

# **Parker-Davis Project**

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1997

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## **Parker-Davis Project**

Historically, the Mighty Colorado River sent its boiling, silt-red waters to Baja, California. Now it is a shimmering, beautiful clear blue. The River no longer sporadically carves new river beds and its famous silt load settles behind Glen Canyon Dam. The once tempestuous Colorado has been brought under control through a system of dams, beginning with Glen Canyon in Utah and Arizona and ending with Laguna Dam in the south.

The Colorado has been dubbed the most managed, litigated, and debated river in the world. On the other hand, the Colorado contains some of the greatest engineering marvels of the twentieth century. Hoover Dam was the first to tame the river as well as the tallest dam in the world at the time of its construction. Hoover no longer ranks as the highest dam in the world, but all the tall, concrete arch dams owe their existence to Hoover. Among the dams that owe their existence to Hoover are Parker and Davis Dams just downstream. In their own right these two dams also rank as engineering marvels. Parker has the distinction of being the “deepest” dam in the world with an record setting excavation depth of 250-feet. Built soon after completion of Hoover, Parker put into practice the lessons learned at Hoover. On the other hand, Davis, an earthfill dam, stands nearly as tall above the foundation as Parker Dam does below.

Reclamation engineers tamed the Colorado River; much to the dismay of some and the delight of others. The engineering marvels they created stand as testament to the ingenuity of man, as well as their folly.

### **Project Location**

The Parker Dam Project or Parker Dam Power Project, comprised of Parker Dam and Powerplant, the resulting Lake Havasu Reservoir, and a high voltage transmission system, including substations, is located on the Colorado River between Arizona and Nevada. Parker

Dam, a concrete arch structure, spans the Colorado River just below the mouth of the Bill Williams River, 155 miles downstream of Hoover Dam and eighty-eight miles downstream of Davis Dam.

### **Historic Setting**

### **Prehistoric Setting**

Beginning nearly six thousand years ago people started living next to the Colorado River. The earliest residents were prehistoric American Indians, primitive hunters and gatherers, who used isolated caves located in the walls of the Grand Canyon as religious shrines. In 1933, archeologists discovered remnants of these early cultures in the form of split-willow figurines left within the isolated caves. Recognizing the antiquity of the artifacts, they were then carbon-dated by both the University of Michigan and the University of Arizona and these original artifacts dated back to only 1580 (plus or minus 300 years) or 1150 (plus or minus 110 years) A.D. (the results vary between the two schools responsible for the carbon-dating). An artifact discovered in 1963 was dated 2145 (plus or minus 100 years) B.C. Archeologists believed that these effigies were part of an imitative and ritualistic hunting magic. In 1964 a prominent sandstone and lava-capped pinnacle was discovered a few miles south of the Grand Canyon. Archeologists found evidence within this structure tying its residents to the Pinto Complex, a desert culture people first recognized in the Pinto Basin of the Mojave Desert dating back three or four thousand years. Whatever their actual purpose, these ancient effigies prove the existence of long ago residents who chose to reside within the Grand Canyon's walls. The length of habitation by these early dwellers remains undetermined, however it is believed that these early settlements disappeared by the beginning of the Christian era.

After these early Pinto dwellers disappeared, the Grand Canyon area remained

uninhabited for hundreds of years. The next known record of civilization occurred around 700 A.D. These later Indian dwellers were very different from their Pinto forebearers. These residents were pueblo peoples, most likely descended from the Hopi. Originally thought to be a desert culture like the Pintos, these pueblo peoples evolved into a “basketmaker” culture around 1 A.D. in the Four Corners area. Around 500 A.D. the basketmaker culture evolved into more of a village type culture. As they were expanding their culture the Pueblos also expanded their geographic area, laying the foundation for the later pinnacle of their civilization in the Grand Canyon.

At the same time that the Pueblo peoples were evolving and becoming a more sophisticated civilization, natural changes affected their lifestyle. Precipitation patterns began to vary affecting the maturation of crops; eventually these variations became prolonged drought. The changing climate also brought semi-nomadic, non-Pueblo peoples from the northwest into the Grand Canyon region.

The non-Pueblo peoples, likely ancestors of the Southern Paiute, may have generated an intercultural relationship similar to a “cold war” between the two tribes now inhabiting the Grand Canyon area. Eventually the non-Pueblos reached and settled around the northern rim of the Grand Canyon while the Pueblos consolidated their numbers around the more reliable water courses— the Little Colorado, the Rio Grande and the usually infallible springs of the Hopi country. Just as today, water governed the settlement patterns of the early inhabitants of the Southwest. It was in locations near reliable water that the Spanish explorers found them in the summer of 1540.<sup>1</sup>

### **Historic Setting**

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1. T. H. Watkins, *The Grand Colorado: The Story of a River and its Canyons*, with a forward by Wallace Stegner (American West Publishing Company, 1969), 19-27.

Spanish exploration of the Colorado River began as early as 1539 when Francisco de Ulloa encountered the river while looking for the city of Cibola, one of Montezuma's supposed cities of gold. He claimed the river and surrounding territories in the name of Spain.

Unfortunately, Ulloa, sent by Hernando Cortez to locate the fabled city, never found it, never returned from his failed expedition, and thus was never credited with discovery of the river.

The Europeans who followed Ulloa each called the Colorado by a different name. In 1540, Hernando Alarcon, sent by Francisco Vasquez de Coronado to locate the "Land of Gold," made the first credited European discovery of the Colorado. He named it, El Rio de Buena Guila, which roughly translated means "The River of Good Guidance." Concurrently, Coronado sent Captain Melchoir Diaz to march over land to the west. Diaz also encountered the Colorado, which he named "Rio de Lizon," the "Fire Brand River," for the Indians who had to carry torches to keep the mosquitos away. A third party was also sent by Coronado, this one led by Lopez de Cardenas. Cardenas discovered the south rim of the Grand Canyon and the Colorado. He found the canyon hard to explore and after a few days of trying to reach the bottom he gave up and rejoined Coronado's main party. The river remained unexplored until the padres arrived in 1604.

From 1604 to 1781, the vast territory known as New Spain belonged to the padres. Though they concentrated their efforts along the Rio Grande and the Pacific Coast, the area around the Colorado was a desert, they remained determined to find an overland route between their settlements. In 1604, aiming to find a passable land route Don Juan de Orñate, first governor of New Mexico, began one of the first trips across the desert. On his journey Orñate encountered a river and named it the Colorado because of its muddy, red color. Upon further exploration it was discovered that this was merely a tributary, making Orñate the first European

to discover the Little Colorado River. In his travels Orñate also discovered the actual Colorado, and on January 23, 1605, reached the mouth of the river. His name for the Colorado, the “Rio Grande de Buena,” the “River of Good Hope.”<sup>2</sup> Settlers, mostly Spanish missionaries and priests hoping to convert the local native populations, followed Orñate’s expeditions. Some of these ranchos lasted until the Mormons began settling along the Little Colorado in 1876. The padres continued to settle along the river for the next twenty years or so, but their practice of taking the Hopi women and giving them to the Spanish soldiers eventually backfired when the Hopi’s and Pueblos suddenly rebelled. They killed twenty-one missionaries and four hundred other Spaniards, driving the remainder back to old Mexico. Half a century later, Padre Eusebio Kino took thirty years and mapped the Colorado River area; his name for the Colorado, the Rio de Los Martines.<sup>3</sup>

The next Europeans to try locating a route from Mexico to California, two padres-- Francisco Garcés and Francisco Silvestre Velez de Escalante. Garcés became the first to use the name “Colorado” to distinguish the river, largely because the river drained red country and was tinted red by silt for part of the year. He was also one of the first to discover the extent of the large drainage area of the river; he obtained this information from the Utes, at the same time learning that the Yumas called the river “Javil.” On March 4, 1776, he hired Mojave Indian guides to guide him across the river.

Meanwhile, Francisco Velez de Escalante had been sent to find a route to California. Encountering the Colorado north of the Grand Canyon, Escalante named the river the “Rio del Cosnina,” meaning they had given up their search for Monterey. Escalante crossed the river

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2. Marion V. Allen, *Rio Colorado & Parker Dam*. (Redding, California: River City Printing and Publishing, 1987), 2-9.

3. Allen, 9; Frank Waters, *The Colorado*, (New York: Holt, Rinehart and Winston, 1974; reprint, Athens: Swallow Press/ Ohio University Press, 1985), 149 (page citations are to the reprint edition).

north of Marble Canyon above where John D. Lee established a ferry, which became known as the “Crossing of the Fathers.”

The first American to cross the Colorado arrived in November 1826. Jedediah Smith crossed the Colorado and entered Nevada about the same place that Garcés had in 1776. Unlike the Spanish explorers, Smith did not plant a cross and claim Nevada for the United States. Realizing that if one were going to claim a country one had to be prepared to defend it, Smith merely explored. Much of Smith’s information eventually reached John Frémont, who crossed the Colorado several times in his five trips across Nevada, between 1842 and 1853.

About the same time as Frémont was traipsing across Nevada, another group began to eye the Colorado. The Mormons who had settled in Utah in 1847, under Brigham Young’s leadership, turned to the Colorado in hopes of finding an easier route to their inland empire of Deseret.<sup>4</sup> In 1857, Young sent Rufus Allen to explore the Colorado. Allen reached the Las Vegas, Nevada, area in June, but was called home to help defend Deseret after the Mountain Meadows Massacre and invasion by United States troops. The recall of Allen’s expedition did not signal the end of Mormon expansion on the Colorado, twenty years later they returned as settlers and not just explorers.

While the Mormons were defending their chosen land, in December 1857 Lieutenant Joseph Ives of the Corps of Technological Engineers, US War Department, proved the river could be navigated by sailing from Robinson’s Landing on the mouth of the Colorado, sixty miles south of Yuma, upstream to about four miles north of the later site of Hoover Dam. Lieutenant Ives’ successful navigation of the river met with much excitement in the land of

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4. In 1849, Brigham Young and a significant portion of those practicing the Mormon religion moved west to avoid further persecution. They created a provisional state at the heart of which lay Salt Lake City. Young named their new state Deseret.



Deseret. However, six years passed before Brigham Young was able to establish a settlement along the Colorado.

In November 1864, Young sent Anson Call to locate a suitable landing site on the Colorado. By 1865, Call had built Callville, a dock and fort, about a half-mile south of Echo Wash and about two and a half miles above Black Canyon. Callville lasted only a few years and was defunct by the fall of 1867, however the fort remained. When the gates of Hoover Dam were closed in 1935 the historic fort was submerged by the waters of Lake Mead.<sup>5</sup>

Two years after the Mormons abandoned Callville, on May 24, 1869, the Powell Geographic Expedition set out on the Green River in Wyoming. Lead by Major John Wesley Powell the expedition consisted of four wooden dories and ten men. On this journey Powell christened: Flaming Gorge Canyon, Red Canyon, the Canyon of Lodore, Desolation Canyon, Gray Canyon, Labyrinth Canyon, Stillwater Canyon, Cataract Canyon, Glen Canyon, Marble Canyon, Soap Creek Rapids, Badger Creek Rapids, Crystal Creek Rapids, Lava Falls, and Lava Cliffs. Three months later, at Grand Wash Cliffs, Powell and his remaining men--three had opted to leave the expedition several days earlier--reached the confluence of the Colorado and the Virgin River. They were met by a Mormon group sent by Brigham Young to watch for the Powell expedition, though they were primarily looking for wreckage and information as Powell had been reported dead several times in the newspapers. The knowledge that the Mormons gained from Major Powell and his expedition allowed them to continue with their plans to settle the Colorado.<sup>6</sup>

The next major settlement of the Colorado occurred in 1871 at Lees Ferry, just two years

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5. Allen, 9-19.

6. Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water* (New York: Viking, 1986; reprint, New York: Viking Penguin Books, 1993), 26-34 (page citations are to the reprint edition).

after Major Powell's first expedition. At the request of the Mormon church, John D. Lee, his wives Rachel and Emma, and their children established Lees Ferry, in August 1872. The first actual ferry was launched in January 1873. The first group of colonists, Brigham Young's last great effort to expand the empire of Deseret, arrived in 1873. The colonization effort proved unsuccessful in the name of Deseret, but it paved the way for later permanent settlements.

These later permanent settlements in turn paved the way for development of the Colorado River. The erratic nature of the Colorado—it was prone to floods, droughts, and even to carving itself new banks and channels when the mood struck it—made it the perfect beneficiary of the Bureau of Reclamation. By damming the Colorado, Reclamation could tame the wild river and use it to benefit the settlements that had grown up around the Colorado. The first obstacle to be constructed in the Colorado's path, Hoover Dam.

In December 1928, Congress passed the Boulder Canyon Project Act authorizing construction of a dam at either Black Canyon or Boulder Canyon.<sup>7</sup> Construction of the four diversion tunnels for Hoover Dam at Black Canyon began May 12, 1931, signaling the beginning of the end of the free-flowing Colorado. President Franklin D. Roosevelt dedicated Hoover Dam on September 30, 1935.<sup>8</sup> The filling of Lake Mead behind Hoover Dam resulted in river regulation and power generation, paving the way for construction of Parker Dam, 155 miles downstream.<sup>9</sup>

### **Project Authorization**

Authorization for the Parker Dam Power Project occurred in the Rivers and Harbors Act of August 30, 1935. After feasibility studies had been performed, Secretary of the Interior

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7. Allen, 28-35.

8. Department of the Interior, Bureau of Reclamation, *The Boulder Canyon Project: Hoover Dam*, by Wm. Joe Simonds, project history, Bureau of Reclamation History Program. (Denver, Colorado: Bureau of Reclamation, 1995), 26, 58.

9. *Project Data*, 769.

Harold Ickes authorized the Davis Dam Project on April 26, 1941, under provisions of the Reclamation Project Act of 1939.

On May 28, 1954, the Parker Dam Power Project and the Davis Dam Project were consolidated into the Parker-Davis Project. Each project was authorized and constructed separately but their proximity and the interconnection of power development between the two systems prompted consolidation of the two projects.<sup>10</sup>

### **Construction History**

One of the most unusual dams in the world, Parker Dam has a structural height of 320 feet, of which only eighty-five feet extend above the river bed. This distinguishes Parker as the “deepest dam” in the world. In order to reach bedrock for the foundation, 235 feet below the normal riverbed, 1,700,000 cubic yards of riverfill had to be excavated. The dam itself contains 380,000 cubic yards of concrete. Its crest length extends 856 feet with five fifty-foot square gates to control river flows. Lake Havasu, with a storage capacity of 648,000 acre-feet, backs up behind the dam for forty-five miles.

The Parker Powerplant, including a penstock gate structure, four penstock tunnels, and a powerplant building, sits immediately downstream from the dam on the California side of the River. The penstocks and tunnels transport water from the forebay on the California side of the dam through the powerhouse structure. Each of the tunnels and penstocks measures twenty-two feet in diameter with a water capacity of 5,575 cubic feet per second (cfs).<sup>11</sup>

The Davis Dam Project, comprised of the Davis Dam and Powerplant, and Lake Mohave Reservoir, is located on the Colorado River between Arizona and Nevada. Davis Dam, a zoned

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10. United States Department of Interior, Water and Power Resources Service, *Project Data*, Denver: U.S. Government Printing Office, 1981, 770.

11. United States Department of Interior, Water and Power Resources Service, *Project Data*, Denver: U.S. Government Printing Office, 1981, 767-8; Eric B. Kollgaard and Wallace L. Chadwick, eds, *Development of Dam Engineering in the United States* (New York: Pergamon Press, 1988), 428-30.

earthfill structure with a concrete spillway, intake structure, and powerplant, spans the Colorado River in Pyramid Canyon, sixty-seven miles downstream from Hoover Dam and eighty-eight miles upstream from Parker Dam. In the early investigations of the Colorado River, the damsite was known as Bullshead Dam after a large rock formation in the vicinity of the project. Just prior to the start of construction activities, Reclamation renamed the project the Davis Dam Project after Arthur Powell Davis, former Chief Engineer and Director of the Reclamation Service.<sup>12</sup>

Davis Dam rises 200 feet above the lowest point of the foundation and about 140 feet above the level of the river. Its crest length runs 1,600 feet, with a top width of fifty feet. Lake Mohave, with a total storage capacity of 1,818,300 acre-feet, extends, at high water stage, sixty-seven miles upstream to the tailrace of Hoover Powerplant.

Almost five million cubic yards of earth and rock was excavated to form the diversion, forebay channel, foundations for the dam, spillways, intake structures, and powerplant. Conversely, formation of the dam and other structures required more than 3,642,000 cubic yards of earth and rockfill, around 600,000 cubic yards of concrete, and twenty-three million pounds of reinforcing steel for the spillway, powerplant, and other structures.

The Davis Powerplant, a semi-outdoor type structure, sits immediately downstream from the dam embankment on the Arizona side of the river. From the forebay, water is delivered to the Powerplant through five penstocks, each twenty-two feet in diameter.

Together the Parker-Davis Project contained within its transmission system, thirty-one substations with a total capacity of 2,113,083 kilovolt-amperes, and fifty-one transmission lines

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12. Arthur Powell Davis served as Chief Engineer of the United States Reclamation Service from April 1907 to May 1920. Mr. Davis served as Director from 1914-1923. From 1914 to 1923, his official title was Director and Chief Engineer.

with a total length of 1,609.2 miles. Near the powerplants, high-voltage switchyards provide takeoff points for a system of transmission lines and substations interconnecting the Davis, Hoover, and Parker Powerplants. This system extends to load centers in central and southern Arizona, southern Nevada, and southern California.<sup>13</sup>

### **Parker Dam and Powerplant**

On February 10, 1933, the Bureau of Reclamation contracted with the Metropolitan Water District of Southern California (MWD) for the cooperative construction and operation of Parker Dam. Based on provisions in this contract, the MWD advanced funds for construction of the dam; its purpose being to provide a reservoir of clear water from which the MWD could pump a maximum supply of 1,500 cubic feet per second (cfs) of Colorado River water. With the funds provided by the MWD, on August 25, 1934, Reclamation awarded the contract for construction of Parker Dam to Six Companies, Inc. of Delaware, Boulder City, Nevada; Six Companies was also responsible for the construction of Hoover Dam. Six Companies began work on the Parker Dam Camp and a contractor's bridge across the Colorado River, just over a month later on October 1.

The start of construction on the Parker Dam met with some resistance in the office of Benjamin B. Moeur, the Governor of Arizona. Moeur, still outraged at California's attempt to allocate the lion's share of Colorado River water, viewed Parker Dam as yet another attempt to usurp Arizona's rightful share of the Colorado; among other things, California insisted that the in-state flows of the Gila River be deducted from Arizona's 2.8 million acre-feet allotted in the Colorado River Compact. Deciding that California's continued political maneuvering was akin to declaring war, Moeur opted to begin waging a real war of sorts. On November 10, 1934, he

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13. United States Department of Interior, Water and Power Resources Service, *Project Data*, Denver: U.S. Government Printing Office, 1981, 768-9.

issued a proclamation declaring martial law and ordered the Arizona National Guard to take possession of the territory surrounding the Arizona side of Parker Dam.

An advance expeditionary force, comprised of Major F. I. Pomeroy, 158<sup>th</sup> Infantry Regiment, Arizona National Guard, three privates and a cook, was ordered to the site. Upon arrival, the Arizona Army became the Arizona Navy, when Major Pomeroy requisitioned a ferry from the town of Parker and set out to inspect the damsite.<sup>14</sup>

Major Pomeroy acquired the boats to turn his Army into a Navy from Mrs. Nellie T. Bush, who happened to be a member of the Arizona legislature. Due to her position, the Major put Mrs. Bush in charge of the boats, which one might argue, gave her the distinction of being the first female admiral in American history.

Three days later, Secretary of the Interior Harold Ickes suspended all construction work on the Dam. These events generated a fair amount of interest on the part of the press. According to Marion Allen, newspaper headlines of the events included: Arizona Declares War!, Arizona—the Only Inland State with a Navy!, and Parker Dam War.<sup>15</sup>

Though official work on the project had been suspended, on November 27, 1934, construction work began on the government camp buildings. The Chief of Engineer of the U.S. Army recommended, and the Secretary of War approved, on December 24, 1934, the plans for construction of the dam. Section nine of the Act of March 3, 1899, forbid the construction of any dam in any navigable river without the consent of Congress and approval of the plans by the Chief of Engineers and the Secretary of War; because the Colorado was classified as a navigable river this act applied to Reclamation in regards to the construction of Parker Dam.

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14. Reisner, 257-8; Denver Colorado, National Archives and Records Administration: Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115, “Annual Project History, Parker Dam Project, Arizona-Nevada” Vol I, 1934-5, 7, 8, 14, 29-31.

15. Allen, 48, 50; “Annual Project History, Parker Dam Project, Arizona-Nevada” Vol I, 1934-5, 7, 8, 29-31.

The United States, on January 14, 1935, filed its bill in the United States Supreme Court to perpetually enjoin Arizona's interference with the construction of the Dam. On February 11, 1935, the Court issued a preliminary injunction preventing the Governor of Arizona from interfering with construction activities on the project. The following day, the Secretary of the Interior ordered work to resume. The contractor returned to work and on February 21, 1935, excavation in the diversion tunnel outlet channel began. Work proved to be short lived, however, when on April 29, 1935, the Supreme Court dismissed the bill, stating that the dam had not been approved by the President. The following day, Secretary Ickes again notified the contractor to suspend operations.

Arizona's victory did not last long, as on August 30, 1935, Congress passed the Rivers and Harbors Bill, which included authorization for Parker Dam. President Franklin Roosevelt signed the Bill into law same day. Reclamation notified the contractor to proceed with construction operations on September 3, 1935. Almost six weeks later, on October 15, the contractor resumed operations.<sup>16</sup>

A fire broke out, on February 3, 1936, in one of the contractor's dormitories. The dormitory was destroyed as was the building which housed the mess hall, commissary, recreation hall, barber shop, and post office. Seven men lost their lives in the fire and three more later died in the hospital due to serious burns. The tragedy prompted the contractor to rebuild the buildings with better fireproof construction as well as improved the existing structures.

On March 16, 1936, Six Companies, Inc., sublet the contract for construction of Parker Dam and appurtenant works to J. F. Shea Company, Inc., one of the original Six Companies. After completion of Hoover Dam, Frank Crowe, general superintendent, assumed the same

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16. "Annual Project History, Parker Dam Project, Arizona-Nevada" Vol I, 1934-5, 7, 8, 29-31.

position on the Parker Dam Project to direct the work for J. F. Shea Company, Inc. E. A. Moritz was construction engineer for Reclamation under the direct supervision of Chief Engineer, Raymond Walter.

The change in contractors did not impact work on the project and on April 5, 1936, Diversion Tunnel No. 2 was holed through. Diversion Tunnel No. 1 followed eight days later on April 13. The contractor completed the concrete lining of the tunnels on May 19. Work progressed steadily until August 15, when the contractor suspended operations due to the intense heat of summer; work resumed in September. Diversion of the Colorado River through the tunnels was accomplished on October 23, and on November 26, work began on the upper cofferdam.<sup>17</sup>

The unfinished cofferdam proved its worth on February 7, 1937, when the Bill Williams River flooded. A peak discharge of 92,500 second feet (sf) raised water in front of the cofferdam to an elevation of 405 feet. The work crews endured a busy twenty-four hours; fortunately work on the cofferdam had progressed far enough that only minimal damage ensued, most of which resulted from the washout of the contractor's bridge across the Colorado River. The suddenness of the flood reinforced the need for adequate flood control along the Colorado.

The year 1937, proved eventful on the project even after the flood waters receded in February. At noon, April 23, the contractors' employees went on strike, establishing picket lines near the employment office. Though there was no point of contention, wages were increasing and unions had been organizing on Parker Dam; both the American Federation of Labor (A. F. of L.) and the Congress of Industrial Organizations (C.I.O.) were trying to get a contract to represent the men. A rope attached to the employment office established one side as A. F. of L.

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17. Allen, 58-9; "Annual Project History, Parker Dam Project, Arizona-Nevada" Vol II, 1936, 6, 10.



and the other C.I.O. Rumors changed daily about which side would win the contract, and the picket lines reflected the rumors accordingly. Men would change sides based on the current rumors, demonstrating the necessity of finding work in the midst of the Great Depression, as well as the lack of loyalty to both unions. On April 30, the issue was resolved when the contractor announced only A. F. of L. men would be hired. The employment boss, Mr. MacAdams later commented to Val Allen that he could not understand how so many C.I.O. men could vanish into thin air and so many A.F. of L. members could appear so quickly. In protest of the decision, the remaining C.I.O. members maintained their picket line, until May 3, when the contractor removed them from the camp area and posted guards at the entrance.<sup>18</sup>

The strike did not significantly impact the progress of construction, and on July 29, 1937, at 5:23 p.m. the contractor placed the first bucket of concrete in the dam, thereby starting concrete work on the project. By October 15, concrete work had progressed to the point that it was necessary to begin cooling operations of the concrete mass. Concrete heats up as it cures and expands; then when it contracts it cracks. To prevent cracking, the concrete at Parker Dam was artificially cooled using the same procedures developed during the construction of Hoover Dam. Cooling pipes were embedded in the concrete and then cold river water run through the pipes to cool the concrete at a more rapid rate.

Though the original authorization for the Parker Dam Project included provisions for power development, Reclamation deferred construction of a powerplant until power demand in the Southwest increased. Work began on the powerplant substructure on November 6, 1937, when the first concrete was placed.<sup>19</sup> Because plans called for the eventual construction of a powerplant, it was decided that work would progress on the powerplant substructure so that it

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18. Allen, 69; "Annual Project History, Parker Dam Project, Arizona-Nevada" Vol III, 1937, 9.

19. "Annual Project History, Parker Dam Project, Arizona-Nevada" Vol III, 1937, 9, 79.

could later serve as a cofferdam for the powerplant construction. The substructure was completed on March 31, 1938.

The contractor completed cooling operations at the dam on February 22, 1938, about four months after beginning them. A second flooding of the Bill Williams River followed on March 3 and 4.

On April 7, a crack was discovered in the downstream face of the dam on the California abutment. The cracking did not extend past the surface so the cracked portions could be chipped out and replaced with little difficulty. Replacement of the cracked concrete was completed with efficiency.

In preparation for the end of the Colorado River diversion, the contractor completed the cooling and grouting of the Diversion Tunnel No. 1 plug on June 22, 1938; concreting of the tunnel closure had been completed on May 16. On June 18, the contractor completed removal of the cofferdams. On the morning of July 1, 1938, the Colorado River returned to the river bed. Later the same day water began flowing over the spillways, the spillway gates were not closed until October so the contractor could finish work at the dam. The closure of Diversion Tunnel No. 2 occurred on July 16. Final cooling and grouting was completed on August 13. The contractor finished placement of the forebay trashrack structure on July 20, and on July 26, the last concrete was placed in Parker Dam. The reservoir began filling on October 16. The structure was dedicated November 19, 1938, in a ceremony sponsored by the MWD.<sup>20</sup>

On January 5, 1939, Lake Havasu received its name. A Mojave Indian said to be 102 years old and his ninety-seven year old wife stood on the bank overlooking the newly made lake. Amazed by the clear, sparkling blue water, they called it in their native language “Havasu”,

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20. “Annual Project History, Parker Dam Project, Arizona-Nevada” Vol IV, 1938, 9, 10, 83.

meaning “blue water.” The name, officially given to the fifty-mile long body of water by the officials of the Bureau of Reclamation, was approved by the U.S. Board of Geographic Names on May 26, 1939. On January 7, the MWD held a ceremony dedicating Parker Dam and the Colorado River Aqueduct.; the second dedication ceremony for Parker. The Aqueduct, extending from the banks of Lake Havasu two miles above Parker Dam to Cajaloo Reservoir near Riverside, California, acts as a distribution system leading to various consumption centers of the Los Angeles metropolitan area, otherwise known as the “thirteen Golden Cities.”<sup>21</sup>

Soon after the Dam’s second dedication, it was transferred to Operation and Maintenance (O&M) status under the authority of the Construction Engineer, All-American Canal Project, Yuma, Arizona.

Construction of the Parker Powerplant began on August 7, 1939, much earlier than originally anticipated; it had been thought that construction of the powerhouse was at least ten years distant after completion of the dam. Demand for power in central Arizona provided the impetus for the start of construction activities. The original contract between Reclamation and the MWD provided for joint power generation on the project. On May 2, Congress appropriated funds for construction of the Parker Dam Power Project. Though it was in reality an addition to the Parker Dam Project, the second phase of construction was known as the Parker Dam Power Project. Before the Parker Project’s consolidation with the Davis Project, to form the Parker-Davis Project, the entire Parker Project remained the Parker Dam Power Project.

Dwight Chapin, Jr., transmission lines contractor, initiated work on the power project when he began installation of transmission towers in the vicinity of the project. Reconnaissance survey’s for the powerlines had been initiated on March 6. Excavation for the powerhouse

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21. “Annual Project History, Parker Dam Project, Arizona-Nevada” Vol V, 1939, 8-10.

structure began soon after when Clyde W. Wood began work on November 13, 1939, one week before Reclamation issued the notice to proceed on November 20.<sup>22</sup>

Work progressed steadily and on January 31, 1940, the Parker Dam-Phoenix Transmission line was energized. For the second time, on August 8, 1940, the contractor placed the first concrete in the powerhouse substructure; the first time occurred when the substructure was constructed with the intention of its becoming a cofferdam to aid in later construction activities.<sup>23</sup>

Line work continued in 1941, as did work on the Phoenix Substation. Excavation for the synchronous condenser and control house building began in July and the building had been completed, except for finishing work, by December. If the necessary equipment could be procured, the substation was expected to be completed in September 1942.

The end of 1941, saw a drastic change in construction, as well as O&M activities, on the Parker Dam Power Project, as it did for the rest of the world. The National Emergency declared by President Roosevelt on December 7, 1941, just after the bombing of Pearl Harbor, Hawaii, prompted the closing of the roads leading to Parker Dam. In a general notice issued by S. A. McWilliams, construction engineer on December 9, all roads leading to Parker Dam and the MWD aqueduct facilities were closed to everyone except Reclamation and MWD employees, their families, and other persons able to prove they had bonafide business in the area.

On December 17, 1941, McWilliams issued National Defense Bulletin No. 1, detailing instructions for persons residing or coming into the Parker Dam area. Lake Havasu, from Hayden's Camp north of the Intake Pumping Plant for one mile up the Bill Williams River, was closed to all boats. The Colorado River was closed to all boats and fishing from the dam to the

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22. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol I, 1939, 1, 7, 8, 11-2.

23. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol II, 1940, 7, 8.

No. 1 Guard Station. Everyone was instructed to stay out of and away from any materials storage areas. Likewise, everyone had to stay out of the hills overlooking the dam and camp areas. Anyone violating instructions could be fired upon by the guards or soldiers guarding these areas.<sup>24</sup> Troops were stationed accordingly, however on April 20, 1942, they vacated their posts at Parker Dam.

The Nation's attentions turned toward national defense in the days following Pearl Harbor, and the production of power played an important defensive role. As such, work continued on the Parker Dam Power Project throughout the war years.

Major work completed on the project included, the concrete powerplant structure and appurtenant structures, and the installation of several major items of machinery. On September 29, 1942, the Generating Unit 1 penstock was filled, the wicket gates partially opened to allow water to rotate the turbine, and the unit started. After running for a short period Reclamation shut down the unit for minor work. The unit was restarted the following day and continued operations at one-third to one-half speed. On December 13, 1942, Reclamation placed generating Units 1 and 3 and the Parker-Phoenix transmission line into commercial operation.

Reclamation awarded several construction contracts in 1942. Fritz Ziebarth received the contract for the Phoenix-Tucson line and the Gila-Drop No. 4 line; the Phoenix-Tucson line was subsequently subcontracted to Larson Construction Company; the line was completed August 21 and the Coolidge-Tucson portion placed into service delivering power from the Indian Service System to Tucson. Fritz Ziebarth could not complete the Gila-Drop No. 4 line because access to five miles of right-of-way on Indian lands had not been obtained. All but this five miles, near the Gila end of the line was completed by August and Reclamation released Ziebarth from his

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24. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol III, 1941, 41, 58, 59.

contract.

The Chief Engineer negotiated a contract with Larson Construction Company of Denver, Colorado, for the construction of the Parker-Bagdad Mine transmission line. Work began in November and was completed early in 1943. Continued construction fell under the jurisdiction of the War Program, because of the increased National demand for copper. Bagdad Copper Corporation advanced the funds for construction of the line.

In May work began on the Coolidge and Tucson Substations. Sufficient equipment and temporary structures were installed to get the substations into service to meet the urgent power demand in the Tucson area. Although considerable work remained, both substations were energized and placed into service on August 21, 1942. Erection of the Gila and Drop 4 Substations began soon after and continued throughout the remainder of the year. As with Coolidge and Tucson much of the work was temporary in nature; all of these installations had to wait until the end of the war for final completion.<sup>25</sup>

In 1943 the remaining two generating units in the Parker Powerplant went on line. Unit 2, of the Parker Powerplant was placed in commercial service on January 3, 1943, and Unit 4 on May 28. Campsey Construction Company began work on the Gila-Yuma 34.5 kV transmission line on January 25, and completed it March 3. On May 31, Reclamation placed the Phoenix-Tucson line in operation. The Gila-Drop 4 transmission line and the Gila Substation were energized on July 31; the line had been completed on June 23. In addition, the Coolidge Substation was completed and energized on May 31, 1943. By the close of 1943, the Parker Powerplant was substantially complete with all four generating units in operation. Despite the powerplant's essential completion, it was not released to O&M status due to the temporary

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25. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol IV, 1942, 5, 12, 34, 42-3, 46, 47.

nature of much of the construction.<sup>26</sup>

Beginning in 1944 officials of the Parker Dam Power Project was called on to supervise the construction of the Davis-Phoenix transmission line. They awarded the contract to Larson Construction Company on December 21, 1944, and work began January 3, 1945. The line had been completed by November 14, 1945, and was placed in operation December 16, 1945.<sup>27</sup>

The Parker-Davis 230-kV transmission line was energized from Davis Dam on December 31, 1950. In addition, on November 9, 1950, Blythe Substation, used for the first time though incomplete, delivered emergency power to the California Electric Power Company.<sup>28</sup> With one transformer in operation, the Electrical District (ED)-4 Substation was placed in operation on December 21, 1950.

Work on Blythe Substation was substantially complete February 13, 1951, and released for operation April 6, 1951. Reclamation accepted all work as complete on July 8, 1951, after placing the Substation in commercial operation on May 1, 1951.

Generally 1950 and 1951, proved to be busy years for substation construction. The ED-2 Substation was placed in operation January 9, 1951. Coolidge Substation began commercial service April 13, 1951; Hufford and Kyger began construction on November 20, 1950, and the substation was finished and released for operation April 6, 1951. Vyne Brothers Electric Company began work on the Prescott Substation October 2, 1950. The substation was completed, accepted, and released to O&M April 4, 1951. Prescott Substation began commercial service April 13, 1951. Newbery Electric Company, Yuma, Arizona, on December 15, 1950, began work on the Wellton-Mohawk Switchyards, which were energized August 22, 1951.

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26. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol V, 1943, 5, 41, 45, 46.

27. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol VI, 1944, 41; "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol VII, 1945, 7.

28. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol VIII, 1946, 8; "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol XI, 1950, 145.

Arrow Construction Company, on June 12, 1951, began work on Knob Substation. In February of the following year, Knob Substation was placed in service as a switching station. On June 1, 1951, Mesa Substation was placed in service.

In addition, Bureau personnel took over operation of two other Substations during the calendar year. Operation of the Phoenix Substation was transferred from the Central Arizona Light and Power Company on January 1, 1951. The Colorado River Commission of Nevada transferred operation of the Hoover-Basic 230-kV transmission system and the Basic 230-kV Substation June 1, 1951.<sup>29</sup>

Nearly all of the substations completed in 1951, were released to O&M in 1952: Prescott Substation on January 8; Knob Substation on February 9; Mesa Substation and ED No. 5 on February 14; Maricopa Substation on April 1; Cochise Substation on May 16; and Tucson Substation Addition on December 14. The following substations were also placed in commercial service in 1952: Knob Substation, February 10; ED No. 5 Substation, February 20; Maricopa Substation, April 3; Prescott Substation, April 13; Cochise Substation, May 17; Wellton-Mohawk Switchyard and Pumping Plant No. 1 Switchyard, August 15; and Pumping Plant No. 2. Switchyard, September 27.<sup>30</sup> The initialization and transfer of these features signaled the end of construction on the Parker Dam Power Project in 1952.

### **Davis Dam and Powerplant**

Original investigations of Pyramid Canyon, the later site of Davis Dam, began as early as 1902-1903. These initial investigations proved the site infeasible due to the inability to control the Colorado River. After authorization of Hoover Dam in 1928, additional investigations and

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29. "Annual Project History, Parker Dam Power Project, Arizona-Nevada" Vol XII, 1951, 20, 23, 26, 36, 40, 45, 48, 50, 115, 116, 117.

30. "Annual Project History, Parker Dam Power Project, Arizona-California-Nevada" Vol XIII, 1952, 8.



explorations of Pyramid Canyon occurred. These later investigations provided the basis for authorization of the Davis Dam Project in April 1941.

The main reason for selecting the Pyramid Canyon site was the ease of power development, necessary to meet the rapidly increasing demand for electrical energy in the Pacific southwest. In addition, the site provided for better regulation of the river for irrigation, flood control, and improvement of navigation on the river.<sup>31</sup>

An additional reason for construction of the Davis Dam presented itself in the form of the Mexican Treaty of 1944. This Treaty required that the United States construct the Dam in order to provide Mexico with a regulated flow of the Colorado River.<sup>32</sup>

During the course of investigations of the areas to be inundated by Lake Mohave, an almost forgotten mining camp was rediscovered. Eldorado, located at the mouth of Eldorado Canyon, thrived for about fifty-years before it faltered. Reclamation engineers discovered that the camp cemetery would be near the reservoir line and in danger of washing away when Davis Dam was completed. When the town of Eldorado was established is unknown, however it is estimated that gold was first discovered in the canyon in 1857, with the establishment of the Honest Miner mine. As with most mining towns, Eldorado's lifetime can be traced through post office records. Records of the Post Office Department show a post office was established in January 1879; the last postmaster was Charles Gracey and the post office closed on August 31, 1907. The town had been located on the river bank due to the necessity of water for the mill and transportation of supplies from Yuma. As the town was situated right on the river bank, it was inevitable that during one of the river's high floods much of the town would be washed away.

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31. Denver Colorado, National Archives and Records Administration: Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115, "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol I, 1942, vi-vii, 1, 46.

32. *Project Data*, 768-9.

The inevitable occurred prior to construction of Hoover Dam. All that remained of Eldorado, two of the mill buildings, an antiquated steam tractor, and thirteen of the cemetery's graves—an estimated one-third of the cemetery.

The remaining thirteen graves of Eldorado's cemetery, needed to be moved prior to the completion of Davis Dam. Of the thirteen only three retained legible headstones, so Reclamation set out to discover the identities of the remaining ten cemetery inhabitants. Though they were unable to identify the remaining bodies, Reclamation did turn up some interesting folk tales about their deaths.

One such tale involved the murder of five men by a Paiute Indian named Avote. Two teamsters driving an ore wagon, Lars Frandsen and another man, stopped at Huess Spring one mile below the Nelson townsite to rest and water the horses. Avote, well known for his jealousy concerning his good-looking squaw, hid on a bluff overlooking the spring and was heard muttering threats regarding Frandsen and the other teamster. As the men got ready to leave, Avote shot them both. Apparently, after this shooting Avote decided to wipe out all the white men in the canyon and return it to the Indians. His next victim, Charles Nelson, for whom the town of Nelson was named. Charlie Monohan, a partner in the firm of Monohan and Murphy, and Judge Morton were his last two victims. A posse formed to search for the Indian, which found Avote on Cottonwood Island and brought his head back in a burlap bag. Lars Frandsen's headstone was one of the remaining three legible ones. The graves themselves were moved without incident, despite the fact that the remaining ten graves were never identified.<sup>33</sup>

Though authorization for the project occurred in April 1941, initial work on the Davis Dam Project did not begin until June 1942. Work commenced when government forces started

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33. John A. Leveritt, "Thirteen Graves in Eldorado," *Reclamation Era* 34 (March 1948): 53-4, back cover.

construction on several temporary camp houses. On June 25, 1942, Utah Construction Company and Reclamation signed the contract for construction of Davis Dam and Powerhouse. There were eight other construction firms associated with the Utah Construction Company in this venture: Morrison-Knudsen Company; MacDonald and Kahn, Inc.; J. F. Shea Company, Inc.; J. H. Pomeroy and Company; Winston Brothers Company; Raymond Concrete Pipe Company; Griffith Company; and J. Stanley Bent. Reclamation awarded the contract for furnishing of five 45,000 kW generators to General Electric Company on June 29, 1942.

Utah Construction Company began work on August 10, 1942, with establishment of a construction office in Kingman, Arizona. Construction of a transmission line to the damsite began on August 26; except for the stringing of the conductor the transmission line was completed December 16. Two weeks later, on September 12, actual drilling and blasting of rock in the diversion and forebay channel, forebay structures, and powerhouse areas began. Subsequent, excavation of materials from the diversion channel, forebay structures and powerhouse areas started October 5.

On October 27, 1942, the War Production Board issued an order revoking preference rating, providing for immediate cessation of construction except work necessary to prevent damage to, or deterioration of materials. The War Production Board subsequently granted permission, on November 14, to continue construction until further notice; and work on the excavation work in the diversion channel, forebay, spillway, and powerplant areas continued until November 26. On December 24, 1942, the Contracting Officer issued a notice to the Utah Construction Company to stop work, except as provided in the War Production Board's order of October 27.<sup>34</sup> On February 20, 1943, Reclamation formally terminated their contract with the

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34. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol I, 1942, vi-vii, 1, 46.

Utah Construction Company for construction of the Davis Dam and Powerhouse. After cancellation of the contract and issuance of the War Production notice all work on the Davis Dam Project ceased for the duration of World War II.

On July 10, 1945, nearing the end of World War II, the War Productions Board approved resumption of construction of the Davis Dam and Powerplant. Reclamation awarded a new construction contract to the Utah Construction Company on January 15, 1946, after the war ended. The Contractor received a notice to proceed on March 22, 1946, and began excavation of the Switchyard and Powerplant area and the Diversion and Forebay channel on April 3. Power for construction purposes was made available on the Davis-Needles transmission line April 13.

Official construction of Davis Dam began on April 19, 1946, with appropriate ceremony. The ceremonies were attended by representatives of the press, radio, newsreels, the contractor, and the government.

Unofficial acknowledgment of the start of construction occurred on December 16, 1946, with completion of the transfer of project personnel and records from temporary quarters in Kingman, Arizona to the damsite.

Reclamation awarded additional contracts for construction in 1946. The first went to Charles J. Dorfman, of Los Angeles, California, for construction of Davis Government Camp streets and utilities on February 28. On April 25, W. S. Ford, of Kingman, Arizona, received the contract for the construction of seven six-room and thirteen five-room permanent residences at Davis Government Camp. Finally, Reclamation awarded a contract to Baldwin Locomotive Works, Eddystone, Pennsylvania, to provide five hydraulic turbines for the powerplant. In addition, the Utah Construction Company subcontracted with D. G. Longtin Company of San

Francisco, California, for grouting operations.<sup>35</sup>

In 1947, the Department of Interior extended the Lake Mead Recreation Area, administered by the National Park Service, to include the Davis Dam Reservoir and surrounding areas. A small area around the dam and government camp was excluded to provide for continued construction of the project. The extension of the Recreation Area did not have a noticeable affect on the progress of construction.<sup>36</sup>

Work continued steadily throughout 1947. Charles J. Dorfman completed the contract for streets, sidewalks, water mains, and a sewage system of the Government Camp on January 30. Utah Construction Company completed excavation of the diversion and forebay channel in February in accordance with the original plans; foundations for the spillway and intake structures were virtually complete in February, as well. On April 24, W. S. Ford finished construction of twenty permanent houses in the Government Camp. The first concrete was placed in the gravity wall on May 7. The Donovan Construction Company, on September 27, completed the Davis-Kingman 69-kV transmission line. The permanent warehouse was completed on November 26, by W. S. Ford Company, occupation of the structure began in January 1948. On December 9, the subcontractor completed foundation grouting in major portions of the spillway and intake structure areas.<sup>37</sup>

The completion of foundation grouting in 1947, paved the way for the start of large scale concrete placement operations in the spillway structure in January 1948; subsequent placing of concrete in the intake structure began in February. Meanwhile work continued on the Davis Dam Camp. John Bohannon, completed forty prefabricated houses, twenty in January and the

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35. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol II, 1946, 13, 14, 69, 82.

36. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol IV, 1948, 12.

37. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol III, 1947, 4.

remaining twenty in March. Also in January W. S. Ford finished construction of the garage and fire station. In March construction began on the highway bridge pier; work was completed in October. Clearing operations for the reservoir began in April. Also in April, contractors completed the removal of temporary construction buildings and clean up of work areas in the Government camp.

Initial diversion of the Colorado River around the damsite occurred between June 26 and 28, 1948. In July, the unwatering of the stream bed was completed and excavation for the dam embankment cut-off trench, tailrace, channel, and powerplant began. The first placement of impervious materials in the dam embankment cut-off trench started in October, followed by placement of riprap in the tailrace channel in November. In addition, in November, the first mass concrete was placed in the fault zone below the structural grade in the power plant.

In 1948, after completion of the preliminary surveys for the 230-kV Davis-Prescott and Davis-Hoover transmission lines, all of the Davis Dam Project line and substations were transferred to the Parker Dam Power Project for administration of construction. Under the direction of the Project Engineer, Parker Dam, California, work on the transmission lines and substations continued on schedule. On March 29, 1948, erection of three 30,000-kVa transformers, furnished by Allis-Chalmers Manufacturing Company, for the 230-kV switchyard began; together with the metering transformers, these transformers were placed in operation on Jun 7, 1948. On April 20, 1948, Reclamation energized the Phoenix-Tucson No 2 transmission line between Phoenix and Electrical District (ED) No 5 Substation.<sup>38</sup>

In February 1949, the contractor placed the first structural concrete in the powerplant installation of penstocks. Penstock installation was completed in October. The penstocks had

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38. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol IV, 1948, 5, 10, 42.

been fabricated on site by Southwest Welding and Manufacturing Company according to Reclamation specifications. The fabricator was also responsible for welding smaller sections of the penstocks together after they had been installed by the general contractor. By December the installation of penstock fixed-wheel gates and outlet structure radial gates had been substantially completed, which provided for the start of the second stage diversion of the Colorado River early in 1950. Also in February, the contractor placed the first concrete in the powerhouse structure; by year's end portions of the structure had neared full height. Metalwork, the erection of cranes, installation of penstocks, gates, embedded turbine parts, became a major part of powerhouse work in 1949. Most of the work was handled by subcontractor, J. H. Pomeroy and Sons.

During the month of April 1949, the Parker Dam Project Office moved from Parker Dam into the same building occupied by the Davis Dam Transmission System Design Unit. Work continued on the transmission lines. Reclamation awarded a contract, through the Parker Dam Office, to United Concrete Pipe Corporation, Ralph A. Bell, and Arizona Sand and Rock Company for the construction of foundations and erection of steel transmission towers. All work was completed on the Davis-Hoover transmission line by the end of the calendar year. Work also began and was over half-way completed on the Davis-Prescott transmission line.

As work progressed on the powerplant structure, the dam itself began to take shape. In April, the dam embankment reached full height. Construction of the concrete intake and spillway structures, except for the spillway crest, bridge, and superstructure, finished in May; portions of the spillway superstructure and the spillway crest were left low to provide temporary diversion slots. Work continued throughout the year on the remaining portions of the spillway bridge and superstructure. By year's end the roadway bridge over the spillway and two of the three sections of the walkway bridge were complete. In September the parapet wall on top of the

dam embankment on the upstream side, along with concrete curbs for the roadway on the downstream crest, were completed. All foundation grouting ended in October as did construction of the trashrack structures and slope paving of the forebay channel.

As construction progress, minor cracking on the concrete surfaces of the dam was observed. The contractor took steps to correct the problem. The cracking was thought to be caused by the application of rather cold (62 F) river water on hot (sometimes 125 F) concrete surfaces.<sup>39</sup>

In January 1950, second-stage diversion of the Colorado River took place. The placing of concrete in the temporary diversion slots and the completion of the spillway crest followed. The spillway superstructure was completed in April, and the crest concrete in June. Installation of spillway regulating gates began in June and finished in October. The removal of the downstream cofferdam began in May.

In August, Reclamation issued an amendatory agreement providing for the expedited installation of powerplant machinery. This agreement permitted the early installation of electrical and mechanical equipment in the powerhouse. The Utah Construction Company had essentially completed the entire powerplant structure in December, including all concrete placement, allowing operation on dry-out and test runs.<sup>40</sup>

On January 5, 1951, Reclamation placed Unit 1 of Davis Powerplant in service, complete with appropriate ceremony. In his office in the Department of the Interior, Oscar Chapman, Secretary of the Interior, pressed a telegraph key, a special gold-plated instrument, borrowed from the White House to start the first generator. A remote control Western Union transmission

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39. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol V, 1949, 5, 10-1, 22-3, 25-9, 34, 36, 108-9.

40. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol VI, 1950, 5, 11-2, 24.



line transmitted the Secretary's signal to Davis Dam. Prior to the start of the generator, the Secretary sent a message to those witnessing the event at Davis Dam. "I am happy to extend greetings to the people of the Pacific Southwest on this important occasion . . . The Lower Colorado River development is a shining example of what a free democracy can accomplish in utilizing the national resources for the benefit of its people."<sup>41</sup>

On January 18, nearly two weeks later, when Unit 2 was started for the first time the thrust bearing over-heated and failed. On April 4, Unit 2 was successfully restarted and placed in operation April 13. The remaining three units, were placed on line April 20, May 12, and June 16, respectively. The installation of major powerplant equipment had been completed when Unit 5 went on line. As each generating unit went on line, Reclamation transferred it from construction to O&M, which resulted in an increase in project O&M forces. In addition, Reclamation transferred the Davis 230-kV switchyard and the transmission lines emanating from it to O&M status in 1951.

In May 1951, the Utah Construction Company completed removal of all their temporary camp and plant buildings. They also finished the final cleanup of the area. The last major event before the dedication of the Davis Dam and Powerplant and transfer of the remainder of the project to O&M status, occurred on July 13, 1951, when the highway over the crest of the dam was opened to the public.<sup>42</sup>

Official dedication of the Davis Dam and Powerplant occurred December 10, 1952. The dam had been dedicated in honor of Arthur Powell Davis, Chief Engineer and Director of the Reclamation Service for many years. His widow and four daughters were special honored guests at the dedication ceremony. Prior to the dedication the remainder of the Project components

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41. "Davis Dam Power on the Line," *Reclamation Era* 37 (February 1951): 27.

42. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol VII, 1951, 4, 22, 28-9.

were transferred to O&M status: the elevator, outside lighting, utility building, communication facilities, and the forebay channel bridge on August 1; and the dam, reservoir, forebay structure, and powerplant structure on December 1.<sup>43</sup>

### **Post-Construction History**

Not long after Parker Dam's dedication and release to O&M status, during the week of October 12, 1939, Reclamation noticed that thousands of fish were dying in the Colorado River for approximately ten miles below the Dam. Reclamation notified the Arizona and California State Fish and Game Departments. Mr. Towers of the Pollution Detail Department of California's Department of Fish and Game arrived and made a study of the situation. He checked the analysis of the water and determined that the oxygen depletion due to the high organic content of the water was causing the high mortality of fish life. He was subsequently able to solve the problem satisfactorily.<sup>44</sup>

On February 1, 1943, the Parker Dam Power Project took over operation of Parker Dam from the All-American Canal Project. The O&M of the Dam had been managed by the Project Engineer, All-American Canal Project since its transfer to O&M.<sup>45</sup>

Two years after completion of the dam serious surface cracking became noticeable. Reclamation engineers, R. F. Blanks and H. S. Meissner, later determined the cracking was the result of "incompatibility" between the aggregate (sand and gravel) and the cement. The cracking appeared to confine itself to the surface and did not present a significant danger to operation of the dam. In addition to the cracking, the project office reported in 1950, that the top of the dam had moved downstream about .07 foot since 1941. The direction of the movement,

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43. "Annual Project History, Davis Dam Project, Arizona-Nevada" Vol VIII, 1952, vii, 8.

44. "Annual Project History, Parker Dam Project, Arizona-California" Vol V, 1939, 12.

45. "Annual Project History, Parker Dam Power Project, Arizona-California-Nevada" Vol V, 1943, 1.

opposite to that of other arch dams afflicted with an alkali-aggregate reaction, indicated that some structural distortion or misbehavior had occurred. As with the cracking, the project office continued to monitor the situation and no further movement was noticed.<sup>46</sup>

After the substantial completion of construction of the Davis Dam Project it was combined with the Parker Dam Power Project into the Parker-Davis Project on July 1, 1953.<sup>47</sup> Congress officially authorized consolidation of the two projects into the Parker-Davis Project on May 28, 1954.

One of the insulators on structure 33-2 of the Davis-Parker 230-kV transmission line failed at the cement joint on January 1, 1954. The failure allowed the west conductor to fall across the Santa Fe Railroad tracks. Shortly thereafter, a train hit the conductor causing the insulator strings on both structures 32-4 and 33-3 to fail. The entire incident prompted the installation of double insulator strings on all 230-kV line structures located on each side of all railroad, primary road, and lake crossings to prevent a possible reoccurrence.<sup>48</sup>

In 1957, Reclamation established a system of unguided tours at both Parker Dam and Davis Dam Powerplants. In order for the visiting public to conveniently view the inside of these plants, directional and instructional signs were installed. Reclamation made available a system of tape recorded talks to inform the public of items of interest which occurred during the course of construction and O&M. Diagrams and illustrations display details of the operation and coverage of transmission lines. The addition of tours resulted in an increase of visitors to the two sites. The tours themselves did not appear to interfere with the operating personnel on duty

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46. "Annual Project History, Parker Dam Power Project, Arizona-California-Nevada" Vol XI, 1950, Appendix p 1, 5; H.S. Meissner, "Expansive Cracking in Concrete," *Reclamation Era* 34(April 1948):74.

47. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol I, 1953, 13.

48. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol II, 1954, 8, 10-1.

during the hours that the plants were open to the public.<sup>49</sup>

The project expanded again in July 1962, when Region 4 transferred supervision of the construction of the southern portion of the power network of the Colorado River Storage Project (CRSP) to the Parker-Davis Project. Project features transferred included: Flagstaff-Pinnacle Peak 345-KV transmission lines Nos. 1 and 2 (each approximately 114 miles in length); the Pinnacle Peak-Mesa double circuit 230-kV transmission line (approximately 22 miles in length); the Pinnacle Peak Substation; and the Mesa Substation. Transfer of the CRSP features necessitated a complete reorganization of the Parker-Davis Division. Three branches were established during the reorganization: the office Engineering Branch, the Transmission Line Construction Branch; and the Substation Construction Branch. The creation of these new branches did not affect the O&M activities currently established on the Project. The CRSP features were transferred to O&M status in 1967.<sup>50</sup>

In March 1963, the Parker-Davis transmission system was interconnected with the Salt River Project (SRP) System at Mesa, Phoenix, and Coolidge Substations. The interconnection allowed for the transfer of power to the SRP necessitated by an increased demand in the Project area.<sup>51</sup>

In 1965, the U.S. Coast Guard established a station at Parker Dam. Reclamation poured a concrete slab and erected a fourteen-foot by seventy-foot Butler-type building for their use as an office and shop. In the interest of improved boating safety, the Coast Guard patrols the lake and river. In addition, the U.S. Fish and Wildlife Service moved their base of operations from Parker Dam when a southern section of the Havasu National Wildlife Refuge in Arizona became part of

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49. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol V, 1957, 7.

50. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol X, 1962, 20; "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol XV, 1967, 1.

51. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol XI, 1963, 15.

Buckskin Mountain State Park.<sup>52</sup>

Parker-Davis Project Office personnel begin managing the Region 3 portion of construction of the Pacific Northwest-Pacific Southwest Intertie System (Intertie), in 1966. The Intertie, designed to interconnect the hydropower resources of the Pacific Northwest and the Pacific Southwest, included the original transmission features of the Parker-Davis Project. From 1972 to 1977, the Parker-Davis Project office administered O&M on completed features of the Intertie. The Parker-Davis Project Office discharged its duties toward the Intertie when the system transferred to the Western Area Power Administration (WAPA or Western) of the Department of Energy in 1977.<sup>53</sup>

In 1968, the McCulloch Corporation, developer of Lake Havasu City, Arizona, on the banks of Lake Havasu, began to reconstruct the London Bridge. The town owes much of its existence to the opportunities for recreation provided by Lake Havasu. As an added attraction, Robert McCulloch bought the original London Bridge from England and transported it stone by stone to western Arizona. Reconstruction of the bridge was completed in 1971. After the bridge had been completed a one-mile long channel was constructed from Lake Havasu through the base of the peninsula on which the bridge was situated, creating an island offshore from Lake Havasu City. In addition, a replica of an English village was constructed near the bridge as an added tourist attraction. Since the bridge's grand opening ceremonies in 1971, it and Lake Havasu City, have become the second most popular tourist attraction in Arizona; only the Grand Canyon receives more visitors yearly.<sup>54</sup>

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52. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol XIII, 1965, 1, 2.

53. "Annual Project History, Region 3, Pacific Northwest-Pacific Southwest Intertie, Arizona-California-Nevada," Vol III, 1967, iv, v, 8-9; "Annual Project History, Lower Colorado Region, Pacific Northwest-Pacific Southwest Intertie, Arizona-California-Nevada," Vol VIII, 1972, vi.

54. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol XVI, 1968, 3; Karl Samson, *Frommer's Comprehensive Travel Guide: Arizona '93-'94*, (New York: Simon and Schuster, 1992) 269-70.

The Design and Construction Division of the Parker-Davis Project was deactivated on June 9, 1972. The Arizona Projects Office, Phoenix, subsequently took over all preconstruction and construction activities managed by the Parker-Davis Project, including work on the Intertie and CRSP Transmission Systems.

In late December 1972, a derailment on the Southern Pacific Railroad tracks occurred east of the 43<sup>rd</sup> Ave crossing and adjacent to the Parker-Davis Project O&M center northern boundary, in Parker, Arizona, causing a pileup of freight cars. Several cars ripped out sections of the government's seven-foot high chain link boundary fence. By the end of the month, crews began to clear away wreckage and construct a bypass to restore limited train service.<sup>55</sup>

On October 1, 1977, Reclamation transferred the bulk of the power transmission operations on the Parker-Davis Project to the Western Area Power Administration, part of the newly created Department of Energy. In 1980, all of the remaining O&M on the Project was combined with the Boulder Canyon Project in the Lower Colorado Regional Office. The combining of the Projects made the continued maintenance of the facilities more convenient.<sup>56</sup>

### **Settlement of the Project**

Reclamation never withdrew any lands to be settled in the vicinity of the Parker-Davis Project. While there was no project to be settled in the traditional Reclamation sense, the development of the Colorado River facilitated general settlement in the vicinity of the project, including the towns of Parker, Bullhead City, and Lake Havasu City, Arizona. In addition, the construction of Parker Dam aided in the continued development of the Los Angeles metropolitan area.

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55. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol XX, 1972, vii, 17.

56. "Annual Project History, Parker-Davis Project, Arizona-California-Nevada" Vol XXV, 1977, I; Simonds, 68.

The Mexican Treaty of 1944 made the construction of Davis Dam necessary. Davis regulates the flow of the Colorado River into Mexico allowing the United States to meet their average flow agreements on a yearly basis. The construction of Davis Dam allowed for the continued development of the Colorado River without detriment to Mexico.<sup>57</sup>

### **Uses of Project Water**

There are many different uses for project water provided by the Parker-Davis Project. These uses include, but are not limited to: flood control, municipal and industrial, recreation, and hydroelectric power generation.

Together with Hoover Dam, Parker and Davis Dams provide much needed flood control for the residents along the Colorado River. Parker Dam traps the floods from the Bill Williams River protecting the downstream residents. Parker and Davis Dams regulate and reregulate water releases from Lake Mead for maximum efficient downstream use.

Parker Dam provides up to 1,080 cubic feet of water per second to the Colorado River Aqueduct. Water from the Aqueduct is then used for municipal and industrial purposes in the Los Angeles metropolitan area.

Both Lake Havasu and Lake Mohave Reservoirs provide recreation and fish and wildlife benefits to the surrounding areas. The Havasu National Wildlife Refuge encompasses Lake Havasu as well as most of the large marsh area extending ten miles above the reservoir. Lake Mead National Recreation Area encompasses Lake Mohave. Both areas offer cabin sites for lease as well as picnicking, swimming, boating, and year-round fishing. In addition, at Lake Mohave several concessions offer camping, trailer parks, and boats for hire. Lake Havasu boasts excellent large-mouth black bass, blue gills, and crappie fishing, while Lake Mohave offers

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57. *Project Data*, 767-71.

rainbow trout, bass, catfish and bluegills. In season, Lake Havasu permits migratory waterfowl hunting.

The highly developed agriculture base and the complex industrialization in the Pacific Southwest directly benefit from the power produced by Parker and Davis Powerplants. These two powerplants, as well as Hoover Powerplant, are electrically interconnected to optimize power generation from water passing through the power plants.<sup>58</sup>

### **Conclusion**

The construction of Parker and Davis Dams, along with all of the other dams, changed the face of the Colorado River forever. Now the once free-flowing, impetuous river meanders along benefitting those in its path instead of destroying nearby property. The Colorado now provides water for cities and towns, recreation opportunities for those who choose to play there, and most importantly, flood control for those who choose to reside along its banks. Parker and Davis Dams played a major role in taming the Colorado.

### **About the Author**

Toni Rae Linenberger, a Colorado native, received her B.A. in History from The Colorado College in Colorado Springs, Colorado in 1996. She is currently working on her Masters degree in Western American History at Utah State University in Logan, Utah, with an anticipated graduation date of June 1998.

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58. *Project Data*, 770-1.



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