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San Felipe Division

The Central Valley Project

Wyndham E. Whynot and Wm. Joe Simonds
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The Central Valley Project San Felipe Division

As the crowd watched President John F. Kennedy participate in the groundbreaking ceremony for the San Luis Dam and Reservoir of the Central Valley Project on August 18, 1962, little did they or many other Americans realize they were also watching the beginning of the Central Valley's San Felipe Division. Congress' authorization of the San Luis Unit of the Central Valley Project included an amendment laying the foundation for an additional unit of the Central Valley Project to provide water to the Santa Clara Valley, west of California's Diablo Mountain Range. Farmers in this area would have to wait almost twenty-five years before all the facilities were completed, but water for a variety of purposes was on its way.

Project Location

The San Felipe Division of the Central Valley Project is located in the central costal area of California and covers lands in the counties of Monterey, San Benito, Santa Clara and Santa Cruz. Water for project lands is transported from San Luis Reservoir on the western edge of the Central Valley, through the Pacheco Tunnel under the Diablo Mountains, and distributed to the project area through a series of buried conduits and pipes. The project extends from San Francisco Bay in the north to the town of Hollister in the south and includes lands surrounding the communities of San Jose, Santa Cruz, Los Gatos, Morgan Hill, and Gilroy.¹

Historic Setting

Pre-European inhabitants of the San Felipe Division east of the Diablo Mountains were primarily from the Northern Valley Yokut group; while the Costanoan group lived in the area west of the mountains. Tribes from each group were hunter-gather types, living on small game, fish, plants, acorns, and occasional larger game. When the Spanish arrived in the area during the late 1770s, they generally encountered the Tamyen, Mutsun, and Awaswas tribes of the Costanoan groups in the Monterey Bay area, and the Nopchinchi tribe, a part of the Northern Valley Yokut group, near Pacheco Pass. Euro/American settlement, which introduced disease,

1. United States Department of Interior, Water and Power Resources Service, *Project Data*, (Denver: US Government Printing Office. 1981), 205-6.

forced labor, and inter-racial conflicts, devastated the native populations.²

Juan Rodríguez Cabrillo, a Spanish explorer, led the first expedition into California in 1542, claiming the region for Spain. England's Sir Francis Drake also visited California's coast during a journey in 1579. In 1769, Gaspar de Portolá and Father Junipero Serra led an expedition which founded Monterey, and future expeditions in the area during the 1770s were led by Pedro Fages and Juan Bautista de Anza. Initially, permanent settlements in this region consisted of either presidios or missions. Santa Clara Valley was the site of several missions including Mission Santa Clara and Mission San Juan Bautista, as well as Pueblo de San Jose de Guadalupe. The primary activities of settlers were farming and cattle ranching. While agricultural water generally came from precipitation or farming lands near streams and rivers, a small irrigation system was built at Mission San Juan Bautista.³

Spain lost control of Mexico, which included California, in 1821. During the Mexican era, Don Francisco Pacheco, for whom Pacheco Pass is named, received a land grant near the pass that included the site of the future San Luis Reservoir.⁴

Mexico followed land use policies similar to the Spanish. Mexico was only partially successful in attempts to limit and prevent Americans from settling on the land. Mexico's plans for California were dashed in 1846, when the United States declared war on Mexico. Stephen Kearney and John C. Frémont led military expeditions, which enabled the United States to rapidly conquer California. In 1848, Mexico signed the Treaty of Guadalupe-Hidalgo which gave the United States a large portion of its territory, including California.

In the same year America obtained California, gold was discovered near Sutter's Mill, causing the 1849 gold rush. Settlers poured into California by the thousands, staking claims and homesteads throughout the state. Santa Clara County and neighboring counties saw the establishment of farms, which began replacing some of the large cattle ranches of the region. As

2. Robert F. Heizer, vol. ed., *Handbook of North American Indians: California*, Vol. 8, (Washington DC: Smithsonian Institution, 1978), ix, 462-4, 485-6, 491.

3. Ibid., 99-100, 486, 505; United States Department of Interior, Bureau of Reclamation, *San Felipe Division: A Report on the Feasibility of Water Supply Development*, Report, (Sacramento, California, March 1964), 8-9.

4. Eva McClelland, Guide, Romero Visitors Center, San Luis Reservoir, Los Banos, California Interview by Wyndham Whynot, 30 August 1994.

agriculture grew, residents realized water would become a more important resource than gold. The Santa Clara region generally depended on the small local rivers and groundwater for irrigation, eventually however, increased population and industrial growth during the 1940s put a tremendous drain on groundwater resources.⁵

Irrigation plans for the Central Valley did not include the Santa Clara Valley region which was separated from the Central Valley by the Diablo Mountains. Colonel Robert B. Marshall, chief geographer with the United States Geological Survey, who developed plans to irrigate the Central Valley by canals did not include this area in his 1919 plan which became the basis of the California State Water Project and the Bureau of Reclamation's Central Valley Project. When President Franklin Roosevelt approved the Central Valley Project in December 1935, the lands of the future San Felipe Division were not included.⁶

Water shortages and floods were constant problems for citizens in the Santa Clara Valley. Initial attempts to form a conservation district in the early 1920s were defeated. In 1921, Fred Tibbetts and Stephen Kieffer, engineers hired to investigate possible solutions for flooding and water shortages, proposed a comprehensive plan of flood control and water storage. The Tibbetts-Kieffer program became the basis for future county efforts. An election in 1929 finally authorized creation of the Santa Clara Valley Water Conservation District (SCVWCD), which began a dam building program during the Great Depression. Although these dams helped restore the water table and control flooding, the unchecked population growth, combined with droughts and low rainfall between 1943 and 1955, threatened to undo all of the benefits gained by constructing the dams.⁷

Additional dams were constructed in the late 1940s and early 1950s to increase water storage. However, as the population continued to grow, more wells were developed, which further decreased the amount of local water available. Local citizens realized the only viable

5. *San Felipe Division: Report on the Feasibility of Water Supply Development*, 8-9.

6. Betty Brickson, *Layperson's Guide to the Central Valley Project*, (Sacramento: Water Education Foundation, 1994), 6.

7. *San Felipe Division: A Report on the Feasibility of Water Supply Development*, 8-9; Harry Farrell, *The San Felipe Story*, (Santa Clara: Santa Clara Valley Water District, 1987), 16-9.

solution to the water shortage was to bring water from outside the region. Several proposals were considered, including increased water purchases from the Hetch Hetchy Aqueduct, but each was rejected for various reasons.⁸

California state senator Herb Jones recognized that only the rivers in northern California could supply the Santa Clara region with the water it needed. In 1948, he encouraged the SCVWCD, San Jose, and water-oriented businesses in the region to file for water rights for American River water. This action later proved invaluable since these groups acquired some of the earliest rights to the water. In 1948, during Congressional hearings on the Central Valley Project concerning construction of Folsom Dam and development of the American River Basin, senator Jones recommended that water from the American River be moved to Santa Clara Valley via a conduit through Livermore Valley. Although the final version of the bill did not directly discuss this solution, an amendment directed the Secretary of the Interior to examine ways to bring water to San Benito and Santa Clara Counties.⁹

The Department of the Interior, however, focused little attention on transporting water to these counties. During this same time, California's legislature was considering an extensive state water project. Governor Earl Warren and several successors supported the project, known as the Feather River Project. A problem arose when plans indicated the site of the San Luis Reservoir, which was also desired by the Bureau of Reclamation, was needed for the state's water project. Eventually, Reclamation and the state agreed to jointly develop San Luis Reservoir. During this time, the Santa Clara Valley Water Conservation District, which in 1956 had joined with Alameda and San Benito Counties to form the Tri-County Water Authority, contracted with an engineering firm to determine the best route for bringing water into the valley. This study led to adoption of the Pacheco Tunnel route.¹⁰

Water shortages and depletion of the ground water continued into the 1960s. Realizing that the completion of the Pacheco Tunnel, as yet not approved, would be as much as a decade

8. *The San Felipe Story*, 20-2.

9. *Ibid.*, 22-6.

10. *Ibid.*, 26-31,36.

away, officials in the valley looked to find other sources of water. In the early 1960s, the Santa Clara County Board of Supervisors contracted for 88,000 acre-feet of water from the California State Water Project's South Bay Aqueduct, due for completion in 1964. Knowing that the South Bay Aqueduct would provide only temporary relief, proponents of transporting water through Pacheco Pass continued seeking local, state, and national support. In 1960, the area received a major break when US Representative Charles Gubser of Gilroy, got an amendment to the San Luis Authorization Bill which ultimately led to construction of 1.8 miles of the Pacheco Tunnel, the first section of the San Felipe Division.¹¹

Project Authorization

The first investigation into the importation of water into the Santa Clara Valley region was the Pajaro River Basin investigation, authorized by Congress in 1948. In 1958, House Joint Resolution 585 instructed the Secretary of Interior to investigate the possibility of supplying water from the Central Valley Project to Santa Clara Valley area.¹²

The initial authorization for construction of elements of the San Felipe Division came in the form of an amendment to the San Luis Unit authorization of June 1960. The amendment, submitted by Gilroy Representative Gubser, directed the Secretary of Interior to

. . . plan the works authorized in this Act in such a manner as to contemplate and make possible the future provision of Central Valley project service, by way of the Pacheco Tunnel route, to lands and municipalities in Santa Clara, San Benito, Santa Cruz, and Monterey Counties¹³

Gubser had proposed the amendment in an effort to keep the San Felipe project alive. He had really wanted to get authorization for the entire project in the San Luis Act, but knew that authorization was not possible since the required engineering and feasibility studies for San Felipe were not complete. The engineers who planned San Luis Reservoir determined that the intake and almost two miles of the tunnel would be more than 200 feet below the surface of the reservoir. In order to comply with the amendment, engineers included in their plans for San Luis the intake structure and 1.8 miles of the tunnel which would be completed before filling the

11. *Ibid.*, 35-6.

12. *Project Data*, 207.

13. *San Luis Unit, Central Valley Project Act*. June 6, 1960, Public Law 86-488, 74 Stat. 156, Sec. 6.

reservoir.¹⁴

In June 1959, the United States and the Tri-County Water Authority signed an investigation contract that led to the Bureau of Reclamation's 1963 feasibility report on the San Felipe Division. The report was sent to the Commissioner of Reclamation in 1964 who, after review, forwarded it to the Secretary of Interior for approval. In September 1966, the Secretary submitted the report to the Speaker of the House, and on August 27, 1967, the San Felipe Division of the Central Valley Project was authorized for construction.¹⁵

Construction History

Construction on the San Felipe Division began in 1964 with work on the intake structure and reach no. 1 of Pacheco Tunnel. Bids for construction of the intake structure and reach no. 1 were opened October 15, 1964. The Dravo Corporation of Pittsburgh, Pennsylvania, submitted the low bid of \$4,549,520.00 for the contract, which was \$949,725.00 below the estimated cost. The Bureau accepted the bid and awarded the contract to the Dravo Corporation on November 2, 1964. The company received notice to proceed on December 15 and had until November 24, 1967, to complete the work.¹⁶

Work on the intake channel began on November 4, 1964. On February 15, 1965, the company increased from one shift to two, resulting in completion of this structure by April 13. Excavations for the shaft of the intake structure began on March 4, 1965, and were completed on March 26. Initial tunneling activities began on April 25.¹⁷

Tunneling operations proceeded at a varied pace, with a number of factors either slowing down or speeding up the amount of rock removed. A number of small faults and slides, as well as differing types of rock resulted in progress from a low of less than 10 linear feet per day to over 24 linear feet per day. To assist in ventilation operations and to "supposedly" speed up concreting operations in the tunnel, the contractor extended the tunnel 50 feet beyond the

14. *The San Felipe Story*, 9-12.

15. *Project Data*, 207.

16. United States Department of Interior, Bureau of Reclamation, *Pacheco Inlet Channel and Tunnel to Station 198-55, Specifications No. DC-6160, Final Construction Report*, (Denver: Bureau of Reclamation, 1971), 11-2.

17. *Ibid.*, I.

contract requirement and excavated a 235-foot deep ventilation shaft. After timbering and providing additional support for the tunnel, the contractor began lining the tunnel with concrete during 1967. Concrete operations were completed by December 8, 1967, and clean-up operations commenced on January 20, 1968.(21)

The government accepted the contract as complete on February 23, 1968. The Dravo Corporation was charged \$205,200.00 for failing to finish on time. But the government granted an additional 73 days to compensate for the delays beyond Dravo's control, thus reducing liquidated damages by \$150,600.00. During construction the contractor's forces suffered a number of injuries, including one death, when a miner fell down a gate shaft. The final structure consisted of a 1.8 mile long, 13-foot diameter dead-end tunnel, and the inlet structure.(22)

Construction of the remaining project features would be delayed for more than a decade. Several factors played a significant role in delaying additional construction on San Felipe. In addition to the fiscal austerity practiced by Presidents Lyndon Johnson and Richard Nixon on domestic spending, the rise of the environmental movement, the energy crisis, and inflation contributed to delays.¹⁸

California's State Water Resources Control Board dealt a stunning blow to San Felipe supporters in July 1971, when the Board decided to reduce the amount of water allowed for the southern areas in order to prevent additional salt water intrusion in the Delta. Since less water would be available for the southern units of the Central Valley Project, including San Felipe, Nixon decided to delete a \$1.1 million appropriation for the project. Strong lobbying efforts resulted in Congress restoring \$376,000 for San Felipe. Districts planning on contracting for water via San Felipe also agreed to reduce the amount of water ordered when additional water was needed to maintain water quality in the Delta.¹⁹

Attempts to restart construction of San Felipe in 1973, failed miserably, as several obstacles arose. Once again Nixon refused to include money for San Felipe in his budget, and in February, Reclamation announced an eighteen to twenty-four month delay in issuing the

18. *The San Felipe Story*, 44.

19. *Ibid.*, 44-9.

required environmental impact statement. Representative Gubser was able to salvage a \$200,000 appropriation for the Division. However, the energy crisis of 1973, resulted in San Felipe receiving a low priority since it did not supply entities associated with energy production. Things began looking up in 1974 when Nixon finally included the Division in his 1974-1975 budget and Congress appropriated funds for construction.²⁰

During 1975, Reclamation opened an office in Gilroy and began accepting bids. However, various environmental groups successfully delayed construction. The Sierra Club and the Environmental Defense Fund obtained a temporary federal injunction which blocked construction. At this time, opponents of the project made every effort to stop the project and obtained support from a number of officials, including President Jimmy Carter. Carter's "hit list" of water projects to be eliminated, included San Felipe, but strong bi-partisan support from California's representatives prevented abolition of the project.²¹

After eleven months of deliberation, the federal court dismissed the environmentalist's suit as being "without merit," and the injunction was lifted on April 26, 1977. After this lengthy delay, it appeared construction of Pacheco Tunnel would continue. Santa Clara Valley Water District and Reclamation signed a contract obligating the District to purchase 16,000 acre feet of water in the first year of San Felipe's operation and increasing purchases to 152,500 acre feet in the fortieth year. Santa Clara Valley Water District also agreed to an initial assessment of \$16.50 per acre foot for agricultural use and \$61 for municipal or industrial use. The contract also provided for future price increases during the term of the contract to offset inflation and other expenses.²²

Since a previous Court injunction filed at the request of environmental groups prevented work on Pacheco Tunnel Reach No. 2 from starting in 1976, the Bureau readvertised the contract on June 2, 1977. After years of battling against the state, environmentalists, and the President, contractors almost stopped the project from being built. Upon opening the bids on July 14, the

20. *Ibid.*, 49-53.

21. *Ibid.*, 55-7.

22. *Ibid.*, 57-8.

Reclamation discovered that the low bid of \$105 million was significantly higher than the engineer's estimate. All bids were rejected and it appeared that approval for the San Felipe project would have to start over again.

However, Reclamation submitted the current plans to the its Engineering and Research Center in an attempt to seek a cheaper solution. Donald Duck, a Reclamation engineer, realized the entire tunnel needed to be redesigned. The remaining portion of the tunnel was moved 300 feet higher which reduced the its length from 8.5 miles to 5.2 miles. A pumping plant was added to raise water from the end of the existing tunnel to the level of the new tunnel where it would be transported to into Santa Clara County via gravity.

These changes resulted in significant cost reductions which helped save the project. Once again, Reclamation readvertised bids for the tunnel, and the Guy F. Atkinson Company of South San Francisco submitted the low bid of \$49,753,520 for the Pacheco Tunnel Reach No. 2. Although the bid was \$4 million higher than the engineer's estimate, Reclamation accepted the offer.(30)

On January 23, 1979, environmentalists made a last ditch effort to stop construction of the project. Friends of the Earth asked the Federal courts to issue a temporary restraining order and a permanent injunction halting work until Congress reauthorized the San Felipe Project. Although the court dismissed the suit in March, Reclamation eliminated a small storage reservoir, and moved the site of the Coyote Pumping Plant to avoid environmentally and archaeologically sensitive areas. Reclamation finally awarded its first contract for the San Felipe Project since 1967 to Guy F. Atkinson Company. Excavation on the inlet end of the tunnel began on April 18, 1979, and in late May the company began drilling and excavating the outlet end.²³

During the next two plus years, the contractor tunneled 24 hours a day, five days a week. Drillers would bore a series of four foot deep holes in the rock which were then filled with

23. *Ibid.*, 59-62; United States Department of Interior, Bureau of Reclamation, *Design Summary, Coyote Pumping Plant and Switch Yard, San Felipe Division, Central Valley Project, California*, (Denver: Bureau of Reclamation, January 1985), 3.

dynamite and blasted. Fractured material was then cleared from the tunnel by small diesel-powered rail cars. I-beams were bent and inserted into the tunnel to shore up the tunnel. The contractor encountered a few problems during excavation. A 5.5 earthquake in the area failed to damage the work, but a pocket of methane gas was uncovered on July 17, 1980, while excavating the west end. Work was suspended until September 2, when appropriate measures insured the safety of the workers.

Tunnelers on both ends continued moving towards each other, and on May 28, 1981, ten months ahead of schedule, the workers holed through the mountain. During this construction phase, no deaths and only six major injuries occurred. Interest in the project continued throughout this period, as hundreds of visitors toured the tunnel during the construction phase.

Concrete lining operations commenced on August 3, 1981, and continued until completed on May 18, 1982. Finishing work was completed on January 26, 1983. Project water would not be delivered by the tunnel for another four years because additional pumping plants, tunnels, and conduits remained to be built or connected to the Pacheco Tunnel.²⁴

The Pacheco Pumping Plant lifts water from the lower tunnel to the upper tunnel. Reclamation received fifteen bids for construction of the pumping plant by the closing date of February 1, 1983. At 10:00 a.m., the bids were opened, with the Underground Construction Company and Continental Heller Corporation of San Leandro, California, submitting a joint low bid of \$14,456,000.²⁰ Reclamation accepted this offer and awarded the contract to the companies on March 7, 1983.²⁵

Reclamation allowed the company 1,460 days to complete the contract from the date it received notice to proceed. The company received this notice on March 22, 1983, and was expected to finish the job by March 21, 1987. Work on the pumping plant began March 23, when the contractor started moving equipment to the work site with excavation operations for

24. *The San Felipe Story*, 62-4.

25. United States Department of Interior, Bureau of Reclamation, *Technical Report for Pacheco Pumping Plant and Substation, Specifications DC-7530*, (Gilroy, California: Bureau of Reclamation, 26 July 1988), 16.

the plant beginning April 18, 1983.²⁶

Between November 1983 and May 1, 1984, plant equipment such as motors and pumps arrived on site. During this same period, the contractor continued preparing the plant's foundation for the concrete, which was placed starting on May 1. By October 1984, concrete for the plant walls was being poured. Work progressed at a satisfactory rate, and in March 1985, the contractor began installing the pumps. Throughout the remaining months, work continued on the pumps and the substation. A temporary problem occurred on March 25, 1986, when the International Brotherhood of Electrical Workers called for a walkout when representatives from Toshiba arrived to work on the pump units, however, they returned on March 31, after Toshiba's employees left. The contractor continued pump installation and worked out various problems affecting the pumps during the rest of the year.

Pacheco Tunnel Reach No. 2 was filled with water for the first time in October 1986. During early 1987, the contractor continued working to fix minor problems with pumps and other equipment. On March 19, 1987, Reclamation's contracting officer accepted the work as substantially complete. Earth grading operations were completed in April and by the end of the month the contractor and subcontractors had moved off the job site. The pumping plant consists of twelve, 2,000 h.p. pumps capable of lifting water 309 feet, and a 150-foot diameter regulating tank which holds over 3 million gallons.²⁷

With completion of Pacheco Tunnel and the Pacheco Pumping Plant, water could now be moved from the San Luis Reservoir through California's Diablo Mountains to provide water for agriculture and industrial use. But several additional facilities were needed before water could be transported from the tunnel outlet to the various districts buying water.

After water is delivered through Pacheco Tunnel, it is transported through a series of conduits which distribute water throughout San Benito and Santa Clara counties. Water from the tunnel enters the Pacheco Conduit which delivers waters to the Hollister and Santa Clara Conduits. Due to the length of the Pacheco Conduit, almost 8 miles, Reclamation divided the

26. *Ibid.*, 16, 53.

27. *Ibid.*, 1-13.

construction into two sections. The contract for section one was awarded to the Granite Construction Company of Watsonville, California, on September 20, 1983, with the contract for section two going to KNC, Inc., of Albuquerque, New Mexico received the contract for Pacheco Conduit on June 25, 1984.²⁸

Granite Construction Company began excavation and installation of section one in 1983, with KNC commencing operations on section two in 1984. The major work involved in construction of section one included laying about four miles of conduit and the erection of the bifurcation structure. KNC's major responsibility was installation of three and three quarters miles of pipe. By September 1986, Pacheco Conduit was completed. To reduce potential environmental damage in the region, the 120-inch diameter concrete pipe was buried. Pacheco Conduit starts at the Pacheco Tunnel outlet and runs in a southwesterly direction for 7.92 miles. At the end of the pipe, water enters a bifurcation structure which separates the water between the Hollister and Santa Clara Conduits.²⁹

Water for Santa Clara, Monterey, and Santa Cruz are transported from the bifurcation structure via the Santa Clara Conduit and Tunnel. Due to the length of the Santa Clara Conduit and the need for a tunnel, the work was divided into four sections. Santa Clara Tunnel was the first structure built. Shank-Artukovich Joint Venture, of Littleton, Colorado, received the contract with a bid of \$9,233,432. The concrete-lined tunnel is approximately one mile in length with a diameter of 9.79 feet and runs through the western foothills of the Diablo Mountains.³⁰

Reclamation awarded the contract on May 15, 1981. The company commenced operations on September 14, 1981, and began excavating the tunnel on January 7, 1982. On April 29, the contractor had completed tunneling operations. Grouting operations and concrete placement in the inlet and outlet portals continued until August 1983. The government accepted

28. *Project Data*, 205; United States Department of Interior, Bureau of Reclamation, *Design Summary, Pacheco Conduit*, (Denver: Bureau of Reclamation, February 1985), 1-2.

29. United States Department of Interior, Bureau of Reclamation, *Construction Considerations, Pacheco Conduit-Section 1*, (Denver: Bureau of Reclamation, June 1983), 1; United States Department of Interior, Bureau of Reclamation, *Construction Considerations, Pacheco Conduit-Section 2*, (Denver: Bureau of Reclamation, July 1984), 1.

30. Santa Clara Valley Water District, *San Felipe Project Facts* (San Jose: Santa Clara Valley Water District, Public relations Office) ; United States Department of Interior, Bureau of Reclamation, *Design Summary, Santa Clara Tunnel*, (Denver: Bureau of Reclamation, October 1984), 1-2.

the tunnel as complete on December 20, 1983.³¹

The Santa Clara Conduit, which starts at the Pacheco Conduit is separated into two sections by the Santa Clara Tunnel. Since increased residential growth just north of Gilroy threatened to cover part of the area traversed by the conduit, section 1 of the pipe, which is located in this region was constructed first.³²

John A. Artukovich Sons, Inc., of Azusa, California, received the contract for section one on November 11, 1982, with a bid of \$17,451,387.00, which was over 11 million dollars below the engineer's estimate. In March 1983, Reclamation awarded Granite Construction Company, which bid \$24,215,685.00, the contract for Section 2. Construction on both sections began shortly after the contracts were awarded, with both sections completed by April 1987. The final contract for section 3 was included with the Coyote Pumping Plant contract. Western States Construction Company of Loveland, Colorado, received the contract for the Coyote Pumping Plant with a low bid of \$9,545,169.60. The Company began work in early March 1985, and completed construction by May 6, 1987.³³

Hollister Conduit is buried underground and runs for approximately 17.09 miles where it terminates at the San Justo Dam and Reservoir. Construction of this facility was divided into two stages since it appeared that residential development would occur on one section where the conduit needed to be buried. Valley Engineers Inc. of Fresno, received the contract for section 1 with a bid of \$1,547,982. The company was awarded the contract on September 9, 1980, and completed excavation and installation of about 2 miles of conduit on September 18, 1981.³⁴

The contract for section 2 of the Hollister Conduit was awarded to the Granite Construction Company of Watsonville, California, on February 7, 1985. Their bid of

31. *San Felipe Project Facts*; United States Department of Interior, Bureau of Reclamation, *Santa Clara Tunnel Technical Report*, (Gilroy, California: Bureau of Reclamation, 15 August 1986), 3-7.

32. United States Department of Interior, Bureau of Reclamation, *Design Summary, Santa Clara Conduit*, (Denver: Bureau of Reclamation, August 1984), 1; United States Department of Interior, Bureau of Reclamation, *Construction Considerations, Santa Clara Conduit-Section 1*, (Denver: Bureau of Reclamation, July 1982), 1.

33. United States Department of Interior, Bureau of Reclamation, *Technical Analysis of Contractor's Claim for Impacts and Delays*, (Denver: Bureau of Reclamation, 25 January 1990), 1; *Design Summary, Santa Clara Conduit*, 2.

34. United States Department of Interior, Bureau of Reclamation, *Design Summary, Hollister Conduit*, (Denver: Bureau of Reclamation, August 1986), 1-2, 52; *San Felipe Project Facts*.

\$15,401,999 for the remaining work was about \$98,000 less than the estimated cost. Work consisted of the excavation and installation of about 17 miles of conduit ranging in size from 60 to 42 inches inside diameter. Since the conduit crosses the Calaveras Fault, part of the conduit is constructed with 679 feet of steel carrier pipe inserted in a 120-inch diameter reinforced concrete casing pipe to allow the carrier pipe to move independently of the casing pipe. When completed in May 1987, the Hollister Conduit was able to transport water from the Pacheco Conduit to San Justo Reservoir.³⁵

San Justo Dam and Reservoir, completed in January 1986, serves as an offstream storage facility. Water from Hollister Conduit is stored in the reservoir and is released during the winter months. Reclamation issued advertisements for bids on the San Justo Dam during 1984. On January 24, 1985, Reclamation awarded the contract to Grade-Way Construction of Fresno, California, which submitted a bid of \$11,790,368.³⁶

San Justo Dam and a dike are the primary features this facility. The dam is a zoned earth and rockfill dam 146 feet high, with a crest 1,105 feet long. The reservoir's capacity is 10,308 acre-feet. The dike is a zoned earth structure 81 feet high, with a crest 1,300 feet long. To control seepage, Reclamation installed a 40-millimeter thick, high-density, polyethylene membrane liner in the reservoir which was covered with earthfill to protect it against damage. Contract stipulations required that the facilities be completed within 840 days.³⁷

The contractor began stripping topsoil within the dam and dike areas during mid-March, 1985. Excavation of the dike's embankment foundation commenced March 25 and was completed on May 15. Beginning July 30, embankment material was placed in lifts ranging from 6 to 12 inches thick and compacted by rollers. The dike was completed on September 3.

Excavation of the dam foundation commenced April 25, 1985, and was finished on August 13. During April 1985, the contractor began stripping topsoil for the membrane liner

35. R. P. Fuerst, *Santa Clara Conduit - A Case History of the Calaveras Fault Crossing*, Report, (Denver: Bureau of Reclamation [1989]), 2; *San Felipe Project Facts, Design Summary, Hollister Conduit*, 1-2.

36. United States Department of Interior, Bureau of Reclamation, *Final Construction Report on San Justo Dam*, (Gilroy: San Felipe Construction Office, January 1988), 20-2; *San Felipe Project Facts*.

37. *Final Construction Report on San Justo Dam*, 17, 21, 62.

areas. Installation of the liner began in May and was completed by October 7. Embankment placement, using the same process used on the dike, was finished December 18, 1985. Reclamation accepted the structure as complete on January 21, 1986, almost a year ahead of schedule.³⁸

San Justo Dam's emergency spillway and the Hollister Conduit Outlet Works which connect the dam to Hollister Conduit were constructed by the J. F. Shea Company Inc. of Walnut, California, which submitted a low bid \$5,809,120. Work on the structure began in mid-1985. The emergency spillway, located on the northeastern rim of the reservoir is an open-cut channel lined with grass to protect against weathering and erosion. The outlet works, also located on the northeastern side of the reservoir, include a 1500 foot long tunnel, 688 feet of buried 60-inch diameter pipe, and a 23.1 foot diameter shaft about 135 feet deep which terminates at a gate. To protect against seismic damage the 60-inch steel carrier pipe is run through an 84-inch diameter concrete pipe filled with grout which acts as a cushion and allows the carrier pipe to move independently of the concrete pipe. The contract was finished by September 1986, and in 1987, all features necessary to deliver water throughout the San Felipe Division were complete and the first water deliveries began in June.³⁹

Post-Construction History

The first water deliveries could not have come at a better time. In 1988 the first year of a long drought hit California. Water from the Central Valley Project enabled the region to replenish at least some of its ground water. The drought did, however, prevent the districts from receiving their full share of project water. Of the 152,500 acre feet allotted, the Santa Clara Valley Water District has generally received 25% to 50% less than their contracted total.⁴⁰

The San Felipe Division has faced several problems, some were easily handled while others remain. The 1989 earthquake caused minor damage to the system near the Calaveras

38. Ibid., 38-48; United States Department of Interior, Bureau of Reclamation, *San Justo Dam and Hollister Conduit Outlet Works, Construction Geology*. (Denver: Bureau of Reclamation, June 1987), 24.

39. *San Justo Dam and Hollister Conduit Outlet Works, Construction Geology*, 53; *San Felipe Project Facts; Final Construction Report on San Justo Dam*, 2.

40. Teddy Morse, Santa Clara Water District Public Information Officer, Telephone interview by Wyndham E. Whynot, 19 September 1994.

Fault, but water was still available. While the drought has affected the availability of water, the presence of endangered species in the northern Central Valley has had a significant impact on the San Felipe Division.

Winter-run chinook salmon, an endangered species found in the rivers of the northern Central Valley, have had a significant impact on the ability of San Felipe to acquire its full water allotments. Salmon eggs and fry suffer increased mortality in waters of greater than 60 degrees. In order to ensure proper water temperature, Reclamation has been forced to increase releases from reservoirs in the northern divisions of the Central Valley Project, reducing the amount of water available for San Felipe and other southern divisions. It is possible that the Sacramento Splittail and other species of fish could soon be added to the endangered species list, thus causing additional operating restrictions for Central Valley Project and limiting water available for divisions in the south, including San Felipe.⁴¹

Settlement of Project Lands

Like the other units and divisions of the Central Valley Project, the majority of the land in the San Felipe Division was already settled and developed. Water from San Felipe did and will play an important role increasing the Santa Clara Valley's population, but the majority of this increase will likely be located in urban and suburban regions.

Uses of Project Water

The primary recipients of water from the San Felipe Division are municipal and industrial users. In 1991, non-agricultural users received over 46,000 ac/ft of project water with just over 15,000 ac/ft going to agricultural customers to provide supplemental irrigation to slightly more than 24,000 acres.

Farmers in the San Felipe Division grow a variety of crops, including grain and cereals, vegetables, fruits, and nuts. San Benito Water District farmers grow a wide variety of crops including canning tomatoes, lettuce, broccoli, peppers, apples, and apricots, with Santa Clara farmers generally focusing on the latter four crops. Average crops values per acre on lands

41. Water Education Foundation, *Western Water*, (Sacramento: Water Education Foundation, November/December 1990), 9; *Layperson's Guide to the Central Valley Project*, 16-7.

irrigated in San Benito and Santa Clara counties were \$2,955.32 and \$4,198.20 respectively, with a combined 1991 value of \$71,944,828.00 for 24,089 irrigated acres.⁴²

Conclusion

After World War II, citizens of the San Felipe Division lands realized they needed to bring water into their area. Although efforts to connect their counties with the Central Valley Project took some time, they ultimately succeeded. The San Felipe Division plays an important role in replenishing groundwater and providing water for agriculture, industry, and municipal use, making this division an important addition to the Central Valley Project. However, difficulties in authorization and construction of the various facilities during the 1960s, 1970s, and 1980s, are indicative of difficulties faced by the Bureau of Reclamation. Construction of the San Felipe Division highlighted the role environmental concerns play before projects can be built and clearly demonstrates issues Reclamation must confront for any projects.

About the Authors

William Joe Simonds was born and raised in Colorado and has a clear understanding of the importance of water in the American West and its influence on the development of that region. He attended Colorado State University where he received a BA in History in 1992 and a Masters in Public History in 1995. He lives with his wife and two children in Fort Collins, Colorado.

42. US Department of Interior, Bureau of Reclamation, *Summary Statistics: Water, Land, and Related Data*, (Denver: Bureau of Reclamation, 1991), 58, 68.

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