

W. PETER BALLEAU, CPG, P. Hg.

Hydrogeologist

EDUCATION: Bachelor of Arts in Geology, 1968, University of New Mexico

REGISTRATION: Registered Geologist (#18432) in the State of Arizona (1985)
Certified Professional Hydrogeologist (#238) by the
American Institute of Hydrology (1984)
Certified Professional Geologist (#2716) by the
American Institute of Professional Geologists (1975)
Licensed Geologist (Cert. 686) in the State of Kansas (2006)

**PROFESSIONAL
SOCIETIES:**

American Association for the Advancement of Science
American Geophysical Union
American Institute of Hydrology
American Institute of Professional Geologists
Association of Ground-Water Scientists
and Engineers (National Ground Water Association)
Geological Society of America
Geological Society of Australia
New Mexico Geological Society
Albuquerque Geological Society

CAREER EXPERIENCE:

1992 to Present: President and Hydrogeologist, Balleau Groundwater, Inc.
1991 to 1992: Vice-President and Director, Leggette, Brashears & Graham, Inc.
1985 to 1991: Associate and Senior Associate, Leggette, Brashears & Graham, Inc.
1977 to 1985: Hydrologist and Supervisory Hydrologist, Bureau of Indian
Affairs, Albuquerque, New Mexico
1973 to 1977: Hydrogeologist and Senior Hydrogeologist, Leggette,
Brashears & Graham, Inc.
1971 to 1973: Groundwater Geologist, Geological Survey of Western Australia
1968 to 1970: Geologist, Water Development Division, Government of
Kenya through U.S. Peace Corps.

SUMMARY OF PROFESSIONAL EXPERIENCE:

Career experience in major aspects of hydrogeology, with emphasis on arid-zone hydrology, mine dewatering, water-rights litigation support, and computer modeling of regional aquifer systems. Water-supply planning and wellfield layout for municipal, industrial and governmental projects have been major activities. Contamination and water-quality projects include assessment of NPDES and groundwater discharge effects on surface-water standards, landfill leachate work, evaluation of groundwater discharge permits, UIC and UST projects, geothermal project effects, salt-water intrusion, and detailed characterization and three-dimensional aquifer modeling of uranium mine and Superfund sites.

Government employment in East Africa, Western Australia and in New Mexico included water-supply development in remote areas, regional aquifer studies, management of water-resources programs, and acquisition and protection of groundwater rights. Consulting experience is in the northeast and western United States, the Gulf Coast, and in northern Alberta, the Yemen Arab Republic, Ireland, Peru, Chile, Mexico and Honduras. Major consulting projects have included wellfield development for the World Bank and USAID in the middle east; litigation support for the United States in several basin-wide adjudications; dewatering design and environmental assessment for major mines in Nevada, Alberta and Ireland; dam and reservoir seepage modeling studies on the Rio Grande; regional water planning in New Mexico and for the State of Mississippi; and permitting for municipal and agricultural water in southwest Florida and New Mexico.

Formal testimony has been presented as an expert witness in hydrology and hydrogeology in Federal and State Courts, and in administrative hearings on more than 40 cases.

PUBLICATIONS:

"Hydroscience for Findings of Fact," in Fundamentals of Water Law, National Business Institute, Albuquerque, New Mexico November 9, 2006.

"Hydrology and Administration of Domestic Wells in New Mexico," (with Steven E. Silver), Natural Resources Journal, Fall 2005 Vol. 45, No. 4.

"The European Water Framework Directive and Groundwater Planning in American Southwest," Geological Society of America Abstracts with Programs Volume 35, No. 6, September 2003, and
http://gsa.confex.com/gsa/2003AM/finalprogram/abstract_62815.htm.

"The Ogallala Aquifer: Where's the Water?" New Mexico Water Law Conference, August 26 – 27, 2002, CLE International, Santa Fe, New Mexico.

"Overabstraction as a Failure in Obligations," World Bank Groundwater Management Study Tour, April 29, 2002, Albuquerque, New Mexico.

"Water, Planning, and Administration in the Middle Rio Grande Basin," New Mexico Journal of Science, Volume No. 38, 1998.

"Groundwater Modeling in the Lower Rio Grande," in Water Challenges on the Lower Rio Grande, Proceedings of the 43rd Annual New Mexico Water Conference, October 22 – 23, 1998.

"Surface Water and Groundwater for Growth in the Albuquerque Basin," in The Water Future of Albuquerque and Middle Rio Grande Basin, Proceedings of the 39th Annual New Mexico Water Conference, 1994.

"Demonstrating Impairment of a Water Right," New Mexico Natural Resources Law Reporter, 1993.

"The Use of Consultants in Water Rights Matters," Cambridge Institute Seminar Proceedings, Understanding and Protecting Your Water Rights in New Mexico, 1992.

"The Transition from Ground-Water Mining to Induced Recharge in Generalized Hydrogeologic Systems," Proceedings Focus Conference on Southwestern Ground Water Issues, 1988 (with A.B. Mayer).

"Water Appropriation and Transfer in a General Hydrogeological System," Natural Resources Journal, Vol. 28, No. 2, Spring 1988, pp. 269-291.

"Quantitative Analysis of Existing Conditions and Production Strategies for the Baca Geothermal System, New Mexico," Water Resources Research, 1984 (with C.R. Faust, J.W. Mercer and S.D. Thomas).

"Discussion of Deprivation Contribution and Interference Effects on Multiple Wells in a Common Aquifer," Ground Water, 1976.

"Flow-through of Water and Chloride Ion in a Water Table Aquifer of the Bassendean Sands, Perth Basin," Institution of Engineers, Australia, Hydrology Symposium, 1973.

"Hydrological Investigation of the Magnesian Limestone of Southeast Durham, England - A Discussion," Journal of Hydrology, 1973.

"Pilbara Region - Outline of Groundwater Resources," Western Australia Geological Survey Record No. 73/21, 1973.

"Outline of Ground Water at the Fortescue River Basin," Western Australia Geological Survey, Hydrology Report No. 997, 1972.

"Geology and Groundwater at the Agaton Exploratory Bore Field," Agaton Project, Perth Basin, Western Australia Geological Survey Record No. 72/11, 1972 (with J. R. Passmore).

"North Gnangara Sand Beds Aquifer - Tentative Water Balance and Yield Analysis," Western Australia Geological Survey Record, 1972/14.

"Saturated Sands at Yenart Soak," Western Australia Geological Survey Annual Report, 1971.

"Summary of Aquifer and Bore Characteristics of North Gnangara Borefield," Western Australia Geological Survey Annual Report, 1971.

PROJECT EXPERIENCE IN WATER SUPPLY:

- Santa Fe, New Mexico: Planning and implementation of 300 AFY wellfield for school.
 - Arkansas River: Advise on management action for sustainability of High Plains aquifer.
 - Valencia County, New Mexico: Assess effect of transferring priority rights to new agricultural operation.
- Colfax Country, New Mexico: Advise on issues of multiple use and water storage in operation of Acequia on Coyote Creek.
- Ruidoso, New Mexico: Hydrogeologic support for protest of agriculture right transferred to municipality.
 - Middle Rio Grande, New Mexico: Evaluate wellfield operations and water rights alternatives for 100-year future of microchip fabrication facility.

- East Mountains, Sandoval County, New Mexico: Sandoval County subdivision water availability report. Specify test wells, aquifer testing, groundwater model development, compute 100-year effects near San Pedro Creek.
- East Mountains, Bernalillo County, New Mexico: Oversee redrill/ deepen, test well, compute 100-year yield, specify pump and setting.
- Bernalillo County, New Mexico: Aquifer testing for proposed subdivision in Rio Puerco Basin of Bernalillo County, New Mexico.
- Estancia Basin, Santa Fe County, New Mexico: Evaluate yield and service life of wells for 7,000 acre Master Plan in Santa Fe County.
- Jemez Basin, New Mexico: Integrated Jemez Basin model. Model used to run Pueblo/Non-Pueblo adjudication proposals and projects.
- Silver City, New Mexico: Water plan supplement on Silver City projected water use and wellfield service.
- Estancia, New Mexico: Evaluate brackish and fresh water resources for regional water system, determine size of development.
- Carlsbad, New Mexico: Evaluate sustainable amount of Ogallala wellfield development of Double Eagle and Tatum water rights.
- Pueblo of Sandia New Mexico: Evaluate BOR proposal for storage release of Pueblo waters in Middle Rio Grande.
- Grant County, New Mexico: Subdivision hydrology report for County and State review.
- Moriarty, New Mexico: Hydrologic support for OSE administrative hearing on school return flow.
- Pueblo of Sandia, New Mexico: Evaluate effects of application on Middle Rio Grande, exhibit preparation, rebuttal exhibit preparation, expert witness testimony.
- Stanley, New Mexico: Provide second opinion on encrustation and reverse-osmosis feed on performance of well.
- Colfax County, New Mexico: Evaluate power transmission line impact on ranch water features.

- Rio Chama Basin: Hydrologic impact analysis and development of exhibits for hearing on change-from irrigation to mountain-lake water use.
- Tinaja, New Mexico: Documentation for declaration of ranch ground and surface water rights.
- Valencia County, New Mexico: Hydrologic support for application for change of point-of-diversion from Middle Rio Grande Conservancy District canal to supplemental well.
- Roswell Basin, New Mexico: Provide groundwater modeling of priority shutdown scenarios.
- Eagle Nest, New Mexico: Identify lands associated with early water-right claims.
- Sandoval County, New Mexico: Assess water availability for 31-section new town Subdivision Master Plan.
- Carlin Trend, Nevada: Scoping study of dewatering requirement at Gold Prospect in Carlin Trend.
- Santa Fe, New Mexico: Water source assessment, water demand study, modeling impacts from planned wells, evaluate water use options and drilling plan and specifications.
- Raton Basin, New Mexico: Advise on numerical modeling approach, and location for monitoring effects of coal/methane development in Raton Basin.
- Pecos Valley, New Mexico: Develop maps and database to identify potential lease wellfield sites for Pecos Roswell to Brantley Lake.
- San Juan River, New Mexico: Support Power Plant with hydrologic forecasts of effects of shortage in San Juan Basin New Mexico in year 2003.
- Jemez River, New Mexico: Comprehensive basin water study with surface water, groundwater model and administrative reports for adjudication settlement of water claims.
- Albuquerque South Valley, New Mexico: Hydrologic and water quality conditions, quantify impacts from proposed well, identify alternative well locations.

- Española Basin, New Mexico: Review LANL models of Española Basin area.
- Puerto de Luna, New Mexico: Evaluate community water-supply source.
- Doña Ana County, New Mexico: Hydrological support of Doña Ana County groundwater permit acquisition.
- Silver City, New Mexico: Prepare exhibits on effects of change in place and purpose of use of Gila River Basin water from mine to Municipal use.
- Hidalgo County, New Mexico: Examine seven wells on 2400-acre tract near Lordsburg, New Mexico for industrial water supply.
- Portales, New Mexico: Evaluate Municipal wellfield acquisition for yield and lifetime.
- Pecos Basin, New Mexico: Technical support for Ad-Hoc Committee on New Mexico delivery under Pecos River Compact. Evaluate 21 alternative management actions.
- Deming, New Mexico: Prepare exhibits for New Mexico Office of the State Engineer hearing for water supply for generating station in Luna County.
- Gallup, New Mexico: Basic data on hydrology and aquifer conditions for industrial, domestic and power plant development on 27,000 acres near Gallup, New Mexico.
- Clovis, New Mexico: Support power plant with water availability, service-life, and information for planning, permitting and construction.
- Rio Puerco, New Mexico: Plan water availability for three-section subdivision.
- Placitas, New Mexico: Water availability plan for subdivision.
- Colfax County, New Mexico: Assess reservoir yield on tributary of Canadian River.
- Lordsburg Basin, New Mexico: Evaluate aquifer yield and lifetime for power plant water supply.
- Colfax County, New Mexico: Assess hydrologic affect of methane development on inter-related stream wetlands and wells.
- Pecos Basin: Publish data summary of stream gaging in the Basin.

- Pecos Basin: Analysis of Stream conveyance efficiency in the Acme Reach.
- Silver City, New Mexico: Evaluate effects of application to change diversion from surface water to alluvial wells of Arroyo de Arenas.
- Bernalillo, New Mexico: Evaluate Town of Bernalillo's application to the New Mexico Office of the State Engineer.
- Las Cruces, New Mexico: Represent Protestants in Lower Rio Grande application for groundwater.
- Sandia National Laboratories, New Mexico: Hydrologic evaluation in the Sandia North area perched water and 3-D saturated/unsaturated model simulation.
- Estancia Basin, New Mexico: Prepare statement of hydrologic effect of 3000 acre feet per year new appropriation in the Estancia Basin.
- Albuquerque Basin, New Mexico: Prepare hydrologic evidence on effects of 12,000-acre feet per year application for wellfield in Albuquerque Basin. Expert witness testimony.
- Gallinas Creek, New Mexico: Compile data and assess potential for improved efficiency for Gallinas Creek municipal and irrigation water operations in court-ordered mediation.
- Statewide, New Mexico: Support State Water Plan for New Mexico. Create GIS maps, figures, and water budgets on framework assessment.
- Rio Grande and Pecos Basins, New Mexico: Examine domestic well effects in rural and urban areas of New Mexico per Senate Joint Memorial.
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- Tularosa Basin, New Mexico: Evaluate impact and effect of ponds on an adjacent spring with private water.
- Lincoln County, New Mexico: Support protest of City of Ruidoso Office of the State Engineer Office application for return flow reuse and in protection of downstream ranch water.
- Santa Fe County, New Mexico: Develop 23,000 acre ranch water claim based on capacity of existing well facilities.

- Vermejo River, New Mexico: Support application to transfer water to lakes and agricultural areas. Design and install gaging system.
- Moriarty, New Mexico: Develop return flow plan, application to enlarge place of use and alternatives to serve Middle and High School at Edgewood and Mountain View, New Mexico.
- Placitas, New Mexico: Calculate effects of transfer of water rights from Tome to Placitas, New Mexico.
- Santa Fe, New Mexico: Develop water plan for subdivision with basic data report management alternatives, modeling of effects, drill site selection, permit support.
- Rio Rancho, New Mexico: Evaluate effects of Rio Rancho municipal water application on shallow and deep water resources of Albuquerque basin.
- Lower Rio Grande, New Mexico: Member of Technical Committee supporting Federal mediation in Lower Rio Grande. Provide gain/loss data and effect of changed operation.
- Pojoaque River, New Mexico: Support United States Department of Justice in Federal court case on effects of irrigation development and on validity of numerical models.
- Costilla Creek, New Mexico: Support administration of Costilla Creek Compact with field inspection, delivery problems, GIS mapping, gaging, data logging, water accounting and recommendations for improvement.
- Middle Rio Grande, New Mexico: Evaluate City of Albuquerque program of testing and design of infiltration galleries and Ranney wells. Review effect on Middle Rio Grande Conservancy District structures.
- Belen, New Mexico: Evaluate prospect for water supply from deep aquifers of Middle Rio Grande Basin.
- Estancia Basin, New Mexico: Pump test two wells for subdivision water availability. Report to Bernalillo County and Office of the State Engineer.
- Isleta, New Mexico: Advise with respect to drilling dispute on lost circulation.
- Santa Fe, New Mexico: Training to State Agency staff on GIS integration with MODFLOW modeling.

- Isleta, New Mexico: Hydrology support for triennial revision of Water Quality Standards on a reach of the Rio Grande. Council presentation, review draft standards, arsenic criterion, NPDES permitting, and public hearing support.
- Potrillo Hills, New Mexico: Evaluate hydrologic effect of a change in water use from a ranch in the Potrillo Hills to the Santa Teresa Port of Entry, New Mexico.
- Santa Teresa, New Mexico: Support New Mexico Border Authority with water-rights hearing information of effect of transfer from Lower Rio Grande to Santa Teresa Port of Entry.
- Crescent Valley, Nevada: Second opinion on mine dewatering requirement and schedule based on response to pumping since October 1996, using appropriate models.
- Estancia Basin, New Mexico: Prepare plans and specifications for two permanent observation well nests. Supervise installation and testing of wells to 700 feet depth.
- Clovis, New Mexico: Hydrologic support for agricultural users in protest of municipal water-rights transfer on the Ogallala Aquifer, Eastern New Mexico.
- Churchrock, New Mexico: Hydrologic support on hydrologic effects of New Mexico State Engineer water permit for uranium solution mine project near Churchrock, New Mexico.
- Bernalillo County, New Mexico: Provide hydrologic support for Bernalillo County application to appropriate 7,725 AFY and depletion of Rio Grande.
- Las Vegas, Nevada: Evaluate hydrologic effects of appropriation of 2,000 AFY in Las Vegas Valley on other water use in basin. Prepare affidavit for use in adjudication.
- Carlsbad, New Mexico: Hydrologic modeling and water planning for use in municipal water rights transfers and long-term municipal water supply.
- Estancia Basin, Central New Mexico: Develop groundwater flow model of Estancia closed basin for use in water rights, water supply, availability and administration of the basin.
- Stanley, New Mexico: Hydrologic support for 2,400 AFY application to appropriate water in the Estancia Basin for public supply purposes. Prepare evidence on hydrologic effects to support new administrative criteria for basin.

- Lower Rio Grande Basin, New Mexico/Texas: Hydrologic support and investigation for court appointed Hydrology Committee in litigation and settlement of Lower Rio Grande issues of sources of water and effects of development.
- Middle Rio Grande, New Mexico: Hydrologic effects and water rights impairment analysis of transfer of diversion point and use from San Marcial Valverde surface water to a manufacturing plant using groundwater in Sandoval County. Provide expert witness testimony at SEO administrative hearing.
- Bosque del Apache National Wildlife Refuge, Socorro County, New Mexico: Quantify effects of water spreading on wildlife refuge, appraise groundwater conditions, develop permit application and provide representation to New Mexico State Engineer Office.
- Carlin, Nevada: Assessment of dewatering requirement and layout of structures for water control in slope of mine highwall. Interpretation of aquifer tests.
- Sandia Mountains, New Mexico: Hydrologic evaluation of subdivision development effects on San Pedro and La Madera Creeks.
- Chihuahua, Mexico: Field investigations and evaluation of effects of Etapa II wellfield expansion on El Sauz agricultural developments.
- Sangre de Cristo Mountains, Santa Fe County, New Mexico: Evaluate hydrologic effect and water supply availability for subdivision development.
- Las Vegas Valley, Nevada: Hydrologic representation for negotiation of water rights between Nevada, U.S. agencies and Tribe. Apply models of basin to appraise hydrologic impacts of new water right at levels of 7,500 to 15,000 AFY including drawdown, basin water balance, water quality and subsidence effects.
- Tesuque Creek, New Mexico: Hydrologic evaluation of groundwater effects of hotel development and return flow quantities for lease of water.
- Bosque del Apache, New Mexico: Documentation of water-right administrative history and quantification of consumptive use on 6,000-acre wildlife refuge.
- Rio Elqui, Chile: Inspection and interpretation of underground mine water situation with projection of dewatering performance and flow in mine workings at elevation 3800 meters in Andes.
- Tonque Arroyo, New Mexico: Hydrologic opinion on administrative record of water rights for use in development of destination resort on Indian Pueblo lands.

- Rio Chama and Rio Santa Cruz, New Mexico: Hydrologic support for Indian Pueblo water claims based on availability of surface water and groundwater, historic uses and future demands.
- Pojoaque River Basin, New Mexico: Hydrological support for negotiation of groundwater and surface-water rights among Federal, State and private water claims.
- Jemez River Basin, New Mexico: Water resource and hydrologic support. Water claim in negotiation. Preparation of hydrologic factbook and advisory services and representation.
- Rio San Jose, New Mexico: Comprehensive basin assessment of historic natural water supply, water uses, future demands and groundwater sources.
- Carlin, Nevada: Plan for injection of mine dewatering water in foothills of Tuscarora Mountains as hydrologic barrier controlling influence of mine activities.
- Harris Creek, Catron County, New Mexico: Evaluation of sources and yield of streams and springs and develop settlement of water-right claims.
- Boulder Basin, Nevada: Hydrologic support for litigation of mine-water disposal effects.
- San Juan River, New Mexico: Evaluation of effects of generating station water use on Navajo Reservoir contract water demands and on prior rights and shortages.
- City of Santa Fe, New Mexico: Subdivision lot-size assessment based on availability of water.
- San Miguel County, New Mexico: Inventory of wells, water use, future sources of groundwater, aquifer tests to quantify yields, and evaluation of hydrologic effects of commingling wells on extensive ranch lands.
- Middle Rio Grande, New Mexico: Evaluate effects of Albuquerque municipal wellfield expansion on irrigation canal and diversion supplies based on application of Albuquerque Basin hydrogeologic model.
- Northern Sangre de Cristo Mountains, New Mexico: Evaluation of water resource and administrative status of water rights on extensive ranch lands.

- Doña Ana County, New Mexico: Specification and hydrologic supervision of drilling 1,000-gpm capacity public supply well for regional water system. Hydrologic support for water-rights transfer to wells.
- Animas River, New Mexico: Hydrologic evidence on effects of an application to appropriate 30,000 AFY of surface water for municipal use.
- Farmington, New Mexico: Aerial photographic interpretation and quantification of historical use of water for irrigation on County fairgrounds properties. Presentation of testimony.
- Rio Rancho, New Mexico: Hydrologic effects on surface water and groundwater of microchip manufacturing plant wellfield in Rio Grande basin-fill aquifer. Presentation of testimony.
- Santa Fe County, New Mexico: Ranch well and water-right review of resource and administrative status of lands west of City of Santa Fe.
- Seboyeta, New Mexico: Inspection and plan for watershed management in extensive ranch lands in Rio Puerco basin for control of erosion and restoration of perennial baseflow.
- Las Cruces, New Mexico: Numerical model calculation of University wellfield capacity for 40 and 100-year term, and identification of sources of water, capture zone delineation, and water-quality projections.
- Manzano Mountains, New Mexico: Subdivision water availability and effect on prior water wells.
- Tularosa Basin, New Mexico: Ranch water inventory with geologic, well history, aerial photograph interpretation, irrigated acreage delineation, and conclusions on administrative standing of water rights.
- Gila River Basin, Arizona: Hydrologic evaluation of Federal Court findings on interrelationship of groundwater and surface water under Arizona and Federal law.
- Changkeng, China: Hydrologic assessment of a planned open-pit gold mine in karst geology on tributary of river Xi. Analyze available data on groundwater and surface water resources, including borehole, pump test, spring flow, precipitation and gaging data. Assess feasibility of dewatering operations and prepared preliminary cost estimates.

- Cañada Ancha, Santa Fe County, New Mexico: Field testing and model evaluation of the hydraulic connection between the Rio Grande and a shallow alluvial aquifer.
- Santa Fe, New Mexico: Development of a water-supply plan for western Santa Fe County for use in County-wide development.
- Galisteo Creek, New Mexico: Evaluation of water availability and hydrologic effects of a proposed residential subdivision. Ensure regulatory compliance with County land development code regarding development water supplies.
- Carlin Trend, Nevada: Development of a numerical model (MODFLOW) for evaluation of an open-pit mine dewatering project. Analysis of extensive pump test, monitoring well and streamflow data for hydrogeologic site characterization and model calibration.
- Albuquerque, New Mexico: Investigation and declaration with the State Engineer Office of the historic water rights associated with a 45-acre school parcel in urban area.
- Albuquerque, New Mexico: Hydrologic investigation and characterization of the origin and extent of saturated soils at a residential subdivision.
- Lake DeSmet, Wyoming: Advisory services in preparation for litigation on the hydrologic effect of a change in reservoir stage on coal reserves, the efficacy of a slurry trench for protection of coal reserves, the delineation of wetlands, and the water quality of a reclaimed coal mine site.
- Crownpoint, New Mexico: Analysis of hydrologic and water-quality effects of a proposed in-situ uranium solution mining project in response to a Draft Environmental Impact Statement. Evaluate restorability of aquifer, excursion control, exemption from Underground Injection Control standards and brine disposal alternatives.
- Morenci, Arizona: Yield analysis for wellfield in tributary of Gila basin for use in mine and mill water supply.
- Cajamarca, Peru: Mine hydrology study for feasibility reports involving dewatering, water supply and hydrologic effects.
- Kelley Creek Basin, Nevada: Review and commentary on three-dimensional groundwater flow model focusing on water-balance for the pre-mining basin for water-rights purposes.

- Battle Mountain, Nevada: Assessment of hydrologic effects of mine development in the Shoshone Range, including geothermal response at Beowawe area.
- Albuquerque, New Mexico: Field tests and water-balance study to determine the source of water in soils in a residential subdivision involving an inverted water table.
- Maggie Creek Basin, Nevada: Evaluate hydrologic effects of mine dewatering on fisheries resources of Tuscarora Mountains.
- Kilkenny, Ireland: Evaluate dewatering requirements and hydrologic effects, including those on fisheries, of dewatering an underground mine.
- Albuquerque, New Mexico, South Valley: Hydrology effect of 100,000 acre-foot superfund remediation system. Assess depletion of Rio Grande and conservation of stored aquifer resource.
- Animas River, New Mexico and Colorado: Yield analysis of surface-water system and downstream-depletion impacts on existing water users due to operation of Animas-La Plata Project.
- State of Mississippi: Water-planning advisor to State legislative task force on groundwater plan for Mississippi.
- Taos Plateau, New Mexico: Preparation of basin-wide groundwater development plan and three-dimensional groundwater flow model of regional aquifer system.
- Colfax County, New Mexico: Regional water plan, groundwater inventory and impacts of 40-year demands.
- Baton Rouge, Louisiana: Yield analysis and wellfield design for aquifers at industrial site requiring 40 million gallons per day.
- Boulder Valley, Nevada: Reservoir seepage investigation for 500-acre surface storage reservoir.
- Grant, Luna, Hidalgo and Catron Counties, New Mexico: Regional water plan for four counties in southwestern New Mexico.
- Carlin Trend, Nevada: EIS hydrology report for mine-dewatering impacts at Carlin.
- Sarasota, Florida: Simulation of agricultural wellfield effect on municipal wells with salt-water transport impacts.

- Cochiti Dam, New Mexico: Development of dewatering plan and three-dimensional surface- and groundwater flow model to correct waterlogged lands below Cochiti Dam.
- Elko, Carlin Trend, Nevada: Preparation of mine-dewatering model for use in mine planning in north-central Nevada.
- Jemez River, New Mexico: Preparation of a three-dimensional model to display the effects of development of wellfields in the Jemez River alluvium in terms of aquifer drawdown and surface-water depletion.
- Santa Fe, New Mexico: Simulation of effects of new withdrawals of groundwater in Santa Fe Group aquifers at the municipal wells.
- Grants, New Mexico: Aquifer and stream simulation three-dimensional model of the Rio San Jose, New Mexico.
- Jemez Mountains, Baca Location, New Mexico: Study of geothermal hydrology, ion-balance and potential flow depletion at the Jemez Mountains, New Mexico.
- Grants, New Mexico: Quantitative studies of hydrological impacts of development of the Rio San Jose, New Mexico.
- Roswell Basin, Otero County, New Mexico: Preparation of three-dimensional digital model of flow systems in Permian rocks of the Pecos River Basin.
- Santa Fe County, New Mexico: Review and parameter specification for U.S. Geological Survey three-dimensional model of groundwater flow in Rio Pojoaque Basin, a tributary of the Rio Grande.
- Sanaa and Taiz, Yemen Arab Republic: Field review of Sanaa, Yemen wellfield for World Bank. Site selection and feasibility tests for aquifers for municipal supply near Taiz, Yemen for U.S. Agency for International Development.
- Ft. McMurray, Alberta, Canada: Design and supervision of depressurization for Athabaska tar sand open-pit mine. Parameter estimation and geotechnical review of three-dimensional digital model of gas-driven aquifer.
- Perth, Western Australia: Quantitative flow system studies of coastal aquifers of the Perth Basin, including feasibility studies for a 20-MGD (91,000 meters³/day) municipal wellfield.

- Pilbara District, Western Australia: A regional inventory of groundwater in the West Australian Hammersley-Pilbara Iron Ore Province.
- Northeastern Province, Republic of Kenya: Resource surveys for the Water Development Division of the Government of Kenya.

PROJECT EXPERIENCE IN WATER QUALITY:

- Edgewood, New Mexico: Prepare discharge plan renewal application for Middle School.
- Raton Basin, New Mexico: Advise on numerical modeling approach, and location for monitoring effects of coal/methane development in Raton Basin.
- Albuquerque South Valley, New Mexico: Hydrologic and water quality conditions, quantify impacts from proposed well, identify alternative well locations.
- Moriarty, New Mexico: Groundwater discharge plan for Elementary School.
- Vermejo Creek, New Mexico: Evaluate oil and gas-produced water disposal plan. Comment on test procedures and hydrologic effects.
- Sells, Arizona: Provide information on hydrology ground pit potential for contamination in San Simon Basin, Arizona.
- Rio Rancho, New Mexico: Delineation of capture zone and system for hydraulic control of solvent plume in Middle Rio Grande Basin.
- Albuquerque, New Mexico: Natural Resource Damage Assessment for solvent plume in Middle Rio Grande Basin. Valuation of groundwater resource.
- Santa Fe County, New Mexico: Hydrologic evaluation of an application for landfill permit.
- Choloma, Honduras: Assessment of hydrologic and water-quality impact of regional wellfield water-supply development.
- Seboyeta, New Mexico: Uranium mine tailings hydrologic characterization and management plan. Field work, data interpretation, and modeling of groundwater conditions and migration.

- Santa Fe County, New Mexico: Subdivision report on projected 100-year effects of septic tank effluent on groundwater and wells.
- Rio Grande, Rio Arriba County, New Mexico: Development and hydrologic support for water-quality standards on water of Indian Tribe treated as a State under Clean Water Act.
- Las Cruces, New Mexico: Numerical model calculation of University wellfield yield-capacity for 40 to 100-year term, and identification of sources of water, capture zone delineation, and water-quality projections.
- Albuquerque Airport: Assessment of sources of volatile organic contamination of commercial property west of airport.
- Albuquerque South Valley: Field sampling for toxic soils at site of demolition of chemical storage facilities.
- Seboyeta, New Mexico: Review of dewatering and water quality control studies of a closed uranium mill tailings pile. Assess tailings hydraulics and water balance and drainage and pumping systems. Evaluated groundwater quality to determine impact from tailings water. Review interpretation of data from field testing characterization program (test borings, laboratory analysis, pump testing, and cone penetrometer testing). Examine alternatives to enhance drainage. Assist with regulatory representation with the New Mexico Environment Department, the New Mexico State Engineer Office and the U.S. Nuclear Regulatory Agency.
- Crownpoint, New Mexico: Analysis of potential hydrologic and water-quality effects of a proposed in-situ uranium solution mining project for use in response to a Draft Environmental Impact Statement. Evaluate restorability of aquifer, excursion control, exemption from Underground Injection Control standards and brine disposal alternatives.
- Albuquerque, New Mexico: Investigate the groundwater hydrology of a light industrial site. Performed site inspection, review of historical references and analyzed historic gradients. Review State regulatory agency files to determine the potential for nearby contaminated groundwater to impact the subject site.
- Albuquerque, New Mexico: Site inspection and regulatory review of a site investigated by the New Mexico Environment Department for potential inclusion to the National Priorities List of Superfund.

- Albuquerque, New Mexico: Investigate the potential contamination impacts of a closed municipal solid waste landfill on a nearby planned water-supply well.
- Rio Grande, New Mexico: Develop water-quality standards for a reach of the Rio Grande and adjacent surface-water bodies in north-central New Mexico. Evaluate upstream water quality and hydraulic data and effects on Clean Water Act jurisdictional waters. Perform analyses of the scientific basis of specific criteria and resulting effects on upstream permitted discharges.
- Albuquerque South Valley, New Mexico: Identify flow-pattern in groundwater at industrial site to indicate offsite sources of potential contamination.
- Albuquerque South Valley, New Mexico: Compile historical land- and water-use information and evaluate use of environmental tracers for active Superfund site.
- Albuquerque Downtown site, New Mexico: Advise on Hazardous Ranking System status of site proposed for listing.
- Rio Grande, New Mexico: Assess impacts on water-quality standards from City of Albuquerque water treatment plant discharges including arsenic effects on fish consumption.
- Rio Grande Valley, New Mexico: Evaluate the timing and extent of contamination in soil and water from an underground storage tank site. Testimony presented in U.S. District Court.
- Rio Grande, New Mexico: Development of Water Quality Standards for reaches of the Rio Grande on three Pueblos treated as States under the Clean Water Act.
- State of Mississippi: Water-planning advisor to State legislative task force on groundwater plan for Mississippi.
- Colfax County, New Mexico: Regional water plan, groundwater inventory and impacts of 40-year demands.
- Grant, Luna, Hidalgo and Catron Counties, New Mexico: Regional water plan for four counties in southwestern New Mexico.
- Carlin Trend, Nevada: EIS hydrology report for mine-dewatering impacts at Carlin.
- Sarasota, Florida: Simulation of agricultural wellfield effect on municipal wells with salt-water transport impacts.

- Jemez Mountains, Baca Location, New Mexico: Study of geothermal hydrology, ion-balance and potential flow depletion at the Jemez Mountains, New Mexico.
- El Paso, Texas: Hydrologic assessment of soil and groundwater contamination conditions at a casting-foundry site in the Rio Grande Valley.
- Albuquerque, New Mexico: Hydrologic investigation and remediation design and operation for UST site.
- Corrales, New Mexico: Hydrologic investigation and remediation design and operation for UST site.
- Tatum, New Mexico: Hydrologic investigation and UST site characterization on behalf of the State of New Mexico.
- Barelas, New Mexico: Hydrologic investigation and UST site characterization on behalf of the State of New Mexico.
- Albuquerque, New Mexico: Investigation of 1,500-gallon tanker spill on I-25 and associated contamination.
- Taos, New Mexico: Nitrate contamination source and mitigation study for municipal effluent and sludge in the Rio Pueblo de Taos, a tributary of the Rio Grande.
- Acoma, New Mexico: Water-quality impacts of municipal sewage effluent transported via groundwater to springs in Rio San Jose, New Mexico.
- Laguna, New Mexico: Environmental assessment of groundwater levels and water quality associated with reclamation of the Jackpile open-pit uranium mine.
- Woodbridge, Connecticut: Landfill leachate ion-balance studies for Connecticut Department of Environmental Protection.

EXPERT TESTIMONY:

- NM Office of the State Engineer (February 14 - 17, 2005) – support downstream water user in protest of Ruidoso OSE application for return flow reuse and in protection of Ranch water.
- NM Office of the State Engineer (December 7 and 8, 2004) – support for application to change prior surface right to new farm operation from wells to supplement shortage.
- NM District Court for New Mexico (September 12 - 13, 2002) – on an appeal to State Court in Silver City of application to change from surface water to groundwater for irrigation in the Mimbres Basin.
- NM Office of the State Engineer (July 26-27, 2001) – on an application to change from surface to groundwater for irrigation in Mimbres Basin.
- NM Office of the State Engineer (January 19, 2001) – on the stream depletion associated with a new appropriation of 12,000 AFY for municipal purposes.
- U.S. District Court for New Mexico (August 2000 – February 2001) – a series of mediation and court hearings on the habitat requirements and irrigation water-use impacts on the endangered Rio Grande Silvery Minnow.
- NM Office of the State Engineer (November 29-30, 2000) – on the hydrologic effects of a six-AFY appropriation of groundwater in Placitas, New Mexico.
- NM Office of the State Engineer (January 25 - February 5, 1999) - on the hydrologic effects of an application to appropriate 2,400 AFY from Estancia Basin.
- U.S. District Court for New Mexico (June 11, 12 and 15, 1998) - on the stream depletion effects of a Federal reserved water right on the Pueblo of Nambe (NM v. Aamodt).
- NM Office of the State Engineer (March 26, 1998) - on an application to change place of use from an underground mine to in-situ uranium mining near Churchrock, New Mexico.
- NM Office of the State Engineer (March 10, 1998) - on an application to change location, place and purpose of use from agriculture to a four-year transfer to the Santa Teresa Port of Entry.

- NM Office of the State Engineer (March 3, 1998) - on a series of seven applications to combine wells and change place and purpose of use from agriculture to municipal wells in Clovis, New Mexico.
- NM State Engineer Office (August 4-8, 1997) - on the hydrologic effects on other water uses, and conservation of the resource due to a transfer of water rights from San Marcial to Rio Rancho, New Mexico.
- NM State Engineer Office (August 4, 1995) - on the aerial photograph interpretation of historical use of water on San Juan County Fairgrounds property.
- NM State Engineer Office (April 19, 1994) - on the hydrologic effects of an application to appropriate groundwater for microchip manufacturing at Rio Rancho, New Mexico.
- U.S. District Court for New Mexico (February 16, 1993) - on the hydrologic characteristics of the Tesuque Formation, basin yield, water balance, and water quality (NM v. Aamodt).
- U.S. District Court for New Mexico (June 1-4, 1992) - on the timing and characteristics of a gasoline release at a site in the middle Rio Grande valley (Ever Ready v. Ranger, et al.).
- NM State Engineer Office (December 13, 1991) - on an application to transfer water rights to Mountain Ranch Subdivision in the Sandia Underground Water Basin.
- NM District Court for Taos County (February 6, 1990) - on the water-quality impacts of municipal sewage effluent and sludge disposal in a case for condemnation of property.
- FL Division of Administrative Hearings (August 25, 1989) - on an application to the Southwest Florida Water Management District for an agricultural consumptive use permit and the effects on a City of Sarasota wellfield.
- NM State Engineer Office (August 4, 1987) - on an application to change points of diversion and to enlarge the place of use of water from wells at La Madera, New Mexico.
- NM State Engineer Office (June 23-24, 1987) - on an application to combine and commingle wells in Bluewater Basin.

- NM State Engineer Office (April 14, 1987) - on an application to appropriate groundwater for public supply in Magic Valley, Bernalillo County, New Mexico.
- NM State Engineer Office (December 10, 1986) - on an application to commingle and combine wells in Bluewater Basin.
- NM State Engineer Office (August 20, 1986) - on an application for transfer of water rights to wells in Canon Alegre, Sandoval County, New Mexico.
- NM State Engineer Office (June 18, 1986) - on an application for enlarged place of use of wells under RG-26816 for La Madera Water Users Association.
- NM District Court for Cibola County (January 13-14, 1986) - appeal of State Engineer decisions, presented assessment of effects using applicant's three-dimensional computer model of Bluewater Basin.
- NM Environmental Improvement Division (August 20, 1985) - on the effects of City of Grants sewage sludge Discharge Plan DP-60.
- NM State Engineer Office (March 21, 1984; October 30, 1984; December 4, 1984; February 5, 1985; May 1, 1985; and November 21, 1985) - a series of hearings on permits to transfer groundwater to Plains Electric Escalanté Generating Station.
- NM State Engineer Office (January 26, 1983) - on the permit and plan of replacement for Plains Electric Escalanté Generating Station.
- U.S. District Court for New Mexico (January 28, 1981) - aquifer tests and hydrologic simulation of a groundwater development plan for four Pojoaque River Pueblos in NM v. Aamodt.
- NM Public Service Commission (October 2, 1980) - hydrologic constraints on development and longevity of Public Service Company of New Mexico's Baca Unit 1 Geothermal project.
- NM State Engineer Office (April 11, 1980) - on the groundwater permit for Union Geothermal Company's Baca Project.
- NM Water Quality Control Commission (February 7, 1980 and December 3, 1981) - on the reclassification of designated uses and stream standards for the Rio San Jose.
- NM Environmental Improvement Division (January 14-15, 1980) - regarding Bokum Marquez Mine Ground Water Discharge Application.