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The Central Valley Project
The East Side Division
The New Melones Unit

(Second Draft)

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The New Melones Unit

The East Side Division and the construction of the New Melones Dam and Powerplant is one of the more controversial chapters in the history of the Central Valley Project. Development of the Division brought the need for water and flood control into direct conflict with concerns over damage to cultural resources and the environment. The battle over construction of New Melones Dam was a signal at the end of the era of large dam construction. The controversy focused on the loss of a popular stretch of recreational white water, inundation of archeological sites, and flooding of the West's deepest limestone canyon. Controversy over the project lasted over a decade before the decision to proceed and provide irrigation water, flood control, and power generation occurred. (1)

Project Location

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The New Melones Dam and Powerplant are located on the Stanislaus River, about 60 miles upstream from its confluence with the San Joaquin River and 40 miles east of Stockton. The river forms the boundary between Calaveras and Tuolumne Counties, and drains an area of about 980 square miles on the western slope of the Sierra Nevada Mountains in east central California. The Stanislaus River Basin has three major tributaries, the North, South and Middle Forks, and the annual average flow is almost 1,000,000 acre/feet (ac/ft). The climate is semiarid with hot, dry summers, and cool wet winters.(2)

Prehistoric Setting

Evidence of human activities in the Sierra Nevada Mountains indicates that scattered, seasonal incursions into the region occurred more than 10,000 years ago, with more permanent settlement beginning between 3,000 and 4,000 years ago. Among the evidence of early human occupation in the Stanislaus River Basin are village sites, mortars, and petroglyphs. As early as 1850, reports told of gold prospectors finding artifacts and human skeletal remains in the Stanislaus River area. In 1840, just prior to the start of the gold rush, the Central Sierra Miwok Indians were the primary inhabitants of the Stanislaus River Basin.(3)

Historic Setting

Development of the Stanislaus River Basin began during the gold rush of the late 1840s. Water companies diverted water for use by miners. In the 1890's utility companies began generating hydroelectric power on the river, much of which they sent outside the area. The early 1900's saw development of several irrigation districts to serve local farmers. In 1926, the Oakdale and South San Joaquin Irrigation Districts built the Melones Dam and Powerplant. The peak of construction by irrigation districts came in the 1950's with construction of the Tri-Dam Project. That consisting of the Donnells and Beardsley Dams on the upper Stanislaus River, Tulloch Dam on the lower Stanislaus River, and the enlargement of Goodwin Dam, also on the lower river.(4)

Authorization

The Flood Control Act of December, 1944 authorized construction of a dam to replace Melones Dam, the New Melones Dam. The dam was to be built and operated by the Army Corps of Engineers for flood control. In the Flood Control Act of October, 1962, Congress reauthorized and expanded the project to a multi-purpose unit to be built by the Corp of Engineers and operated by the Secretary of Interior as part of the Central Valley Project, thus creating the New Melones Unit. The multi-purpose objectives of the unit include flood control, irrigation, municipal and industrial water supply, power generation, fishery enhancement, water quality improvement, and recreation. While the 1944 authorization called for construction of a 355 foot high concrete arch dam with a capacity of 450,000 acre/feet (ac/ft) and the continued use of the existing powerplant, the reauthorization of the project in 1962 changed the design to an earth and rock fill dam, and required construction of a new powerplant.(5)

Construction History

Initial construction work on New Melones Dam began in July 1966. This work consisted of building access and haul roads; construction of the low-level intake structure for the outlet works; construction of the administration building, visitor overlook and parking lot; clearing the dam site; and excavation and grouting of the foundation. Construction of the diversion tunnel began in 1966 and was completed in December 1973. In May 1972, the Corps of Engineers released the Final Environmental Statement (FES) for the project and announced that bids for construction of the main dam would be opened in October 1972. On June 8, 1972, the Environmental Defense Fund filed suit

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in Federal court (EDF vs Armstrong) challenging the FES. The Fund hoped to delay further construction on the dam until questions about the FES could be resolved.(6)

Bids for construction of the main dam were opened on October 10, 1972. The Corps received a low bid of $83,200,000, but delayed awarding of the contract pending the court's decision concerning the FES. The case was heard in Federal Court, and on October 16, 1972, the court ruled the FES adequate, but ordered submission of a supplemental FES addressing certain issues. The Corps submitted a supplemental FES in January 1973, and on March 16, the district court ruled the statement adequate. The Ninth Circuit Court of Appeals upheld the ruling of the District Court, and in April 1974, the Supreme Court refused to hear further appeal.(7)

Delays caused by the legal proceedings resulted in the bidder withdrawing the low bid due to rising costs. The request for bids was readvertised in December 1973, and a new low bid of $109,709,637 was received from the Melones Contractors of Jamestown, California, a joint venture of the Guy F. Atckinson Company, Gordon H. Ball, and the Arundel Corp. Several other supplemental contracts were awarded. Allis-Chalmers was awarded a $5,300,000 contract for two power turbines, and General Electric received a $6,200,000 contract for two 150- megawatt (mw) generators. The $39,944,975 contract for construction of the powerplant and appurtenant structures was awarded to Melones Contractors.(8)

The reservoir formed behind the dam required relocation of several roads and construction of a number of bridges. Relocation work was carried out by The California Department of Transportation, Roy E. Ladd, Inc., and the S. J. Groves and Sons Company. The cost of bridge construction and road relocations was almost $28,000,000.(9)

Construction of the main dam by the Melones Contractors began on March 6, 1974, with embankment placing operations beginning in January 1976. Even after construction resumed, opponents of the project continued their fight. One of the primary controversies centered around the amount of water that would be allowed to accumulate behind the dam. In March 1973, the California State Water Resources Control Board issued Decision 1422, regarding Reclamation's application for permits to store water a New Melones. The decision granted Reclamation permits to store only enough water at New Melones to meet pre-existing water rights, and obligations for wildlife enhancement and water quality. The permits did not allow storage of water for consumptive use or power generation. Decision 1422 further stated that only when Reclamation could show firm commitments for use of any additional water would the terms of the decision be changed. Reclamation filed a suit claiming the State could not place conditions on Federal reclamation projects. The State countered with a suit seeking a judgement that the Bureau be bound to the conditions of Decision 1422.(10)

While lawsuits where pending in the courts, parties seeking to limit the size of New Melones Lake took their case to the voters of California. Proposition 17, which sought to limit the size of New Melones Lake, was defeated in the November 1974 election. In October 1975, the District Court entered a judgement in favor of Reclamation holding that the State could not place conditions on the permits for water storage at New Melones. The State appealed the decision to the Ninth Circuit Court of Appeals. On August 12, 1977, the Ninth Circuit Court of Appeals upheld the decision of the District Court in favor of the Bureau of Reclamation. On July 3, 1978, the Supreme Court of the United States, in a six to three decision, upheld the State's right to impose conditions on water permits provided that those conditions were not inconsistent with Congressional directives. The Supreme Court remanded the case to District Court to determine the consistency of the conditions. In January 1979, Senate Bill 1482, which sought to place portions of the Stanislaus River in California's Wild and Scenic Rivers System, thus protecting the river from inundation, failed.(11)

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While the controversy raged, construction on the main dam continued. The dam embankment was "topped out" on October 28, 1978, and all work on the embankment was completed in November. Not restricted by legal battles and court orders, the Army Corps of Engineers allowed water to begin to back up behind the dam. The powerplant was completed, and the turbines and generators installed by the end of 1978. Testing of the generating units was completed in June 1979.(12)

Some of those opposed to construction of New Melones Dam went to extremes to attempt to halt the filling of the lake. In May 1979, Mark Dubois, director of Friends of the River, a group opposed to the project, chained himself to a rock in the reservoir area. Several of his supporters joined him at the edge of the rising waters. They were soon released unharmed, but not before the Corps of Engineers was forced to make releases from the dam to prevent the protesters from being overcome by the rising waters.(13)

New Melones Dam is California's second largest earthfill dam, containing 15,700,000 cubic yards (cu/yd) of material. The dam is 625 feet high and 1,560 feet long. The outlet works consist of a 3,774 foot long, 23-foot diameter, concrete lined, multipurpose, tunnel, and two 6-foot diameter steel conduits for emergency releases. The two emergency release conduits are embedded in the concrete lining of the multipurpose tunnel, and flows through the conduits are controlled by two 72-inch ring follower gates, and two 66-inch fixed-cone valves. Releases for flood control and irrigation are made through a 13-foot diameter branch of the multipurpose tunnel that branches into two 8-foot diameter pipes. Flows are controlled by 96-inch ring follower gates and 78-inch fixed cone gates. Flows into the outlet works are controlled by a 13-foot by 27-foot sliding gate located at the intake structure. The outlet works have a capacity of 8,300 cubic feet per second (cf/s). The spillway has an uncontrolled concrete crest and an unlined channel that was excavated through solid rock about 1.5 miles northwest of the dam. The spillway cut is 5,945 feet long and 200 feet wide with a capacity 112,600 cf/s. Material excavated from the spillway went into the dam embankment. New Melones Lake has a capacity of 2,400,000 ac/ft and a surface area of 12,500 acres with the water level at 1,088 feet above sea level. The shoreline is over 100 miles long.

The New Melones Powerplant contains two generators each rated at 150,000 kilowatts (kw) with a total rating of 300,000 kw. Water is supplied to the power units by two, 17-foot diameter, concrete lined tunnels that branch from the multipurpose outlet tunnel. Flows into the power turbines are controlled by two, 174-inch butterfly valves. A 55-foot diameter, 620-foot tall surge protection shaft protects the penstock tubes and control valves from water hammer damage.(14)

Post Construction History

In November 1979, New Melones Dam, Lake and Powerplant was turned over to the Bureau of Reclamation for operation, but the controversy continued. On May 29, 1979, Assembly Bill 2164, which allowed filling New Melones Lake to its full capacity, was passed and sent to Governor Brown for approval. The Governor vetoed the bill. On June 29, 1980, the Ninth Circuit Court of Appeals upheld the State's authority to impose conditions on water permits and ordered the storage level be set at an elevation of 820 feet above sea level, and on November 20, the California State Water Resources Control Board set the limit at 844 feet which is 438,000 ac/ft, or just over eighteen percent of total capacity.

In March 1981, the Federal District Court in Fresno upheld the State's right to place conditions on water permits, but declared invalid the condition that water could not be stored for power generation. In November, both California and the Federal Government filed suit in Ninth Circuit Court of Appeals protesting the decision of the District Court. The State maintained that the restriction on storage for power generation was valid, while the Federal Government argued that all conditions placed on the permits by the State were invalid. While governments and federal agencies

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must abide by the decision of the courts, nature does not necessarily do so. On January 15, 1982, swollen by heavy rains, New Melones Lake reached and passed the State-imposed limit. By June 1982, heavy rains and spring snowmelt had raised the level of the lake to 1,017 feet, and in early 1983, the dam spilled for the first time. After the wet years of 1982 and 1983 filled the lake to its full capacity and flooded areas upstream from the dam, the Water Resources Control Board saw no reason to withhold the permits sought by the Bureau and, in March 1983, lifted all restrictions on filling the lake.(15)

Following the wet years of 1982 and 1983, California entered a drought period, and water supplies fell. Within a short time, the areas of the Stanislaus River inundated by the rising waters of New Melones Lake emerged from the depths. The stretch of prime white water that environmental and rafting enthusiasts had fought for so bitterly was once again open and available for use. As the drought wore on, water levels in the lake continued to drop until the surface of the lake began to approach the top of the old dam. The old Melones Dam was left standing and inundated by the lake.

As the water level approached the top of the old dam, a new problem began. The temperature of water released to enhance spawning of fish downstream must be below 57 degrees or the newly hatched fish will die. When the surface of the lake lowers, the old dam, now submerged, prevents cold water at the bottom of the lake from reaching the outlet works of the new dam. The only water reaching the new dam is that portion that is able to pass over the top of the old dam. As the lake surface drops, the layer of cold water above the old dam is exhausted and the water being released is too warm for the fish downstream from the dam.(16)

The situation becomes most critical when the amount of water in the lake drops below 350,000 ac/ft, about the point where the layer of cold water above the old dam is exhausted. One solution to the problem is to maintain a minimum water level above 350,000 ac/ft. This is difficult when the inflows are not great enough to increase storage while meeting downstream water obligations. When the water level drops below 350,000 ac/ft, cool water passing through the low level outlets of the old dam is diluted by warm water flowing over the old dam, keeping the temperature too high for the fish. This problem continues until the water level falls below the top of the old dam and only cold water is able to pass the old dam. A solution that has been effective when the water level is around 400,000 ac/ft has been to suspend power operations at the powerplant and make low level releases. This solution is effective until the layer of cold water above the old dam runs out. While this helps to keep the water temperature down, suspending power operations reduces revenues from the project. The estimated loss from suspended power operations during the fall of 1994 was over $200,000.(17)

It is now clear that water availability for the New Melones Project is significantly different that expected. When New Melones was studied, estimates of the water available from the project used historical data on annual flows and data pertaining to pre-existing claims to water in the Stanislaus River Basin. The model constructed for the study used data from the years 1922 through 1978. Under this model, the amount of water predicted to be available from the project, approximately 200,000 ac/ft, justified its construction. When data for the years 1979 through 1992 were factored into the model, Reclamation found that the previous estimates of drought and demand were off by a significant amount (California experienced a severe drought beginning in 1987 and lasting through 1992, and demands for releases for water quality improvement were higher than anticipated). Further complicating the situation was passage of the Central Valley Improvement Act (CVPIA) in 1992. This legislation changed water usage priorities. Environmental, water, and wildlife enhancement priorities moved to a level equal to or ahead of other water use priorities. As a result, less water is available to meet the obligations to already existing water users. As a result of passage of the CVPIA and improved understanding of the water availability, it is believed that New Melones does not have a sustainable water supply sufficient to meet existing obligations for

irrigation, wildlife enhancement, and water quality improvement.

Original estimates anticipated that approximately 200,000 ac/ft would be available after pre-existing obligations were met. As a result of those estimates, contracts were negotiated with the Stockton East Water District and the Central San Joaquin Water Conservation District for up to 155,000 ac/ft per year. But during the drought period of 1987 to 1992, pre-existing obligations were not always met, and no water was available to service those contracts. As a result, the Stockton East Water District has filed suit against the Bureau of Reclamation seeking a judgment forcing the Bureau to meet the obligations of their contract. In 1994, the Bureau of Reclamation had to purchase 50,000 ac/ft of water from the Tri-Dam Project at a cost of $50.00 per ac/ft to meet the release requirements for the fall salmon run.(18)

Although plagued by problems, New Melones Dam has provided significant flood control benefits, its original function. Through 1993, the dam and lake prevented a cumulative total of $128,500,000 in flood damage.(19)

Settlement of the Project

The Stanislaus River Basin and the region served by water from the basin were well developed and settled prior to construction of New Melones Dam. Development of the basin has been underway since the late 1800s when water was diverted for mining operations, and later for power generation. The construction of New Melones Dam, which replaced the older, smaller Melones Dam, has not significantly impacted the existing development patterns of the region. It seems unlikely that, unless problems with the lack of a sustainable water supply are overcome, much new development as a result of the construction of the dam will occur.

Uses of Project Water

The primary function of New Melones Dam and Lake is flood control. Of the 2,400,000 ac/ft capacity, 450,000 ac/ft is reserved for flood control purposes. The remaining capacity is used for a number of purposes including the satisfaction of pre-existing water rights, fisheries enhancement, water quality improvement, and electrical generation.(20)

Conclusion

The New Melones Dam stands as a reminder of the conflicts surrounding growth, the environment, and water in the West. The Corps built it at the end of the era of large dam construction. Even without the environmental controversy that surrounds the project, the operational and water yield problems will certainly cause continued difficulties well into the future. With the enormity of the problems facing New Melones, it seems unlikely that the project will ever realize its full potential as a multi use unit. Indeed, new Melones may become a case study of all that can go wrong with a project.

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About the Author

William Joe Simonds was born and raised in Colorado and has a solid understanding of the importance of water in the American West and its effect 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.

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