

Richard A. Rhone, P.E., Senior Consultant



Education

B.S., Civil Engineering, University of Southern California, 1959

Registration

Arizona, California: Registered Civil Engineer

Diplomat American Academy of Environmental Engineers

Background

Mr. Rhone has over 45 years of experience in all aspects of water resources development, engineering, management, and operations, including planning studies related to surface and groundwater resources management, hydrologic studies, watermaster services, water demand estimates, preliminary designs, preparation of bid documents, and cost estimates.

Mr. Rhone also specializes in water rights and water system appraisals, managing and conducting operational studies of conjunctive use projects, and evaluating projects related to the California State Water Project and the Colorado River. Since 1960, he has represented water contractors in numerous matters related to the California State Water Project including contract issues, cost allocations and annual budgets. He has also provided expert testimony before the California State Water Resources Control Board, California Superior Court, and federal court on such matters as water rights, water supply, and water resource development.

Experience

Groundwater Banking Program, Kern County, California, Semitropic Water Storage District.

Semitropic Water Storage District's Groundwater Banking Program has been a primary effort for Mr. Rhone since 1996. The work included completion of the original one million acre-foot Semitropic Groundwater Bank including finalizing contracts for storage of 1 million acre-feet, facility planning, design and construction supervision. The expanded groundwater banking project was developed with Mr. Rhone's aid including project conception, feasibility studies, environmental documentation, and facility planning. The finalization of pre-design activity is under way. The original project stores 1 million acre-feet of water in the groundwater basin; the expansion adds 650,000 acre-feet of storage and up to 200,000 acre-feet per year of return flow to the California Aqueduct. Studies included hydrogeologic modeling, facility planning of pipelines, canals, wells, reservoirs, distribution systems and a well field of 65 wells.

While under Mr. Rhone's direction, Semitropic has constructed several million dollars of facilities including lining of existing canals, expanded and constructed eleven new pumping plants, added over 35 miles of distribution pipeline and constructed numerous production and monitoring wells.

Central and West Basin—Los Angeles County, Water Replenishment District of Southern California.

Participated in the development of and managed one of the largest conjunctive use programs in southern California for the Water Replenishment District of Southern California. Groundwater basins are recharged using local water; water imported from the Metropolitan Water District of Southern California, and reclaimed water from the County of Los Angeles. Project included spreading, well injection, and in-lieu methods to accomplish recharge.

Saw the need and organized in 1980 the San Gabriel River System Groundwater Recharge Committee. This group, which continues to regularly meet, includes all parties concerned with spreading operations along the

river. It coordinates the spreading of local, imported and recycled water so that the groundwater basin is maintained at an optimum level to protect against droughts and to allow room to store wet year water.

Developed an overpumping program to pump an additional 50,000 acre-feet over the court-adjudicated amount from the Central and West Basins of Los Angeles County during droughts.

Performed a hydrogeological analysis to determine the availability of recharge water, storage capacities, direction of movement, basin balance, and subsurface inflow and outflow. Prepared annual reports for the Water Replenishment District of Southern California that summarized activities for the current year and recommended operational criteria and financing of future water purchases.

Verified over 200,000 acre-feet of water rights in Central Basin to determine groundwater production rights for the Water Replenishment District of Southern California.

Managed a continuing water quality monitoring program for the Water Replenishment District of Southern California, including about 200 wells and 10 surface water-sampling points. The program also includes reviewing data collected by the Regional Water Quality Control Board on possible sources of pollution, reviewing federal and state regulations and requirements, investigating wells that exhibit low levels of volatile organic compounds, and developing remediation programs for their removal.

Prepared a report for Central Basin Municipal Water District on the effects of the Alameda Corridor construction on water systems because of the deep trench severing of distribution systems.

In 1987, designated as consulting engineer for the Water Replenishment District of Southern California and served for several months as its interim general manager.

Based on studies and procedures he developed, an in-lieu groundwater replenishment program was instituted in 1978 for the Water Replenishment District of Southern California. Under this program, a groundwater producer with a water right would take surplus imported water and forgo groundwater production, resulting in increased groundwater in storage. The producer was provided with an incentive payment to participate.

Conceived for the Water Replenishment District of Southern California the development of a successful financial incentive program to encourage groundwater producers to extract water with low levels of volatile organic compounds.

Estimated movement of recharge water in Los Angeles County, based on changes in ion concentrations.

Watermaster Service. Appointed by the Court in 1986 as the San Gabriel River Watermaster, representing the lower area. Beginning in 1962 provided technical analysis to support the adjudication of the San Gabriel River. Beginning in 1965 provided staff support for the determination of annual hydrologic conditions and flow as required by the judgment, determined the annual amount of required make-up water deliveries and prepared annual reports. Also testified before the State Water Resources Control Board on operations and water accounting.

Serves as court-appointed Watermaster since 1986 for the Puente Basin, The three person Watermaster verifies pumping rights, determines safe yield operations, and prepares annual reports and holds public hearings.

Prepared documents for the Santa Ana River adjudication including a legal description of the Santa Ana River Watershed.

Provided engineering services to Six Basins Watermaster including drafting of the annual operating safe yield report and the annual report.

State Water Project

While with the California Department of Water Resources, worked on the feasibility study for the State Water Project (DWR Bulletin 78). In addition to route studies, developed and prepared cost allocations of aqueduct facilities; the basic procedures became the basis for the water contracts.

Beginning in 1960, provided technical support to water contractors, including Castaic Lake Water Agency, San Geronio Pass Water Agency, Santa Barbara County Water Agency, Semitropic Water Storage District, Wheeler Ridge-Maricopa Water Storage District, and the Coachella Valley and Desert Hot Springs areas, during water purchase contract negotiations with the Department of Water Resources. Emphasis was on cost allocation from the state to the local water contractor. Also prepared studies of urban and agricultural water demands, local water supply availability, requirements for supplemental water, local facilities required to treat and transport state water, cost estimates, and financial analysis.

Provided staff engineering for Castaic Lake Water Agency from inception through 1982. The effort included project facility planning, water demand estimates, supply availability projections, water balance analysis siting study for a 50-million-gallon-per-day water treatment plant, required storage capacities, cost estimates, and financial and rate studies. Planned the primary distribution system for the Agency taking advantage of the hydraulic head in Castaic Reservoir to minimize pumping by local purveyors. Prepared preliminary plans for the Earl Schmidt Treatment Plant and prepared cost estimate for a bond issue. Project was constructed within budget. Managed the design of a 54-inch-diameter transmission pipeline with a pressure head of 200 pounds per square inch and prepared plans, sizing, right-of-way documents, and routing studies for the pipeline, which ranges from 18 to 60 inches in diameter.

Represented State Water Contractors in reviewing the State Water Project annual budget and in quarterly meetings on design and construction reviews. From this work, has maintained a continuous connection with the State Water Project and particularly the cost and cost allocation thereof.

For the Santa Barbara County Water Agency, participated in the planning of a countywide water system, which included population projections, water demand studies, route studies, and cost estimates of facilities. Prepared financial data for purchasing imported water.

Developed salinity/water quality mass balance flow model of California Aqueduct to study the downstream effects of introducing groundwater into the aqueduct.

Participated in study of capacity limitations in East Branch Aqueduct.

Prepared water supply evaluations for an integrated water resource study for Castaic Lake Water Agency, Los Angeles County, California.

Reviewed allocation of cost of off-peak pumping for the Coastal Aqueduct and reached agreement with water contractors regarding allocation.

Prepared operations studies to determine the capacity of the facility required to serve State Water Project water in Santa Barbara County.

Imperial and Coachella Valleys

Project manager for a conjunctive use and surplus water storage program for the Coachella Valley funded by Coachella Valley Water District and The Metropolitan Water District of Southern California. Projects were developed to use surplus surface water to reduce groundwater overdraft in the Coachella Valley. In dry

periods, Coachella Valley would increase groundwater use to make surface water available to others. Projects included spreading, increased irrigation, and golf course irrigation with canal water.

Participated in the development of the water conservation and transfer program for the Imperial Irrigation District; performed the hydrologic and operational analysis to determine quantities of water to be conserved. An estimated 300,000 acre-feet of water can be saved from a combination of water conservation measures, thus reducing the demand on the Colorado River system. The conservation measures include canal lining, a tailwater recovery system, reservoirs, and gate automation. Total construction amounted to \$125 million for the first-phase savings of 106,000 acre-feet. Conducted before-and-after ponding tests, measured reductions in water releases, analyzed data from the newly installed gaging stations, and monitored water savings.

Prepared hydrologic data, reports, and analyses regarding water operations of Imperial Irrigation District in several litigations regarding water use and the Salton Sea. Studies included a water balance for 500,000 irrigated acres, a salt balance, cost estimates, a hydrologic balance of Salton Sea, and a groundwater flow analysis. Prepared exhibits and testified before the State Water Resources Control Board, California Superior Court, and federal District Court on the district's behalf.

Managed the design of a pumping plant, reservoir and four-mile, 48-inch-diameter pipeline that are part of the Imperial Irrigation District's water conservation facilities.

Other Representative Experience

Developed governance options for the Sacramento Metropolitan Water Authority.

Prepared appraisals of water rights and water facilities in City of Escondido. Also prepared a hydrologic analysis of natural flow in the San Luis Rey River system.

Evaluated water resources management options for the City of Claremont, California. Water supply sources include imported water from the State Water Project purchased through overlying agencies and a local groundwater supply from four unadjudicated basins within the city limits supplied by a private utility. Operations and rate studies were performed. Recommended future development strategy of 15,000 acre-feet of supplemental water and mitigation measures to remediate the rising groundwater problems in the city.

Performed water supply studies for the City of Glendale that included the development of blending procedures to mix high nitrate groundwater with imported Metropolitan Water District of Southern California (MWD) water for municipal supplies. Hydraulics and operations of the distribution system (seven pressure zones) were evaluated. An additional 3,000 acre-feet of groundwater pumped from four wells are blended to supplement the surface supply. Work also included an analysis of a power generation facility from the MWD supply service connection. Provided input on the draft of the water conservation ordinances during the 1991 drought.

In association with another firm, analyzed all pertinent hydrologic data on five major groundwater basins in southern California (Central and West Basin, San Fernando Basin, San Gabriel Basin, Chino Basin, and Orange Basin) for the possible development of conjunctive use operations within the Metropolitan Water District of Southern California's five-county service area.

Project manager and chief designer for 5 and 7.5-million-gallon-per-day water filtration plants for the California Water Service Company.

Determined validity of claim of riparian rights in the Nacimiento Reservoir area through a detailed search of historic ownership.

Performed operation studies of Lake Arrowhead, including the development of a simulation model which can forecast lake levels, using 50-year historical hydrological data. Prepared studies on hydrology of Lake Arrowhead and testified before State Water Resources control Board on Pre 1914 Rights and proper operation of Lake Arrowhead.

Prepared appraisals of water rights and water systems, including wells and canals, of the Anaheim Union Water Company, water rights in San Diego County for City of Escondido and for County Counsel, and water rights in Puente Basin for a golf course.

Prepared an appraisal of the Suburban Water System, conducted rate studies, and assisted in the purchase negotiations for the City of Santa Fe Springs.

Valued the water rights tributary to the Puddingstone Reservoir for the County of Los Angeles.

From 1973 to 1979, responsible for preparation of construction specifications. Prepared specifications for over 30 construction contracts valued at over \$60 million, including canals, pipelines, pumping plants, wells, water treatment plants, water storage tanks, and miscellaneous support facilities. Also prepared about 15 specifications for furnishing of over \$20 million of equipment, including pumps, valves, meters, automatic controls, and electrical equipment.

Prepared studies to locate and size four groundwater spreading facilities for the Mojave Water Agency to be located along the Mojave River Pipeline. Also responsible for major conveyance facility sizing studies. Spreading facility studies considered soil conditions, surface culture, aquifer conditions, water quality, and any impediments to water infiltration.

For Eastside Reservoir, on behalf of land appraisers, prepared analyses of water supply and sewage disposal conditions for several parcels being appraised for The Metropolitan Water District of Southern California.

Supervised groundwater model study that used MODFLOW™ and a solute transport for a desert basin in Southern California. A report was prepared and publicly presented. Also participated in EIR/EIS regarding extraction of water from desert basin for industrial use.

Analyzed the effects of gravel mining on groundwater recharge capabilities for the upper Santa Ana River system in southern California.

On behalf of The Metropolitan Water District of Southern California, prepared analyses and participated in studies of the need for additional pipeline facilities to serve the foothill area of its system, which includes the Raymond Basin and the San Gabriel and San Fernando Valleys.

On behalf of The Metropolitan Water District of Southern California, was project engineer for a salinity management study to evaluate the effects of salinity including the economic impacts. Most salinity inflow to Southern California enters in Colorado River water. The study recommended a strategy for dealing with the short-term and long-term effects of salinity buildup, particularly in groundwater basins and in recycled water projects.

Sited the City of San Bernardino's regional tertiary treatment plant, which utilizes the rapid infiltration/extraction (RIX) process. As part of the Phase I work, located a site whose geologic conditions would allow the intended infiltration to occur.

Prepared a proposal on behalf of a private water company to acquire and operate utilities at Fort Ord, California.

Represented the City of Pomona in developing water rights, technical work and negotiations that led to stipulated Six-Basin groundwater adjudication.

Prepared a hydrologic analysis of moving a water right storage permit from Fallbrook Dam to Lake Skinner.

Studied the extension of a pipeline for conjunctive use purposes from Bunker Hill into the Chino Basin.

Evaluated the cost allocation of a pipeline and other facilities for Tri-City Municipal Water District regarding a disputed allocation; prepared reports, and was deposed.

Publications

- “VOC-Contaminated Water Cleanup Incentive Program,” presented by co-author at American Society of Civil Engineers conference in Baltimore, Maryland, 1992.
- “Ground Water Recharge in the Central and West Coast Basins,” presented at American Society of Civil Engineers, Environmental Section, Reno, Nevada, 1991.
- “Conjunctive Use Operations in the Central and West Coast Basins of Los Angeles County,” presented at U.S. Committee on Irrigation and Drainage, El Paso, Texas, 1991.
- “Artificial Recharge with Imported and Reclaimed Water,” presented at International Symposium on Artificial Recharge, Anaheim, California, 1988.
- “Financing Recharge: The California Experience,” Tempe, Arizona, 1985.