics. June 2002.
- “Appropriate Technology Application: An American/Romanian Well Drilling Program.” G. Hamer. International Symposium on Environmental Contamination in Central and Eastern Europe. October 1992.
- “Regional Screening and Selection of Candidate Sites for California’s Low-Level Radioactive Waste Disposal Facility.” G. Hamer. Association of Engineering Geologists 35th Annual Conference. 1991.
- “Regional Screening and Selection of Candidate Sites for California’s Low-Level Radioactive Waste Disposal Facility.” G. Hamer. *U.S. Geological Survey Circular 1036: Safe Disposal of Radionuclides in Low-Level Radioactive-Waste Repository Sites: Low-Level Radioactive Waste Disposal Workshop*. July 11–16, 1987.