The Kortes Unit

Oregon Trail Division

Pick-Sloan Missouri Basin Program

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Bureau of Reclamation
1996

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The Kortes Unit

On May 15, 1946, a blast echoed off the 1,000-foot high walls of the Black Canyon of the North Platte River, signaling the start of construction of Kortes Dam and Powerplant. Named for a Wyoming family who pioneered the region and settled only a few miles away, the dam and reservoir, too small to be included on most maps, were the first features of an enormous $2,000,000,000 project to harness and tame the waters of the great Missouri River Basin.[1]

Project Location

The Kortes Unit, consisting of Kortes Dam and Powerplant, is located in a deep, narrow section of the Black Canyon of the North Platte River, about 60 miles southwest of Casper, Wyoming. The location was chosen to take advantage of the drop in elevation from the tailwater of Seminoe Powerplant to the normal surface of Pathfinder Reservoir.

This section of the North Platte River is in an very arid region where the winters are long and cold, and the summers hot and dry. The average precipitation for the area is just over 10 inches, with over half that occurring in the winter months. The average runoff, measured at Seminoe Dam, about two miles upstream from Kortes Dam, is slightly more than 921,000 acre-feet (af).[2]

Historic Setting

The earliest known humans to venture into the Wyoming area were Paleo-Indian hunters who may have come to North America from Siberia more than 20,000 years ago. Archeological sites near Worland indicate the presence of mammoth hunters in the area a little over 11,000 years ago. Other sites have yielded evidence of continuous human habitation beginning some 9,000 years ago and lasting for several thousand years. About 4,500 years ago, climatological changes forced many inhabitants to abandon the region in search of game, and for about 2,000 years, the region was mostly uninhabited. Gradually, the climate improved and people began to

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1. Project Histories: Kortes Unit: Pick-Sloan Missouri Basin Program, Vol. I, 1946-9. Records of the Bureau of Reclamation, Records Group 115; National Archives, Rocky Mountain region, Denver, Colorado (hereafter cited as "Project History," followed by volume number., year, and page), 9; "Wartime Planning Pays Off," *Reclamation Era*, July 1946, 152-3.
2. United States Department of Interior, Bureau of Reclamation, *Technical Record of Design and Construction, Kortes Dam and Powerplant* (Denver: US Government Printing Office, 1959), 1.

return to the area. When the first Europeans entered the region in the early 1700s, the primary inhabitants of Wyoming were Shoshone and Crow Indians, who were later joined by Arapaho and Cheyenne groups. In the 1800s, the Oglala and Brulé Sioux moved into eastern Wyoming from South Dakota.[3]

The first non-natives to visit the Wyoming area were likely fur trappers. In the 1740s, two French-Canadian brothers, François and Louis Joseph Vérendrye, made their way to the north-east corner of what would become Wyoming. Although seeking to open the region for fur trading, the brothers never returned, and no other white men ventured into the region until the early 1800s. In the early 1800s, another French-Canadian trapper explored parts of Wyoming. François Antoine Larocque, leading a band of Canadians, traveled up the Powder River and Clear Creek into the Big Horn Mountains before returning to Canada.

The first Anglo-American in Wyoming was John Colter. Colter was a member of the Lewis and Clark expedition who left the expedition in 1806 to trap in the region of northern Wyoming. In 1807, Colter headed for Saint Louis, but met with another trading party led by the prominent Spanish fur trader, Manuel Lisa, who persuaded Colter to return to Wyoming with them. Arriving at the confluence of the Big Horn and Yellowstone Rivers, the party established a trading post. Lisa ordered Colter to explore northwestern Wyoming and encourage the Indians there to go to the new trading post. It was during this journey into the northwest part of Wyoming that Colter discovered Colter's Hell, Jackson Hole, and Yellowstone Park.[4]

The fur trade in Wyoming came to an end in the 1840s. In the years before, the fur industry had been the primary, and likely the only, economic activity in the region. The mountain men who hunted and trapped in the mountains and plains became famous for their bravery and courage. Their exploration of the region led to the discovery of numerous natural wonders, many of which bear the name the of the explorer who discovered them: Jackson Hole, Colter Bay in Teton National Park, and Bridger Pass. One of the most important discoveries

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3. T. A. Larson, *Wyoming. A Bicentennial History*, States and Nations Series, ed. James Morton Smith (New York: W. W. Norton & Company, Inc.) 3-5.
4. *Ibid*., 11-5.

made by the mountain men was South Pass. Discovered in 1812 by a party of trappers employed by John Jacob Astor's Pacific Fur Company, the pass would be a primary route through the Rocky Mountains used by thousands of emigrants traveling the Oregon Trail.[5]

Between 1840 and 1860 more than 300,000 travelers moved through Wyoming on the Oregon Trail, making it a virtual highway to California and Oregon. For many who traveled the road, Wyoming was merely an obstacle to overcome. Truly, there was little to entice a weary emigrant to stay: no fertile soils to till, no gold with which to strike it rich, and no cities or towns to spark one interests. The few small posts and forts along the trail offered few economic opportunities for those who might consider staying.[6]

In the years prior to 1870, Wyoming's population grew mostly as a result of military build ups, although the greater portion of the region's inhabitants remained Indians. Fort Laramie became a military post in 1849, and Fort Bridger in 1857. Fort Halleck and Fort Sanders were constructed in 1862 and 1866, and numerous stations were established between Fort Laramie and South Pass to provide protection to emigrants and stage and telegraph stations. With the establishment of military posts came blacksmiths, woodcutters, and others engaged in the business of supporting and supplying the troops. Conflicts with the Indians increased as well, as hostile actions between the U.S. Cavalry and Indians on the plains east and south of Wyoming spilled over into the region.[7]

By 1862, travel along the Platte River Road, as the Oregon Trail was often called, had become so dangerous that Ben Hollady, owner of the Overland Stage Company, moved the stage route south to the Cherokee Trail. Hostile Sioux, Arapahos, and Cheyennes harassed and robbed emigrant parties along both trails. In 1866, the government built and garrisoned two small forts in Wyoming, Fort Reno and Fort Phil Kearny, and one in Montana, Fort C. F. Smith, to protect travelers along the Bozeman Trail. The Indians laid siege to all three even before they had been completed and attacked all who traveled along the trail. On December 21, 1866, an Indian band

5. *Ibid*., 17-40.
6. *Ibid*., 44, 46, 50-1.
7. *Ibid*., 63-4, 66-7.

led by Oglala chiefs Red Cloud and Crazy Horse, attacked and annihilated a detachment of seventy-nine men under the command of Captain W. J. Fettermen, who had been sent out from Fort Phil Kearny to protect a woodcutting party.[8]

By the mid-1860s, more than 300,000 emigrants had passed through Wyoming, with few electing to stay. Even so, those who continued on played an important part in creation of the Wyoming Territory. Those who had traveled across the plains to the west coast were so joined by a comparable number who had made journey by sea. Soon they were calling for a link to the east: a transcontinental railroad. With the passage of the Pacific Railway Acts of 1862 and 1864, the quest to link the east with the west began.

Like the emigrants who came to Wyoming before them, those who came with the railroads saw Wyoming as a place to pass through on their way west rather than a destination. The railroad reached Cheyenne in November 1867. The city had sprung from nothing only a few months before, and swelled to over 4,000 people by November. As the tracks moved westward, towns sprang up along the way, among them Laramie, Benton, Green River and Bear River City. By the end of 1868, the tracks had reached the Utah border, and many towns faded away almost as fast as they appeared. Benton and Bear River City lasted only a few months. At the peak of railway construction in 1868, the population of Wyoming was around 16,000. By mid-1869, the population had fallen to just over 8,000.[9]

By the time Wyoming achieved territorial status in 1869, hostilities with the various Indian groups in the area had all but ended. Treaties signed at Fort Laramie and Fort Bridger in 1868 relegated the Indians to reservations in South Dakota and west-central Wyoming. Although isolated incidents took place from time to time, the signing of the 1868 treaties marked the end of Indian/white warfare in the Wyoming territory.[10]

Throughout its history, Wyoming has provided the United States with a number of firsts: the first National Park; Yellowstone, the first National Monument, Devils Tower; and, in 1869,

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8. *Ibid*., 67-9.
9. *Ibid*., 71-2, 79.
10. *Ibid*., 73-4.

the Wyoming Territorial Government became the first government of any kind in the world to grant women the right to vote and hold public office. Many believed that by granting women the right to vote, people would be encouraged to settle in Wyoming, providing a much needed economic boost. But this was not to be. The population of Wyoming had grown, but the territory still suffered the problem that had plagued the region since the first settlers came to the territory: how to attract settlers (and money) to the semiarid and sometimes hostile land.[11]

Wyoming was not lacking in natural resources. While fertile lands may have been at a premium, there was plenty of coal, and for many years it fueled the economy of the region as well as the trains of the Union Pacific Railroad. When the railroad made its way through Wyoming in the 1860s, a conscious decision was made to locate the tracks in southern Wyoming rather than through the more central route over South Pass. The reason for this decision was coal. Along the chosen route, large amounts of coal had been discovered, and under the Pacific Railway Act of 1864, the Union Pacific Railroad received all mineral rights as part of its land grant for the railroad right-of-way. By the late 1880s miners were taking more than 1,000,000 tons of coal from Union Pacific mines at Carbon, Rock Springs, and Almy. Independent mines produced almost as much.[12]

During the later portion of the 19th century, the cattle industry helped maintain Wyoming's burgeoning economy and gave birth to the most enduring figure of the American West: the cowboy. The cattle industry in Wyoming began in the era of the great cattle drives shortly following the end of the Civil War. Cattle bred on the open plains of Texas were driven north to fatten up on the lush grasses of Wyoming and Montana before being shipped to market. The era of the great cattle drive lasted until a web of railroads provided a better means of transporting cattle to market. With the end of the great cattle drives, Wyoming was transformed from open range to large cattle ranching operations spread out over thousands of acres and worked by the cowboys who had once followed the massive herds across the west. For the most

11. *Ibid*., 76; Rand McNally & Company, *Road Atlas and Travel Guide*, (Chicago: Rand McNally & Company, 1983), xvi.
12. Larson, *Wyoming*, 144.

part, the cowboys did not own the cattle they tended or the land on which they grazed. The majority of cowboys simply worked for some faceless cattleman who conducted business while luxuriating in the comfort of a cattlemen's club in Cheyenne or Laramie. Often viewed as living on the border of law and lawlessness, the romantic image of the cowboy came most often from the pens of such noted authors as Zane Grey, Louis L'Amour, and Owen Wister.

By the start of the twentieth century, sheep had replaced cattle as the primary animal grazing on the plains of Wyoming. With the growth of the sheep industry came conflicts with the cattlemen. Newspaper reports from the turn of the century are filled with stories of violent conflicts between cattleman and sheep raisers. Eventually, sheep outnumbered cattle on the plains and the two conflicting interests were forced to come to terms with both groups suffering significant losses in the early 1900s due to drought, overgrazing, and harsh winter conditions.

In the late 1800s, a third group had appeared on the plains of Wyoming: the farmer. Although often cited as being part of the "Great American Desert," efforts were made to attract homesteaders to the state. Few came, and even fewer stayed. Even the construction of several major irrigation projects did not attract many farmers to the region, and farming never took on major importance in the economy of Wyoming.[13]

Throughout its history, Wyoming has been the least industrialized state in the Nation, rarely employing more than a few thousand industrial workers. But the growth of industry in other parts of the country provided Wyoming with the economic stimulus needed to survive. Industry needs power, and Wyoming had the fuel needed to make the power. In the last half of the nineteenth century, coal fueled Wyoming's economy; in the twentieth century oil did. The presence of oil had been well known since the early 1800s, but only in the 1890s could it be marketed at a profit. In the 1900s, the growth of the automobile and industrialization fueled by several major world conflicts helped increase the demand for Wyoming energy reserves. But economic growth did not bring with it population growth, and Wyoming remained one of the

13. *Ibid*., 108-42.

least populated states in the United States, a distinction that continues today.[14]

Project Authorization

Kortes Dam and Powerplant were authorized as an initial unit of the Pick-Sloan Missouri Basin Program, a comprehensive program of the Bureau of Reclamation and the Army Corps of Engineers to fully develop the water resources of the Missouri River Basin. The Pick-Sloan plan, developed by William G. Sloan of the Bureau of Reclamation and Colonel Lewis A. Pick of the Army Corps of Engineers, was approved in the Flood Control Act of 1944 as outlined in Senate Document 191, 78th Congress, 2nd Session, 1944.[15]

Construction History

Investigations

The original plans for construction of Kortes Dam and Powerplant where included with those of the Kendrick Project, but were subsequently dropped from the project and incorporated into the Pick-Sloan Missouri Basin plan. Beginning in 1932, several studies into the possibility of a power development downstream from Seminoe Dam were conducted before the final plan was adopted. The surveys focused on two sites and investigated the potential of both concrete-gravity and arch-type dams. Personnel from the Kendrick Project conducted foundation studies and preliminary surveys between 1938 and 1945. In early 1939, information on the proposed dam and powerplant was submitted to the Commissioner of Reclamation, and in 1941, additional studies were ordered as part of the Power for Defense Program. A preliminary report released in October 1941 recommended construction of a 197-foot high concrete dam about two miles downstream from Seminoe Dam, with a tunnel supplying water to a powerplant 650-feet downstream.

Field investigations and survey work began in the fall of 1941, concentrating on two sites. As additional information became available, two alternative plans were developed. One plan was essentially the same as the 1941 plan, while the second plan proposed construction of a

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14. *Ibid*., 143-80.
15. Technical Record of Design and Construction, 6; Michael C. Robinson, *Water for the West, The Bureau of Reclamation, 1902-1977*, (Chicago: Public Works Historical Society, 1979), 83.

diversion dam about a mile further upstream with a 4,000-foot long tunnel leading to the powerplant. Analysis of both plans showed that the high dam proposal was more economic. Although plans to include the Kortes Unit in the Power for Defense Program did not materialize, investigations continued. In January 1945, the final plan was outlined calling for construction of a concrete gravity dam, 230-feet high, located just over two miles downstream from Seminoe Dam. The dam would have a concrete lined spillway tunnel through the right abutment and a powerplant located at the toe of the dam.[16]

Construction

Kortes Dam and Powerplant was constructed by private contractors under contract with the Bureau of Reclamation. Work by Government forces was limited, their largest task being construction of the Government camp. The isolated location of the project necessitated construction of three camps to house project personnel and their families: the contractor's camp, the Government camp, and a trailer park constructed by the primary contractor to accommodate personnel with trailers. The contractor's camp included residences, a mess hall, commissary, school, first-aid station and dormitories. The Government camp consisted of 19-residences, a 12-room dormitory, a six-unit apartment building, an office, recreation hall, three garages, and a warehouse. The camps were located at the mouth of the canyon, about 1½-miles downstream from the construction site.[17]

Bids for construction of Kortes Dam, Powerplant and the access road were opened on March 12, 1946. Four bids were received with the lowest bid, $4,688,000, submitted by the Morrison-Knudsen Company of Boise, Idaho. Reclamation awarded the contract to Morrison-Knudsen on April 10, 1946, with notice to proceed given on April 23. The contract stipulated that construction be completed within 1,000 days from notice to proceed, setting the completion date at February 19, 1949. Construction under the primary contract began on May 25, 1946. Construction activities during 1946 consisted mainly of construction of access roads, construction camps, and excavations in the river channel below the dam site. River channel

16. Technical Record of Design and Construction, 1-4.
17. *Ibid.*, 153, 160-1.

excavations were carried out in order to take full advantage of the power potential of the site by providing greater drop through the turbines. To achieve this, the river channel was lowered by excavations for over 2,000-feet downstream from the dam. By the end of the 1946 construction season, work under the primary contract was about 17% complete.[18]

Excavations for the spillway tunnel began from the outlet portal on January 16, 1947. The 34-foot diameter tunnel was excavated using a truck-mounted jumbo with 14 drills mounted on four levels. Ninety-six holes were drilled in two sets for each shot. Each hole was approximately ten-feet deep and each shot removed about eight-feet of material. Once the heading reached the start of the inclined portion of the spillway, a 5- by 5-foot pilot bore was driven along the top of the inclined portion of the spillway tunnel. Excavations for the inclined portion of the tunnel began on March 14, 1947. At the same time, open cut excavations for the spillway intake were carried out in conjunction with excavations for the right abutment. On March 20, 1947, all excavations in the dam and powerhouse areas were halted due to a large rock-fall from the right abutment. Work was resumed on April 22 after additional canyon wall stripping to remove any loose material. The pilot bore for the inclined portion of the spillway tunnel was blasted through on July 19. Once the pilot bore was completed, it was enlarged to the final diameter by a series of shots working both up and down the tunnel.[19]

Excavations for the diversion tunnel began on May 5, 1947. The diversion tunnel was driven 242-feet from the upstream end of the horizontal portion of the spillway tunnel and was holed through on October 19. A concrete portal structure and headgate was constructed at the upstream end of the tunnel. Work on the portal was carried out at night when flows in the river were shut off at Seminoe Dam. By the time the diversion tunnel was holed through, work under the primary contract had begun to fall behind schedule, so it was determined that the concrete lining in the diversion tunnel would be eliminated in order to save time. Rock and earth materials from the tunnel excavations were used to construct coffer dams upstream and

18. "Project History," Vol. I, 1946, 25; "Missouri Basin-Initial Project Begun at Kortes," *Western Construction News*, September 1946, 92-3.
19. "Project History," Vol. I, 1947, 4-5; *Technical Record of Design and Construction*, 181.

downstream from the dam site. The river was diverted through the tunnel on October 31, 1947.[20]

With the river safely diverted through the tunnel, excavations for the dam and powerhouse foundations began. Prior to start of foundation excavation, the canyon walls were stripped of all loose and unstable materials. Scaling operations were particularly difficult on the left abutment as the canyon wall was severely fractured and weathered, requiring extensive excavations to remove unstable sections. Almost nine months were required to remove 50,000 cubic-yards (cu/yd) of material from the left abutment. Even then, questions about the stability of the walls still lingered, requiring changes in the design of the powerhouse and switch yard to eliminate the possibility of damage from falling rock.[21]

Located in a deep canyon, the powerhouse, transformers, and switchyard at Kortes required special protection. The original design for the powerhouse placed the switchyard on the roof of the powerhouse. To guard against damage from falling rock, Reclamation designers modified the design, placing the switchyard on a platform extending downstream from the top of the dam and supported by five concrete buttresses. To protect the main transformers, they were moved into reinforced concrete shelters placed between the dam and powerhouse. In addition, the powerhouse roof was constructed of reinforced concrete, two-feet thick, with two-feet of sand placed atop that for protection. Designers armored the left wall of the powerhouse with 6- by 12-inch timbers, and several concrete stabilizing and deflector walls on the canyon walls provided additional protection. As a result of changes, Reclamation increased the contract price by more than $330,000 and extended the contract time by 180 days.[22]

Excavations for the dam and powerhouse were completed in October 1948. Once the foundation areas had been completely excavated, it was necessary to seal the foundation by grouting. The foundation was sealed by low pressure, blanket grouting to a depth of 30-feet and extending about 60-feet downstream from the axis of the dam. The cut-off curtain was grouted

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20. "Project History," Vol. I, 1947, 5; *Technical Record of Design and Construction*, 177.
21. *Technical Record of Design and Construction*, 181-7; John P. Ottesen, "Kortes Dam, They Say, Is - Toughest Dam Job Since `Boulder,'" *Western Construction News*, 15 March 1949, 58-9.
22. *Technical Record of Design and Construction*, 154; Ottesen, "Kortes Dam," 56.

under high pressure to a depth of 100-feet.[23]

Although some minor concrete placements had occurred previously, full scale concrete operations did not begin until August 1948. Concrete in the dam was placed in a series of monolithic blocks with the main dam consisting of blocks 1 through 6, and the spillway intake consisting of blocks 7, 8 and 9. Because excavations on the right abutment and spillway intake where completed before excavations in the bottom of the canyon, the first concrete placed in the dam was placed in block number 6, near the spillway intake, on June 24, 1947. The first bucket of concrete in the lower portion of the main dam was placed in block number 5 on August 19, 1948. Each block is approximately 64-feet wide and runs the full width of the dam from upstream toe to downstream toe, the widest being 197-feet. Concrete placement in each block was limited to a maximum depth of 5-feet in 72 hours. The schedule established by the contractor limited placements in each block to 5-feet every 7 days. The lower 140-feet of the dam was artificially cooled by circulating river water through cooling pipes embedded in the dam. Concrete was transported and placed by two stiff-leg derricks, one on each abutment. The contractor choose to use derricks because the construction site was not suitable for construction of a cableway.[24]

While labor and material shortages plagued the project from the beginning, the weather paid no favor to crews working in the canyon. During the winter of 1948/49, heavy snowfalls and severe blizzards struck the region, delaying work at the site. The arrival of spring in 1949 signaled an end to the heavy snows, but the severe weather of the winter returned to haunt the crews in the form of spring floods. During the late spring and early summer of 1949, it became clear that high runoff on the river would fill Seminoe Reservoir to overflowing. Since the diversion tunnel at the Kortes construction site had been designed to by-pass only the maximum amount of water released through the turbines at Seminoe, it was clear that any additional spills would threaten to over-top the partially completed dam and flood the construction site.

To attempt to prevent overtopping Kortes Dam, operators at Seminoe Dam kept the

23. Ottesen, "Kortes Dam," 59.
24. *Ibid.*; *Technical Record of Design and Construction*, 205, 207(photo).

generators operating at full capacity 24 hours a day and additional releases were made through the spillway gates. Splashboards were installed to raise the level of Seminoe Reservoir two feet to provide additional storage. But flows into Seminoe continued, and in order to prevent overtopping of Seminoe Dam, the spillways were opened, releasing a torrent of water into the canyon. Downstream, the contractor had been warned of the imminent release, and had removed all equipment and material from the construction site. On June 19, floodwaters overtopped Kortes Dam, completely inundating the partially completed dam and powerhouse. The flood continued for nine days before the operators at Seminoe Dam were able to reduce releases to a point were the diversion tunnel at Kortes could handle the flow. The nine days of flooding caused damage to concrete forms, reinforcement steel, and the access road. In addition, the powerhouse was filled with sand and debris, and the contractor's bridge was partially washed away. In total, the flooding and subsequent clean-up and repairs delayed construction by 22 days.[25]

The initial plan for construction of Kortes Dam and Powerplant called for completion of the dam and powerhouse by February 1949, with installation of the turbines and generators to be completed in time to deliver power for irrigation pumping in June and July of 1950. Even before the severe winter of 1948/49, it had become clear that the original schedule could no longer be met. With a growing power shortage in parts of Colorado, Wyoming, and Nebraska, Reclamation engineers and designers developed a plan to bring the generators at Kortes on-line before the dam was complete. Reclamation had originally planned to carry out installation of the turbines and generators by Government force account or by separate contract, but due to the limited space within the narrow canyon and the work currently under way, the issuance of a separate contract was considered impractical. On September 2, 1949, Reclamation and Morrison-Knudsen signed an addendum to the original contract covering all work in connection with completing the powerhouse and placing it into operation.[26]

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25. Technical Record of Design and Construction, 178; "Project History," Vol. I, 1949, 2.
26. E. Parlman, "Kortes Dam Completed After 5 Years Tough Construction," *Mountain Constructor*, April 1951, 14; *Technical Record of Design and Construction*, 156.

The original plan for construction called for plugging the diversion tunnel when the dam was high enough to allow water the flow through the penstock system, into the partially completed powerhouse, and out through the draft tubes. This method would have prevented installation of the turbines and generators until the dam and spillway were completed. Under the modified plan, the penstock for unit number one was extended through the downstream wall of the powerhouse and the full flow of the river diverted through the penstock. With the penstock used to divert the river, crews could plug the diversion tunnel, complete the spillway tunnel and install the turbines and generators for units two and three.

Throughout the summer of 1949, operations concentrated on the dam in order to bring it to a height sufficient to allow diversion through the penstock, and by early November, the dam reached the minimum height. Even before the diversion tunnel was plugged and the river diverted through the penstock, installation of the turbines began. The turbines and turbine governors were supplied by the Allis-Chalmers Company, of Milwaukee, at a cost of just over $427,800. Preparations for installation of the turbines began in September with installation of the embedded portions of unit number three beginning in October 1949. While crews prepared the dam and penstock system, work in the diversion tunnel was carried out at night when flows in the river were cutoff at Seminoe Dam. Excavations were carried out at night, and during the day, flows were resumed and used to carry away materials excavated during the night. Crews concentrated on the plug section, were it was necessary to enlarge the tunnel from its original size. By early February 1950, the dam had been completed sufficiently to permit diversion through the penstock for unit number one. Arrangements were made to have releases from Seminoe Dam halted for 32 hours beginning late in the evening of February 4. To close the tunnel, crews placed 8- by 18-inch timbers across the tunnel opening and constructed concrete forms behind the timbers. Concrete was poured over the entire structure to complete the closure. Releases from Seminoe were resumed and the reservoir filled quickly. Water began to flow through the penstock about 11:30 a.m., February 6, 1950. With the river successfully diverted through the penstock, crews immediately began work on the permanent tunnel plug and spillway tunnel lining.[27]

Throughout the winter of 1949 and spring of 1950, work on the powerhouse continued. Concrete placement to the top of the pit liner was completed in January, and second stage concrete in the generator floor for unit number one was completed by mid-March. To protect crews working in the powerhouse from cold weather and falling objects, a temporary shelter was constructed. The structure was built about two-feet inside the walls of the powerhouse to allow crews on the outside to continue work on the permanent structure while crews inside installed the generating equipment. The roof of the temporary structure was constructed of heavy timbers and had a large hatch built-in to provide easy access for placement of the generating equipment. The generators, which cost the Government almost $600,000, were supplied by the Elliot Company. Representatives of the manufacturer supervised installation of the units by Morrison-Knudsen crews. Without an overhead crane, placement of the generator rotors and shafts, generator stators, and power transformers presented the contractor with a difficult problem. The two stiff-leg derricks each had a capacity of 25 tons, and each lift would be almost twice that amount. To solve the problem, the contractor elected to use both derricks with an equalizer block. The first lift was one of the power transformers which weighed 45 tons. The lift was successful, and the contractor was able to make all nine lifts without difficulty.[28]

The first generator at Kortes was placed on line on June 30, 1950. At that time, only one block of the dam had been completed, and no switch yard existed to tie the generator into the area power system. To bring power from Kortes to the citizens of the region, a temporary switchyard was constructed and tied into the power system with temporary tap lines that ran up the canyon wall to the permanent tap lines which had been completed to the edge of the canyon wall. Present at the ceremony commemorating the first unit at Kortes was William Sloan, then Chairman of the Missouri Basin Inter-Agency Committee, G. T. Mickelson, Governor of South Dakota. With the start-up of the first unit, unit number three, Kortes became the first generating

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27. *Technical Record of Design and Construction*, 177, 221, 225, 258; John P. Ottesen, "Short Cuts for Power at Kortes Dam," *Western Construction*, September 1950, 85-6.
28. Ottesen, "Short Cuts for Power at Kortes Dam," 86; *Technical Record of Design and Construction*, 258.

unit in the Missouri Basin Program to begin power production.[29]

Unit number two began service in early August 1950. With completion of unit two, it was possible to remove the penstock extension from unit number one and begin installation of the turbine and generator. At that time, the spillway tunnel was still unfinished, so operations at Kortes and Seminoe were coordinated to control the level of Kortes Reservoir to prevent spills through the uncompleted spillway. The final generating unit, unit number one, was placed into service in mid-January 1951.[30]

Work under the primary contract was completed by the end of January 1951, almost two years longer than originally anticipated. The spillway was first used in June 1951, when approximately 150,000 acre-feet (af) was passed through the tunnel. The dam and powerplant were transferred from construction status to operation and maintenance on November 8, 1951. Construction of Kortes Dam and Powerplant was much more difficult than planners had anticipated. During the contract period, eight orders for change covering items from changes in the foundation grouting plan to major changes in the design of the powerhouse and switchyard, were issued. In addition, there were eight extra work orders that included extra excavations and canyon wall stripping, and installation of the turbines and generators. In total, the orders for change and extra work increased the cost under the primary contract by more than $1,300,000. In addition to increasing the cost of construction, the difficult conditions contributed to the hazards faced by construction crews. During the construction period from early 1946 to early 1951, there were 117 injuries to workers resulting in over 19,000 lost days: two workers died during construction.[31]

Kortes Dam is a concrete gravity dam 244-feet high and 440-feet long with a volume of 147,000 cu/yd. It has a maximum width of 193-feet with a 24-foot-wide crest. The spillway has an uncontrolled concrete crest spilling into a concrete lined tunnel through the right abutment.

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29. Ottesen, "Short Cuts for Power at Kortes Dam," 85; "Kortes Adds Another "First" to Record," *The Reclamation Era*, June 1950, 115.
30. Parlman, "Kortes Dam Completed After 5 Years Tough Construction," 14.
31. "Project History," Vol. 3, 1951-2, vi, 19; *Technical Record of Design and Construction*, 153-6, 169-171, 292.

The spillway tunnel is 30-feet in diameter and 527-feet long. The capacity of the spillway at maximum water level is 50,000 cubic-feet per second (cfs). Kortes Reservoir has a maximum capacity of 4,700 af and a surface area of 83 acres. It serves primarily as a forebay for the powerplant. Kortes Powerplant is located at the toe of the dam and houses three, 12,000 kilo-watt, vertical-shaft generating units each driven by a 18,500- horsepower Francis-type turbine. Water is supplied to the units via three, 108-inch-diameter steel penstocks running through the dam. Each penstock is controlled by a 96-inch ring follower gate. The three main transformers are located between the dam and powerplant in a reinforced concrete enclosure. The switch yard is located atop the dam on a concrete platform supported by five concrete buttresses. The switchyard is accessed from the power house via a passenger elevator running through the dam.[32]

Post Construction History

Since its transfer to operational status, Kortes Dam and Powerplant has operated without any significant problems or incidents. Reclamation rewound unit number 2 in 1973 following failure of the unit. Units 1 and 3 were rewound in 1983. A minor problem with concrete deterioration and cavitation of the lining of the spillway tunnel is monitored closely by project personnel, but poses no significant risk to the dam or powerplant. Following the transfer of power marketing functions from Reclamation to the Western Area Power Administration (WAPA) in 1977, the switchyard was relocated from the top of the dam to a new location a few miles away. WAPA is responsible for operation and maintenance of the switchyard. Kortes Dam and Powerplant is operated and maintained by Reclamation personnel from the Wyoming Area Office located in Mills. The powerplant is remotely operated from the Casper Control Center and all operations are coordinated with those of Seminoe Powerplant. Power generated at Kortes is distributed to electric customers through the Transmission Division of the Pick-Sloan Missouri Basin Program.[33]

Settlement of Project Lands

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32. *Technical Record of Design and Construction*, frontispiece (photo), 6-7.
33. United States Department of Interior, Bureau of Reclamation, *Power Uprating Program . .To Improve Hydroelectric Generation*, Presented at the White house Conference on Climate Action (21 April 1994), 22; Jay Dallman, Wyoming Area Office, telephone interview by author, 24 July 1996, *Project Data*, 1003.

Because the Kortes Unit was constructed primarily as a power project, no lands were withdrawn for future settlement. Power generated by the unit helps to maintain development throughout the intermountain and Great Plains regions.

Project Benefits and Uses of Project Water

The primary benefit provided by the Kortes Unit is hydroelectric power. Since the first of its three, 12,000 kW generating units went into service in 1950, the Kortes Powerplant has generated more than 6,290,000,000 kilo-watt hours (kWh) of electricity. Power generated by Kortes Powerplant is marketed by the Western Area Power Administration.

Recreational benefits at Kortes Reservoir are limited due to its location within a steep and narrow canyon which limits access to the reservoir. Fishing is the primary recreational activity in the area. A bill passed by the 90th Congress which requires a minimum 500 cfs stream flow downstream from Kortes Dam has helped to maintain a fishery along a popular section of the North Platte River known as the "Miracle Mile." Recreational activities at Kortes Dam and Reservoir are administered by the Bureau of Reclamation.[34]

There are no irrigation benefits derived from the Kortes Unit and the small capacity of Kortes Reservoir and the fact that it is maintained at near capacity to maximize hydropower production precludes any flood control benefits.

Conclusion

Pressed into service ahead of schedule in order to meet the growing demand for power in the West, Kortes Dam and Powerplant has established a record of almost fifty years of reliable service to the citizens of the region. As the first unit in the multi-billion dollar Missouri Basin Program, the Kortes Unit led the way for all units that followed and stands ready to move forward into Reclamation's second century.

About the Author

William Joe Simonds was born and raised in Colorado and has a clear understanding of the importance of water in the American West and its influence

34. United States Department of Interior, Water and Power Resources Service, *Project Data* (Denver: US Government Printing Office, 1981), 931; United States Department of Interior, Bureau of Reclamation, *1992 Summary Statistics, Water, Land and Related Data* (Denver: US Government Printing Office, 1995), 111, 132, 136.

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.

Bibliography

Archival Collections

Project Histories: Kortes Unit: Pick-Sloan Missouri Basin Program, Vol. I, 1946-9. Records of the Bureau of Reclamation, Records Group 115; National Archives, Rocky Mountain Region, Denver, Colorado.

Government Documents

United States Department of Interior, Bureau of Reclamation. *1992 Summary Statistics, Water, Land and Related Data*. Denver: US Government Printing Office, 1995.

United States Department of Interior, Bureau of Reclamation. *Power Uprating Program . . To Improve Hydroelectric Generation*. Presented at the White house Conference on Climate Action. 21 April 1994.

United States Department of Interior, Bureau of Reclamation. *Technical Record of Design and Construction, Kortes Dam and Powerplant*. Denver: US Government Printing Office, 1959.

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

Magazine Articles

"Kortes Adds Another 'First' to Record." *Reclamation Era*. June 1950, 115.

"Missouri Basin-Initial Project Begun at Kortes." *Western Construction News*. September 1946, 92-4.

Ottesen, John P. "Kortes Dam, They Say, Is Toughest Dam Job Since `Boulder'" *Western Construction News*. 15 March 1949, 55-9, 132, 134.

Ottesen, John P. "Short Cuts for Power at Kortes Dam," *Western Construction*, September 1950, 85-7.

Parlman, E. "Kortes Dam Completed After 5 Years Tough Construction." *Mountain Constructor*. April 1951, 14, 42.

"Wartime Planning Pays Off." *Reclamation Era*. July 1946, 152-3.

Books

Larson, T. A. *Wyoming. A Bicentennial History*. States and Nations Series, ed. James Morton Smith. New York: W. W. Norton & Company, Inc.

Robinson, Michael C. *Water for the West, The Bureau of Reclamation, 1902-1977*. Chicago: Public Works Historical Society, 1979.

Interviews

Jay Dallman, Wyoming Area Office. Telephone interview by author, 24 July 1996.

Other Sources

Rand McNally & Company. *Road Atlas and Travel Guide*. Chicago: Rand McNally & Company, 1983.

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