



## *Resume for Robert G. Beeby*

### **ROBERT G. BEEBY, P. E.**

B.S., Irrigation Science, University of California, Davis (1964)

Registered Civil Engineer, California #20997, Arizona #12047, New Mexico #8082

(Retired), South Dakota #3663(Retired) and Washington #40199

Registered Agricultural Engineer, California #24

#### Work Summary

Mr. Beeby has over 40 years of engineering experience in project planning and management of water resources for a wide range of clients, including agricultural and urban water purveyors, power providers, law firms and federal, state and local governmental agencies. He has served as Principal-in-Charge and directed technical studies related to the adjudication of pumping rights of several ground water basins, served on Technical Expert Committees appointed to develop the factual aspects of ground water basins under adjudication, directed the studies leading to water management programs/exchanges between agricultural and urban interests, developed water supply plans to provide cooling water for power plants, developed regional plans for management of surface and ground water resources, directed studies relating to technical and economic feasibility of agricultural water projects and has managed the preliminary design and construction phases of major water resource facilities. Mr. Beeby has provided expert witness testimony since 1980 in numerous proceedings relating to land, water use, groundwater adjudications and water rights. He has testified before a Special Master appointed by the Supreme Court in Arizona v. California (1980), before the California State Water Resources Control Board, California Regional Water Quality Control Boards, California Energy Commission and other judicial or quasi-judicial bodies.

#### Representative Professional Experience

##### Beeby Engineering, Inc., Principal (2009- Present)

Beeby Engineering, Inc. was formed in July 2009 to continue to provide professional services in the field of water resources. Services range from technical studies to evaluate the current and future relationship between water supplies and water demands, conceptual design of facilities to increase reliability of existing water resources, evaluations of current and projected water demands of agricultural and urban areas, preparation of regional hydrologic inventories and water balances, evaluations of the water resource aspects of required environmental documentation for proposed projects that may affect the water resources of an area and litigation support related to water resources such as groundwater basin adjudications, flood damages and water rights.

##### Science Applications International Corporation, Principal Engineer (1998 to 2009)

Mr. Beeby served as Vice President, Engineering Services, with SAIC Engineering, Inc. and a member of the Board of Directors. He served as Program Manager with the parent company, Science Applications International Corporation (SAIC). He was Principal-in-Charge and the Business Area Leader for Water Resource Engineering in the firm's Environmental Sciences and Planning Division and was primarily responsible for the SAIC's consulting engineering activities related to water resources.

Mr. Beeby was responsible for the SAIC engineering activities associated with the planning and management of water resources in the west. His responsibilities included the management and technical direction of the engineering and technical support staff involved in regional water

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resource planning, technical studies related to water supply reliability, environmental documentation and water-related litigation support. Specific activities included, but were not limited to, evaluation and implementation of water banking projects, development of exchange and transfer programs, evaluations of agricultural land and water use, irrigation practices, preparation of hydrologic inventories, analyses of unit water use values for various crops and urban development, analyses of historical hydrologic records of stream flow and diversions, evaluation of geohydrologic data to assess ground water production, analyses of water quality as a constraint on use and economic and financial analyses to assess project feasibility. Many of the water resource investigations directed by Mr. Beeby included the development of the institutional arrangements necessary for project implementation. Mr. Beeby was also responsible for client contact and has presented expert witness testimony in the fields of water rights, water use, surface and ground water hydrology and the technical and economic feasibility of irrigation projects.

Mr. Beeby directed the activities of the firm in the development of long-term water supply planning strategies for the City of Palmdale, California. Specific activities included serving on the Technical Committee for the Antelope Valley Groundwater Basin Litigation, participation in the evaluation of water supplies and demands within the Antelope Valley Groundwater Basin, direction of the engineering activities associated with the development of a ground water recharge project for the City, and serving as the technical representative of the City in the preparation of the Integrated Regional Water Management Plan for the Antelope Valley.

Mr. Beeby directed the activities of the firm in evaluations of the water supplies and demands of the Nipomo Community Services District, a hydrologic subarea of the Santa Maria Valley groundwater basin in California. Specific activities included participation in the Technical Group formed to develop the hydrologic monitoring program and annual reports to the Court on the water conditions of the Nipomo Mesa Management Area, development of water supply shortage criteria for NCSD, evaluation of existing hydrogeologic information, including historical groundwater levels, preparation of urban and agricultural water demands and preparation of hydrologic inventories.

Mr. Beeby directed the activities of the firm in the preparation of a report on the water resources within a portion of the Mojave Water Agency that might be developed for power plant cooling. Development of available water supplies must be consistent with the Mojave Basin Area Adjudication and rules and regulations established by the Court-appointed Watermaster.

Mr. Beeby directed the activities of the firm in evaluating the surface water hydrology of the upper Santa Ana River on behalf of the San Bernardino Valley Municipal Water District and the Western Municipal Water District of Riverside County, both located in Southern California. The findings of recent investigations were used to advance an application filed with the California State Water Resource Control Board by both districts to appropriate water conserved by Seven Oaks Dam, constructed by the U. S. Corps of Engineers, for flood control. The study was initiated to evaluate the potential for utilizing a portion of the inflow to the reservoir after the flood season. Specific activities included, studies related to surface water hydrology of the Santa Ana River system, analyses of the senior water right claimants, analyses of effects of Project implementation on environmental issues, evaluation of a water conservation objective, studies of reservoir operation alternatives, estimates of the amount of flow that might be put to beneficial use, and appearances before the California State Water Resources Control Board.

Mr. Beeby directed the activities of the firm in preparation of an evaluation of the water resources and development potential for a private landowner in San Diego County, California.

## ***Resume for Robert G. Beeby (Continued)***

Specific activities included the preparation of a hydrologic inventory of the available natural water supplies, potential water demands under full development conditions and conduct of assessment of environmental resources to be addressed in the environmental documentation prior to project implementation.

Mr. Beeby directed the activities of the firm for the City of Corona, California in the evaluation of the effects of a well constructed in the Coldwater Basin outside of the boundaries established by mutual agreement on nearby production wells. Specific activities included an evaluation of the geohydrologic conditions of the basin in order to develop operational procedures so both competing entities could sustainably operate the basin. Negotiations are underway.

Mr. Beeby directed the activities of the firm for the City of Rancho Cucamonga in the hydrologic evaluation of a flood event in the City. Specific activities included an evaluation of historical rainfall/runoff relationships and for the specific storm event, effects of land development over time on runoff conditions and the adequacy of the storm water drainage system operated by the City and the private landowner whose property was damaged.

Mr. Beeby directed the activities of the firm in providing technical consulting services to the Friant Water Users Authority (FWUA), a joint powers agency that operates the Friant Division of the federal Central Valley Project (CVP). The Friant Division of the CVP includes roughly 25 water districts, encompassing about one million acres of agricultural land, generally located on the east side of the San Joaquin Valley, California. Water deliveries are about 1.2 million acre-feet annually. SAIC provided technical assistance to FWUA on a number of wide-ranging projects; some of the projects would help to resolve environmental concerns related to the operation of the Friant Division; others relate to improving the water supply reliability. SAIC staff also assisted FWUA staff in the management of consultants retained.

A separate portion of FWUA work directed by Mr. Beeby included an evaluation of a water management partnership with the Metropolitan Water District of Southern California which has the objective of improving the water supply reliability for the 25 FWUA Member Districts and improving the quality of the imported water supply delivered to Metropolitan. Studies included evaluations of additional surface and ground water storage facilities, potential for conjunctive use of surface and ground water supplies, effects of water quality on agricultural production, conveyance facilities to accomplish transfers or exchanges. Specific assignments relate to an appraisal-level evaluation of the potential for increasing the storage capacity of the Mammoth Pool Reservoir and a systems operations study of the entire Friant system and other conveyance facilities located in the San Joaquin Valley to evaluate scenarios to improve operational flexibility.

Mr. Beeby directed the activities of the firm in an evaluation of water rights of the Kern River, located in the southern end of the San Joaquin Valley in California. The specific issue addressed related to the forfeiture of a senior water right to a junior. Specific analyses included the evaluation of over 100 years of hydrologic flow and diversion data. Mr. Beeby provided expert testimony connected with this work.

Mr. Beeby directed and provided senior review for the investigation of the Practicably Irrigable Area (PIA) of a portion of the Lummi Reservation in Northwest Washington. SAIC's client was the State of Washington, Department of Ecology and the State Attorney General. In another PIA investigation, Mr. Beeby was retained as a consultant to the Metropolitan Water District of Southern California to provide historical background and technical advice relating to the continuation of *Arizona v. California* in which he provided expert testimony related to practicably irrigable areas in 1980.

***Resume for Robert G. Beeby (Continued)***

Mr. Beeby provided senior review and direction for an appraisal-level investigation of a project that would include construction of a desalting facility on the Colorado River Aqueduct, two hydroelectric power generating facilities, penstocks and appurtenances. The overall project objectives are to reduce the total dissolved solids content of the water delivered to the Metropolitan Water District of Southern California from the Colorado River, to generate power as the reject stream is discharged to the Salton Sea and to assist in efforts underway to stabilize water levels and salinity of the Salton Sea.

Mr. Beeby directed the activities of the firm in the preparation of an evaluation of the effects of continuing the implementation of the Physical Solution adopted by the Superior Court, Riverside County, to resolve the overdraft situation in the Mojave River Basin and presented expert testimony. Specific activities included projections of the amount of imported water required to bring the five subareas of the Mojave River Basin into hydrologic balance, preparation of estimates of the number of agricultural interests that would be affected and the estimated cost. He also directed the activities of the firm in the preparation of an evaluation of technical reports relating to analyses of the effects of pumping and recharge on native vegetation.

Mr. Beeby directed the activities of the firm and provided engineering and technical assistance to the Tejon Ranch Company in support of their water rights applications submitted to the California State Water Resources Control Board to appropriate water from several local watersheds located at the southern end of the San Joaquin Valley. Analyses included preparation of estimates of historical water demands, evaluation of the amounts of water that might be captured for beneficial use, diversion amounts, design of measuring facilities and development of a management and documentation program for surface water resources available to the Ranch.

Mr. Beeby directed the activities of the firm in the preparation of an evaluation of a groundwater banking and extraction project for the Wheeler Ridge-Maricopa Water Storage District, located in the southern end of the San Joaquin Valley, California. Specific activities included evaluations of the general subsurface geology, selection of the recharge areas, analyses of the reliability of the imported water supply, preliminary system layouts, estimates of probable construction costs and estimates of projected annual costs. These data were compiled to derive the unit cost of water in dollars per acre-foot.

Mr. Beeby directed the activities of the firm in the preparation of the water plan and evaluation of the water resource aspects of a proposed expansion of High Desert Power Project I, located in the vicinity of Victorville, California and within the Service Area of the Mojave Water Agency. The task was to develop a reliable water supply for power plant cooling when water is not available from the California State Water Project. Specific activities include the direction of the hydrogeologic studies related to the effects of groundwater recharge and extraction for Project purposes on nearby wells, preliminary engineering layouts of the proposed well field and conveyance pipelines, evaluations of the use of existing water conveyance facilities and cost estimates thereof.

Bookman-Edmonston, Engineering, Inc., Principal Executive Engineer (1966 to 1998)

Mr. Beeby directed the preparation of the water plan and evaluation of the water resource aspects of the proposed High Desert Power Project to be located in the vicinity of Victorville, California. Specific activities included the direction of the hydrogeologic studies related to the effects of groundwater extractions for the Project on nearby wells, preliminary engineering layouts of the proposed well field and conveyance pipelines and cost estimates thereof. Activities also included appearances before the California Energy Commission and the Boards of Directors of local water purveyors to discuss the water supply aspects of the Project.

## ***Resume for Robert G. Beeby (Continued)***

Mr. Beeby was responsible for preparation of a regional water management plan for the Mojave Water Agency, which encompasses about 5,000 square miles and includes communities from Hesperia to Barstow along the Mojave River in the high desert area of California. Activities included preparation of hydrologic inventories of historical conditions, estimates of future demands, identification of water marketing strategies for the imported supplies from the California Aqueduct and responsible for the technical aspects of the public involvement program. He also provided technical input to the development of the principles of the adjudication of rights to pump groundwater within that portion of the Agency that drains to the Mojave River and appeared as an expert witness and as a rebuttal witness in the trial held in Superior Court of the State of California in and for the County of Riverside.

Mr. Beeby directed the preliminary planning of the \$50 million Mojave River Aqueduct Project for the Mojave Water Agency located in the high desert area of California. Specific activities included investigations to determine the size of the conveyance and groundwater recharge facilities, conceptual development of the financial program, preparation of the preliminary design, engineering report and cost estimates. He assisted the Agency staff and Board in preparation of documentation to secure federal assistance in project funding.

Mr. Beeby was responsible for studies to establish "Zones of Benefit" for the Mojave Water Agency. Activities included evaluation of imported surface and groundwater resources quality and quantity and estimated impacts of proposed recharge program.

Mr. Beeby was responsible for operational studies of a water exchange and conjunctive use program between the Metropolitan Water District of Southern California and the Arvin-Edison Water Storage District, located in Kern County, California. Activities included evaluation of capacities of joint use facilities, agricultural water demands, energy requirements, and costs associated with groundwater extraction and surface water deliveries. He also provided input data to the environmental documentation. He also provided technical assistance in developing the final agreement between the two parties and developed the groundwater operating criteria that was incorporated in the Agreement.

Mr. Beeby directed preliminary design and cost estimating for an additional 5,000 acres of irrigation service area for the Arvin-Edison Water Storage District and an additional 20,000 acres of irrigation service area to the Semitropic Water Storage District, in connection with water exchange and banking programs. He also directed the preparation of a computer model of A-E operations to evaluate the effects of the proposed program on groundwater levels.

Mr. Beeby participated in an investigation of flood damage to landowners on behalf of the Arvin-Edison Water Storage District, California. He served as construction inspector and office engineer responsible for evaluations of construction quantities and contractor pay requests.

Mr. Beeby directed the evaluation of irrigation systems in Sinaloa and Sonora Provinces of Mexico. The objective of the assignment was to recommend both structural and nonstructural improvements for rehabilitation of the conveyance and distribution systems that were constructed in the 1940s. Specific activities included field surveys, interviews with irrigation system managers, evaluations of on-farm irrigation efficiency, evaluations of system efficiencies, preparation of preliminary cost estimates and review of farm economics.

Mr. Beeby developed the water resource section of the scope of work for a proposed project in Oman for USAID. Specific activities included inspection of the existing falaj system in the project area and preliminary evaluations of hydrogeologic conditions for groundwater recharge using reclaimed wastewater and use of spreading ponds or injection wells to mitigate the effects of seawater intrusion.

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Mr. Beeby was responsible for the preliminary planning and engineering studies for a 445,000-acre irrigation project, to be funded by the Inter-American Development Bank, in the Guanacaste Province of Costa Rica. Activities included forecasts of cropping patterns, estimates of water supply and demands, evaluation of surface and subsurface drainage problems and solutions, and preparation of feasibility-level designs and cost estimates of project works, including irrigation and drainage facilities, transportation network, power supply, and community development. He was also responsible for the preparation of feasibility reports and plans and specifications for project design and the development of a 2,000-acre demonstration area.

Mr. Beeby directed the evaluation of the physical and economic impacts of importation of California State Water Project water for the Wheeler Ridge-Maricopa Water Storage District. The District includes nearly 147,000 acres, of which over 88,000 acres receive imported water for irrigation. Specific activities undertaken on behalf of the District include the preparation of hydrologic inventories to determine the change in groundwater storage underlying the District and evaluation of the aquifer characteristics to determine the changes in pumping depths since Project inception in the early 1970s. These physical changes were evaluated to estimate the resulting economic impacts under historical and projected non-project conditions.

Mr. Beeby conducted studies for proposed commercial, residential and recreational developments in southern San Joaquin Valley for the Tejon Ranch Company, Kern County, and along the southern California coast. Activities included projections of future water demands for various development scenarios, evaluation of surface and groundwater supplies, and preparation of cost estimates of alternative water supply facilities.

Mr. Beeby directed the evaluation of standards established by the Arizona Department of Water Resources for Second Management Period of the Arizona Groundwater Management Act. Specific activities included evaluation of maximum conservation standards, on-farm irrigation efficiency, crop unit consumptive use values, leaching requirements, and economic studies to determine if proposed standards were consistent with prudent long-term management practices. He was appointed by the Director of the Arizona Department of Water Resources to serve on the Agricultural Technical Advisory Committee and served as Co-chairman of the Economic Subcommittee.

Mr. Beeby participated in the preparation of a feasibility study for the groundwater banking and extraction program for the Semitropic Water Storage District, Kern County, California.

Mr. Beeby investigated water use practices of the Imperial Irrigation District, located near the Salton Sea in southern California. Specific activities included evaluation of consumptive use within the District and analyses of the effects of District policies on water use efficiencies. He presented expert witness testimony before the State Water Resources Control Board, California.

Mr. Beeby directed the activities of the firm in the evaluation of historical water levels of the Salton Sea, California for the Imperial Irrigation District. Shoreline property owners claimed flooding to their holdings was due to inefficient water management practices. Specific activities related to the hydrology of the inflow to the Sea, land ownership and parcel identification and expert testimony.

Mr. Beeby conducted reconnaissance-level investigations of landowner repayment capabilities associated with the CENDAK Project, a proposed 500,000-acre irrigation project in South Dakota. Specific activities included preparation of projected farm and crop budgets and evaluation of irrigation requirements for various crop patterns.

Mr. Beeby conducted a study for the states of Arizona, California, and Nevada to evaluate claims for additional water rights made by and on behalf of five Indian reservations located along the

## ***Resume for Robert G. Beeby (Continued)***

Lower Colorado River. Activities included classification of land for irrigated agriculture, determination of crop suitability, evaluation of agricultural production costs and returns, irrigation distribution system layout and cost estimates, and evaluation of on-farm irrigation practices. Mr. Beeby qualified as an expert witness in this case and presented testimony before a Special Master appointed by the Supreme Court of the United States in connection with the reopening of the case of Arizona v. California in 1980. .

Mr. Beeby conducted a study for the Salt River Project to determine the development potential and associated water requirements of six Indian reservations in central Arizona, encompassing a total area of approximately 3.5 million acres. Activities included evaluation of agricultural, mineral, timber, and recreational developments, evaluation of water requirements and availability of local and imported water supplies, preparation of cost estimates of water supply facilities, determination of financial feasibility and economic impact, and evaluation of the effects of upstream developments on downstream water quality.

Mr. Beeby conducted water resource evaluations of proposed agricultural development on Indian reservations located in San Diego County. Studies included investigation of Indian water rights, Practicably Irrigable Area, available surface water supplies and groundwater supplies from the Pala-Pauma groundwater basins, and water demands for irrigation, recreational, municipal, and industrial use.

On behalf of the Los Angeles Department of Water and Power, Mr. Beeby directed the evaluation of the possible Indian water rights in the Owens Valley, California. Studies of Practicably Irrigable Area included evaluations of climate and soil characteristics for crop production, crop yields and production costs, ground water supplies, capital cost estimates of on-farm irrigation systems and wells, annual costs of those facilities.

Mr. Beeby participated in an evaluation for the City of Escondido of potential for increased power generation and utilization of local water supplies that could result from revised operating procedures. He directed the technical aspects of the evaluation of the effects of operational changes on the utilization of local water supplies.

Mr. Beeby participated in the planning of projects to supply water to Castaic Lake Water Agency, Santa Barbara County Water Agency, City of Escondido, Vista Irrigation District, and other clients.

Mr. Beeby evaluated the feasibility of proposed major water distribution projects in the southern San Joaquin Valley for Arvin-Edison, Semitropic, and Wheeler Ridge-Maricopa Water Storage Districts. Activities included evaluations of the ability of farmers to pay for irrigation water from irrigation projects.

Mr. Beeby was the Construction Supervisor responsible for construction inspection and contract administration for the construction of an 11-mile, 570 cubic-feet per second, unlined canal for the Buttonwillow Improvement District, Kern County, California.

Mr. Beeby directed an assessment survey for the City and County of Yuma, Arizona, relating to management of their available supplies over the next 100 years. Water supplies, water rights, and water demands were evaluated and estimated as part of the investigation.

Mr. Beeby was responsible for the technical direction of a study performed for the U.S. Bureau of Reclamation involving the determination of salt loading to the Colorado River from the Palo Verde Irrigation District, located in Blythe, California.

Mr. Beeby conducted a hydrologic inventory and prepared input data for the conservation element of the revised general plan for Santa Barbara County, California.

## ***Resume for Robert G. Beeby (Continued)***

Mr. Beeby evaluated water resources availability to a proposed recreational development in Cambria, California. Possible sources included both groundwater and surface supplies to be impounded by a dam.

Mr. Beeby conducted an inventory of the physical properties and assets of the Escondido Mutual Water Company, located in southern California.

Mr. Beeby participated in the investigation of the flood hazard for California State University, located in Bakersfield, California.

Mr. Beeby evaluated the surface and groundwater resources of the Tulare Lake Basin of central California. Studies included the evaluation of the quantity of surface runoff from ephemeral streams located in the San Joaquin Valley, in connection with the 5D basin studies prepared for the State Water Resources Control Board.

Mr. Beeby prepared estimates and evaluated records relating to reconstructed full natural flow for the San Luis Rey River in San Diego County, California.

Rancho Sespe, Ranch Engineer (1964 to 1966)

Mr. Beeby served as Ranch Engineer and performed irrigation efficiency studies on sprinkler-irrigated lemons and made recommendations to reduce the water application rate; assisted in design and field layout of new groves; and supervised various orchard maintenance crews for a citrus ranch in Fillmore, California.

Libby, McNeil & Libby, Agriculturist (1964)

As an agriculturalist, Mr. Beeby advised Libby, McNeil and Libby and consulted with and advised growers in Europe on irrigation methods, scheduling, and most efficient means of irrigating deciduous and citrus fruit orchards and vegetable crops.

University of California, Davis, Laboratory Assistant (1961 to 1963)

Mr. Beeby was involved in agricultural water use studies and irrigation scheduling as a laboratory assistant for the Department of Water Science and Engineering, University of California, Davis.

Gage Canal Company, Engineering Assistant (1962)

Mr. Beeby organized the pump and well testing program and collected data from local citrus farmers to be used in scheduling water deliveries for the Gage Canal Company, Riverside, California.

Specialized Training

- Seminars on hydrology and hydrologic methodologies
- Seminars on water rights in California

Professional Affiliations

- Life Member - American Society of Civil Engineers
- U.S. Committee on Irrigation and Drainage
- Colorado River Water Users Association