

Wayne Aspinall Unit

Colorado River Storage Project

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The Wayne Aspinall Unit Colorado River Storage Project (CRSP)

The Wayne Aspinall Unit is one of four primary projects of the Colorado River Storage Project (CRSP). The other three projects include the Navajo Unit, the Flaming Gorge Unit, and the Glen Canyon Unit. The Wayne Aspinall Unit is on the Gunnison River in west-central Colorado. Originally called the Curecanti Unit, the project had its name changed to Wayne Aspinall Unit in 1980,¹ in honor of the Colorado Congressman who promoted the CRSP. The Colorado River Storage Project, as a whole, manages the water resources of the Upper Colorado River Basin. The Wayne Aspinall Unit's primary purposes are water storage and hydroelectric power production, which it achieves through its three main features, Blue Mesa Dam, Morrow Point Dam, and Crystal Dam.

Project Location

The Wayne Aspinall Unit is located on the Gunnison River in the western part of central Colorado. The three dams of the project stretch over a forty mile length of the Gunnison. The most upstream dam, Blue Mesa, is roughly thirty miles downstream of the city of Gunnison, Colorado, and about one-and-one-half miles downstream of the relocated town of Sapinero. It is a zoned earthfill embankment dam with a structural height of 390 feet. Morrow Point Dam is

1. Throughout this report, the project will be referred to as the Wayne Aspinall Unit (or just Aspinall Unit), as opposed to the Curecanti Unit, which was its name at the time of construction.

twelve miles downstream of Blue Mesa. Morrow Point is a thin-arch, double-curvature dam with a height of 468 feet. It was Reclamation's first thin-arch, double-curvature dam, and also the first to include an underground powerplant. Crystal Dam is six miles below Morrow Point on the Gunnison, and is approximately twenty miles east of Montrose, Colorado. It is a thin-arch, double curvature dam as well, standing 323 feet high.²

The Gunnison River, including its principle upstream tributary the Taylor River, is 190 miles long. It reaches the mainstem of the Colorado River at Grand Junction, Colorado. The Gunnison's headwaters are in the Rocky Mountains of Colorado, and the water supply available for the Aspinall Unit includes all tributaries and inflows at the upper end of the river, above the city of Gunnison.

The closest sizable towns to the Aspinall Unit are Gunnison, Colorado, upstream of the project, and Montrose, Colorado, below it. Gunnison sits at an elevation of 7,683 feet above sea level, and has a mean annual temperature of thirty-seven degrees Fahrenheit. The average annual precipitation is just over ten inches, and there are generally ninety-five days between killing frosts. Further downstream of the project, on the other side of the Black Canyon of the Gunnison National Park, is Delta, Colorado. Delta's elevation is almost 2,000 feet lower

2. United States Department of Interior, Water and Power Resources Service, *Project Data*, (Denver,: U.S. Government Printing Office, 1981), 358-9.

than Gunnison, at 5,115 feet, and consequently has a higher annual mean temperature, at almost fifty degrees. The average annual precipitation is eight inches, and the growing season in Delta is 147 days.

Historic Setting

Prehistoric Setting

West-central Colorado has been home to human habitation for at least 10,000 years, according to the archaeological record of the area. In particular, the valleys of the Gunnison and Uncompahgre rivers contain human habitation sites dating to the Paleo-Indian stage of North American prehistoric cultures, which generally dates to upwards of 5,000 B.C.E. There is flimsy evidence of the Clovis complex in the area. Clovis is the oldest widely accepted human cultural pattern in North America.³ Some projectile points resembling Clovis points have been found in the area, although they are mostly unrepeated, and may be anomalies. The Folsom complex, a slightly later stage, is well-documented in west-central Colorado. Folsom culture dates between 9,000 B.C.E. and 7000 B.C.E. Generally, Folsom points (and the associated culture in general) are associated with extinct forms of bison, which were hunted by prehistoric peoples. The Paleo-Indian stage is typically marked by an economic concentration on animal resource exploitation,

3. Although this increasingly suspect; several other cultural patterns, of significantly greater age, offer reliable evidence of earlier human habitation in North America.

like the bison, and, so far as we know, places only minor importance on plant food processing.

The majority of the prehistoric sites in west-central Colorado, however, can be dated to the Archaic period, which runs, in this area, from 5,000 B.C.E. to European contact. What sets the Archaic period apart from the Paleo-Indian period is increased reliance upon plant foods. The Archaic cultural lifestyle in west-central Colorado was based upon seasonal migratory hunts, combined with increased use of plant foods. By the prevalence of groundstone material at Archaic sites, it is apparent that floral exploitation increased during this stage. A sizable number of stone tools used to grind and process plant matter for consumption were deposited in the area.⁴

The Formative stage of indigenous culture never existed in west-central Colorado. This stage, in other areas, is marked by the cultures of the Anasazi and Fremont. Although these two cultures flourished in southwestern Colorado and northwestern Colorado, respectively, they never lived in the west-central part of the state. An Archaic way of life continued in this area up until the time of

4. U.S. Department on Interior, Water and Power Resources Service, *Survey of Cultural Resources in Lower Gunnison Basin Unit, Colorado River Water Quality Improvement Program*, by Susan Collins, Maurice Albertson, R. Thomas Euler, Lewis Hyer, and John Early Ingmanson, Salt Lake City, U.S. Government Printing Office, 1981, 19-28.

European contact in the late eighteenth century.⁵

Historic Setting

At the time of European contact in west-central Colorado, the indigenous people of the area were the Tabeguache (also known as Uncompahgre⁶) band of Ute. The Ute tribe stretched all across the Great Basin area, from Colorado to Nevada. However, the Tabeguache band lived primarily in the valleys of the Gunnison and Uncompahgre Rivers. Typical of Archaic societies, the Tabeguache lived in small family units for the majority of the year, because food was scarce, and it took large amounts of land to support even a small number of people. From early spring until late fall, the Tabeguache Ute hunted deer, elk, antelope, and other animals. They also gathered large amounts of grass seeds and wild berries. Occasionally, they would plant corn, beans, and squash, which they harvested in the late fall. For the winter, the Tabeguache would leave the relative high elevation of the Gunnison and Uncompahgre River valleys, and move to lower, and

5. Graham, Carole L., *Annual Report of Archaeological Monitoring of Trenching Operations Conducted for the Winter Water Replacement Phase of the Bureau of Reclamation's Colorado River Quality Improvement Program: Lower Gunnison Unit*, Montrose, Colorado, Alpine Archaeological Consultants, Inc, 1991, 28.

6. The name Uncompahgre is the name used most widely since the later half of the nineteenth century, even though Tabeguache is the older term. The name Uncompahgre came into use after their removal, in 1881, to a reservation in Utah. Before that, the term "Uncompahgre Ute" referred only to the Utes living specifically in the Uncompahgre River Valley. When the Tabeguache were placed upon their first reservation, in 1863, the reservation was known as the Uncompahgre Reservation, because of its proximity to the Uncompahgre River. Thus, the most likely reason for the popular name switch is that whites of the area simply got confused and assumed that the people living on the Uncompahgre Reservation must be of the "Uncompahgre band," a grouping that had never existed. Today, the term Tabeguache is preferred; it has also sometimes been spelled Taviwach, Tabaguache, Tobawache, Tabbywatts, Tabaquache, Tabeguache, Tabaguaches, and Tabehuaches. All are a shortening of the original Ute term Möwataviwatsiu.

warmer, areas, in the vicinity of the current city of Grand Junction.⁷

The first European exploration into west-central Colorado came in 1761. A Spanish explorer named Don Juan Maria Rivera led a party into the region at the behest of Governor Cachupin of New Mexico. Traveling mostly overland on plateaus, they did drop into the Uncompahgre River Valley near the present town of Olathe, and managed to follow the Uncompahgre to its confluence with the Gunnison River. Aside from carving his initials and the date into a tree at the confluence of the two rivers, the impact of Rivera's mission was limited. He did not follow the Gunnison, and returned back to New Mexico, where his exploration was mostly overlooked. Not for fifteen years would another European venture into the area.

In 1776, the same year that thirteen small colonies on the eastern part of the continent declared their independence from England, one of the most important Spanish explorations passed through the West. Padre Francisco Silvestre Velez de Escalante and Padre Atanasio Dominguez were charged with finding an overland route between the Spanish settlement at Santa Fe and the newly located Mission at Monterey, California. Following at first the Rivera route, and then "well-traveled" Indian trails, Escalante and Dominguez followed the Gunnison to its junction with

7. www.southern-ute.nsn.us/history/intro.html - accessed 6/27/2000.

the Uncompahgre, where Escalante noted Rivera's carved initials. The two explorers and their men then went down the Gunnison until it merged with the Colorado River, which they followed out of Colorado. The result of this first expedition down the Gunnison and Colorado Rivers was a much better understanding for the Spanish empire of western Colorado and its indigenous inhabitants.

Despite the Escalante-Dominguez expedition, the area of west-central Colorado remained uninhabited by Europeans for over fifty years. It was not until the late 1820s, that Europeans began to filter into the area, and by this point, it was not the Spanish who penetrated the area. French and American fur trappers were the first to colonize west-central Colorado. Traders established one significant outpost, Fort Robidoux, near the confluence of the Uncompahgre and the Gunnison, and used it as a trade center for fur trappers between the late 1820s and 1840s. Little trade was conducted with the Tabeguache people, and although the evidence is murky, disputes between the trappers and the Ute may have partly caused the decline of the trapping outpost. The prime reason for the abandonment of fur trapping in western Colorado in the late 1840s, however, was the discovery of gold along the Sacramento River in California in 1848. The lure of gold caused Colorado to be bypassed as migrants headed west to California to make their

fortune.

With settlement booming in California, in 1853, Secretary of War (and future President of the Confederacy) Jefferson Davis ordered the scouting of a railroad route between St. Louis and San Francisco. Captain John W. Gunnison led the military expedition across the continent, which left in June of 1853. The group crossed the continental divide at Cochetopa Pass in Colorado, and followed the Gunnison River (with the exception of a short stretch that they deemed impassable through the Black Canyon of the Gunnison, where they traveled overland) to its confluence with the Colorado River, much as Escalante and Dominguez had done seventy-five years prior. Once in Utah, the expedition came to an early end when Gunnison was killed by Indians. The expedition was, in some ways, a success, however, as Gunnison's party reported to Davis that, while a railroad route was an impossibility along this route, a wagon road would be feasible. Gunnison's report also noted that western Colorado was not well suited to agriculture.

U.S. Army Colonel William W. Loring led a party which built a road through the area, and soon, this central wagon route across the nation would be put to use. Once in the west-central part of Colorado, however, Loring reported that the area was, contrary to Gunnison's ideas, quite well suited to farming. The land

along the Uncompahgre and Gunnison Rivers, Loring's report noted, was fertile of soil, easy of irrigation, and received frequent rains. This, more than anything, would establish the area of west-central Colorado as a hub of Western farming.⁸

However, the area of the Gunnison and Uncompahgre River Valleys would stay as Ute territory for another two decades. The 1850s and 1860s were boom years for mining in Colorado. Mining, however, was limited mostly to the higher regions of the Rocky Mountains, and the western region was not yet flooded with settlers as the mountainous regions were. In 1876, Colorado was admitted to the Union, and counties were drawn up. The Uncompahgre and Gunnison Valleys became part of Gunnison County, of which the new city of Gunnison was the county seat. This new infrastructure spawned growth, and west-central Colorado became increasingly more populous. The Tabeguache, who lived mostly on the Uncompahgre Reservation in the river valley, and used river water to irrigate their own crops, became problematic for the Euro-American attempt to monopolize the land and water of the area for their own crops. In 1878, when area Indian agent Nathan Meeker attempted to use Federal troops to round up the Tabeguache and force them into an entirely sedentary way of life, the Utes revolted. Even though

8. U.S. Department on Interior, Water and Power Resources Service, *Survey of Cultural Resources in Lower Gunnison Basin Unit, Colorado River Water Quality Improvement Program*, by Susan Collins, Maurice Albertson, R. Thomas Euler, Lewis Hyer, and John Early Ingmanson, Salt Lake City, U.S. Government Printing Office, 1981, 39-48.

they already lived on a reservation, and did practice some farming, the Tabeguache still had room to move around. Meeker's plan would have completely ended this.

In their revolt, the Tabeguache killed Meeker, his assistants, and fourteen Federal troops. Federal response to this was prompt, and even though only a small faction of the Tabeguache Band participated in the attacks, the entirety of the band was rounded up and sent to the Uintah Reservation in Utah. Thus, by 1881, the last of the Tabeguache had been relocated outside of Colorado, to lands considered by whites much less valuable and much more desolate, in Utah. By official treaty, settlement of Indian lands by non-Indians was restricted. However, once the Indians were removed, this ban was lifted. With land and water now available, rapid settlement of west-central Colorado commenced.

Crop-raising and ranching became the two biggest industries in west-central Colorado. Mining, in this lower area (at a lower elevation than the high mountain mining closer to the continental divide), never really made it past early stages. The river valleys of the area contained no significant valuable minerals. It was clear, however, that the area would not be settled fully by farmers without the use of irrigation water. By the middle 1890s, over 100,000 acres of land in west-central Colorado had been claimed for agricultural use, but there was only enough water in the rivers to actually irrigate 10,000 acres of farmland. F.C. Lauzon was the first

to propose diverting water from the Gunnison River, in 1890, but his idea was not well received by local residents, who did not want to spend the money needed for the project. Eventually, money was raised to survey the idea, in 1894. The survey showed that diverting the river was possible, but it would require a costly tunnel between the Gunnison and Uncompahgre Rivers. In the summer of 1900, a survey of the Black Canyon of the Gunnison, where the diversion would be located, was conducted. This sparked interest in the project, and on April 11, 1901, the Colorado legislature passed the Gunnison Tunnel Bill. Although the bill authorized the project, it only allocated \$25,000 to build the tunnel. Another survey, conducted in August of 1901 by the United States Geological Survey, located a specific site for the tunnel. A three mile tunnel would connect the two rivers; a twelve-mile ditch would then carry the water to the Montrose and Delta Canal, which would, in turn, provide water to irrigate 100,000 acres of farmland in west-central Colorado. The whole project would cost \$1,500,000, and would be funded by the state of Colorado. In that same year, 1901, a road was built to the tunnel location, and on December 16, initial drilling began. However, within a year, funds ran out, and the tunnel was abandoned. At the time, 900 feet of the three-miles had been bored. At this point, in 1902, it was decided that the tunnel project should be transferred to the Federal Government for completion by the

newly-formed Reclamation Service. The transfer was not complete until 1906, and construction was then carried out under the auspices of the United States Reclamation Service. The tunnel was completed in 1909, by the Reclamation Service, which contracted the work to the Taylor-Moore Construction Company. All totaled, more than seven years had elapsed since the beginning of the project, which came to be known as the Uncompahgre Project. Part of the problem with the work was water that rushed into the tunnel, which constantly plagued the miners. During construction on the tunnel twenty-four men were killed. On the 23rd of September 1909, a dedication ceremony was held for the Uncompahgre Project. President William Howard Taft presided over the ceremony, and provided the principle speech.⁹

The Uncompahgre Project raised west-central Colorado's agricultural prospects ten-fold. Early on, fruit was grown in the area, but this soon proved to be the wrong crop for the harsh climate. Potatoes followed this, which initially did well, but that crop went out of favor in the 1920s. The crop that did catch on, however, was the sugar beet. Sugar beets were first grown in the area in the early 1900s, before the diversion project was even finished. By the late 1920s, when

9. U.S. Department on Interior, Water and Power Resources Service, *Survey of Cultural Resources in Lower Gunnison Basin Unit, Colorado River Water Quality Improvement Program*, by Susan Collins, Maurice Albertson, R. Thomas Euler, Lewis Hyer, and John Early Ingmanson, Salt Lake City, U.S. Government Printing Office, 1981, 57-62.

both fruit and potatoes proved themselves incompatible with the area, sugar beets took off as the region's number one cash crop.

It was during the 1920s, that west-central Colorado's other major industry began. The area became a somewhat popular tourist destination as early as the 1880s, when the Denver and Rio Grande Railway extended its line through the region. However, in the 1920s, with the advent of the automobile, and due to its exotic scenery, west-central Colorado began to be viewed by more and more Americans as a vacation site. It was in this decade that the "Rainbow Route" was constructed - a passenger vehicle road that wound through the canyons of the area. Complimenting this was the designation, in 1933, of the Black Canyon of the Gunnison National Monument. With a federally funded park for the use of visitors, the region's tourist economy became increasingly important.

The mixed tourist and farm economy of the region dominated throughout the 1950s, when mining returned to the region for the first time in almost one hundred years. As the atomic age progressed, the need for uranium increased. The canyons of west-central Colorado contained this precious radioactive ore, and uranium mining gave an extra economic boost to the region. It was especially needed, too, because rail transportation declined as railroads abandoned lines throughout the region, thus hurting the tourist economy. The closing, in the 1950s, of the scenic

railway that passed through the Gunnison River Canyon was particularly damaging.¹⁰

In this regard, construction of the Wayne Aspinall Unit of the Colorado River Storage Project gave a boost to the economy of the region in the 1960s. The recreational features of the reservoirs on the project helped the tourist economy. In the 1970s, the bottom fell out of the uranium business, returning west-central Colorado to its dependance upon agriculture and tourism. At this point, the Aspinall Unit became increasingly important, as it added to both of these aspects of the local economy.

Project Authorization

The Reclamation Service began investigations into the need for the development of the waters of the Upper Colorado River system as early as 1902, its charter year. Reclamation soon took over the already begun Uncompahgre Project, and provided irrigation water from the Gunnison River to farmers in the region.

The need for the Colorado River Storage Project (CRSP) tracks all the way back to the drafting of the Colorado River Compact in 1922. The compact was an

10. U.S. Department on Interior, Water and Power Resources Service, *Survey of Cultural Resources in Lower Gunnison Basin Unit, Colorado River Water Quality Improvement Program*, by Susan Collins, Maurice Albertson, R. Thomas Euler, Lewis Hyer, and John Early Ingmanson, Salt Lake City, U.S. Government Printing Office, 1981, 70-4.

agreement between the seven states of the Colorado River Basin regarding use of the river's water. Essentially, the compact divided the Colorado River system into two basins, the upper and lower basins, with the dividing point at Lee's Ferry, Arizona. The compact defined the upper basin as consisting of Utah, Colorado, Wyoming, and New Mexico. The lower basin it defined as California, Arizona, and Nevada. Using Reclamation hydrologic data from the late 1910s, it was decided that the annual flow of the Colorado was sixteen million acre-feet. The compact gave each basin a total of seventy-five million acre feet of water over every ten year period - essentially 7,500,000 acre-feet annually. The remaining one million acre feet of annual supply was left unallocated in 1922. The way that the compact reads, the upper basin has an obligation to provide 7,500,000 acre feet of water each year to the lower basin. In years when the Colorado River actually contained sixteen million acre-feet of water, this obligation was not a problem for the upper basin. However, in years where the flow was less, the lower basin's 7,500,000 acre -feet ended up coming out of the upper basin's supply, effectively shorting the upper basin. The problem was that in more years than not, the Colorado River contains significantly less than sixteen million acre-feet, sometimes as low as four million acre-feet.

The Colorado River Storage Project was proposed in order to retain for the

Upper Basin, water stored during wet years for dry years. A plan for CRSP, including a series of dams and reservoirs to provide storage capacity, in combination with power development and other services, was presented in a report by Reclamation in 1950. The report was subsequently printed in House Document 364, eighty-third Congress, second session. Construction of the four mainstem units of the Colorado River Storage Project, along with eleven other participating projects, was authorized on April 11, 1956 by the Eighty-Fourth Congress in Public Law 485. The Secretary of the Interior had to certify for each unit that the benefits would exceed costs. The authorized units were: Glen Canyon Unit on Colorado River in Arizona and Utah, Flaming Gorge Unit on Green River in Utah and Wyoming, Navajo Unit on San Juan River in New Mexico and Colorado, and Curecanti Unit (later renamed Wayne Aspinall Unit) on the Gunnison River in Colorado. The participating projects included: Central Utah Project (initial phase) in Utah, Emery County Project in Utah, Florida Project in Colorado, Hammond Project in New Mexico, LaBarge Project¹¹ in Wyoming, Lyman Project in Wyoming and Utah, Paonia Project in Colorado, Pine River Extension¹² in Colorado and New Mexico, Seedskaadee Project in Wyoming, Silt Project in

11. Later found to be infeasible and deleted from project.

12. Later found to be infeasible and deleted from project.

Colorado, and Smith Fork Project in Colorado.¹³

Certification for the Wayne Aspinall (then Curecanti) Unit came in 1959 for part of the project. Secretary of the Interior Fred Seaton approved both Blue Mesa and Morrow Point Dams and Powerplants, and certified that their benefits would outweigh their costs. Approval for Crystal Dam did not occur at this point, because a finished design for its construction was not complete.¹⁴ Reclamation filed an Economic Justification Report for Crystal Dam in April of 1962. When Secretary of the Interior Stewart Udall approved this report in December of 1962, the third dam of the Wayne Aspinall Unit became a reality.

In creating a plan for the Wayne Aspinall Unit, several alternatives for building the project according to the project authorizing act were considered. The authorizing act stated that the project had to be built above the Black Canyon of the Gunnison National Monument, and below the elevation of 7,520 feet above sea level. This left a forty mile stretch on which the project's features could be constructed.

Initial plan formulation studies were undertaken in 1955, before the project had been officially authorized, and a status report made in 1956. Preliminary indications showed that a series of four dams would be most practicable, but the

13. U.S. Department of Interior, Bureau of Reclamation, *Morrow Point Dam and Powerplant - Technical Record of Design and Construction*, (Denver, U.S. Government Printing Office, 1983), 1-3.

14. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume I, 1961, 7.

report cited the need for further studies. Four sites for dams were noted. In the end, economic consideration caused removal of the fourth dam from the studies, and the top three damsites were chosen for use, as they would require shorter, and hence cheaper, dams to back water up to the elevation of 7,520 feet above sea level. The use of three dams together would provide for maximum water storage capacity and maximum power generation, while still allowing for a regular downstream flow to be achieved.¹⁵

Flows of the Gunnison River are controlled by Blue Mesa Reservoir, which provides most of the storage capacity for the Wayne Aspinall Unit. Water released from the powerplant at Blue Mesa Dam, together with minor downstream inflows, receives short term storage at Morrow Point Reservoir. To maintain stream flows needed for downstream water rights (i.e. Uncompahgre Project), flows out of Morrow Point Dam and Powerplant, as well as Crystal Dam and Powerplant below it, are pretty uniform during the irrigation season. A streamflow of one hundred cubic feet per second (about 200 acre-feet per day), or more, is always maintained. The output of Blue Mesa Powerplant fluctuates to meet variations in load requirements, while Morrow Point and Crystal are operated mostly for base power loads (minimal, continuous demands for electricity) during irrigation season to

15. U.S. Department of Interior, Bureau of Reclamation, *Morrow Point Dam and Powerplant - Technical Record of Design and Construction*, (Denver, U.S. Government Printing Office, 1983), 5-8.

permit uniform flows. For the rest of the year, they are variably operated.¹⁶

Construction History

Reclamation assigned a project construction engineer to the Wayne Aspinall Unit on December 16, 1960. At the same time, Reclamation rented office space for the project headquarters in Gunnison, Colorado. A field engineer for this office began work in May of 1961. In September of 1961, Reclamation opened a field office in rented space in Montrose, Colorado, and the field engineer began work in October of 1961. Personnel were recruited for the project throughout the year, and by the end of 1961, the Aspinall Unit had fifty-four employees.

Reclamation also signed contracts, in 1961, with other federal, state, and private agencies for the Aspinall unit. These contracts were made with:

- The National Park Service - for recreational development.
- The National Forest Service - for studies on impact on use of forest lands, and for access to forest lands from reservoir areas.
- Colorado Department of Highways - for relocation of state highways in reservoir areas.
- Gunnison County - for relocation of county roads and abandonment of county road.
- Gunnison County Electrical Association - for relocation of power lines in reservoir area, and for electric service to construction camps.
- Mountain States Telephone and Telegraph - for relocation of facilities in reservoir area.

Blue Mesa Dam

Unit began in 1960, when Reclamation entered into a contract with the

16. U.S. Department of Interior, Bureau of Reclamation, *Morrow Point Dam and Powerplant - Technical Record of Design and Construction*, (Denver, U.S. Government Printing Office, 1983), 4-5.

Colorado Department of Highways for the relocation of U.S. highway 50 and Colorado State highway 149 to bypass Blue Mesa Reservoir. The highway department then entered into a contract with H. E. Lowdermilk Construction Company for construction of the new U.S. highway 50 in March of 1961. Work began in April of 1961, and continued throughout the year until December 15, when work was suspended for the winter. At this point, the embankment and selected surfacing had been completed, and placement of concrete piers of bridges over Gunnison and Lake Fork Rivers was mostly complete. By the end of the year, the work in this contract was fifty-three percent complete.

Initial work on Blue Mesa Dam began in 1961. It is a zoned earthfill embankment dam. During that year, all required foundation drilling was undertaken and completed. The surveying of borrow areas and access roads also was completed. The surveys for the cross sections of abutments started in September of 1961. In December, the invitation to bid on the construction contract for Blue Mesa Dam was issued.

In late 1961, separate contracts were awarded for earthwork, water, and sewerage systems at the Blue Mesa construction camp, and for office, warehouse, and garage construction at the Blue Mesa Field Station. The contract for the construction camp went to D.A. Mazzaco Construction Corporation, of Gunnison,

Colorado. Work began later in the year, and was thirty-two percent complete by the end of the year. The contract for the field station went to M. L. DuBois Co., of Fort Morgan. Work on it began on November 27, 1961, but only general grading and excavation of the building area and the placing of road embankment were done that year. By the end of the year, work was only six percent complete.

Land acquisition arrangements also began for Blue Mesa Dam and Reservoir in 1961. Reclamation purchased fourteen parcels of land, for a total of 4,133 acres, in the vicinity of Sapinero, Colorado. One parcel of 156 acres required condemnation proceedings, but all others were acquired through negotiated contracts. Also acquired was the land to be used as a borrow area for Blue Mesa Powerplant. The acquisition of this property made the building of the construction camp possible.¹⁷

After being held up for the winter, work on the first stretch of U.S. highway 50 relocation began again on March 29, 1962. It continued throughout the year, and was finished and opened to the public on November 28, 1962. The contract for the second section of highway was awarded by the Colorado Department of Highways to Schmidt Construction Co. Work began in May, and by the end of the year it was fifty-five percent complete.

The earthwork, water, and sewage systems for the Blue Mesa construction

17. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume I, 1961, 9-13.

camp were supposed to be finished by D.A. Mazzaco Construction Co., on February 4. However, due to an eight day strike, and fifty-six days of bad weather, the construction camp work was not completed until April 20, 1962. Not much work on the warehouse, garage, and office of the field office occurred in winter of 1962. The contractor, M.L. DuBois, placed the concrete footings for the building, beginning at the end of March. The steel buildings were erected the first of April, and the whole project was accepted as substantially complete July 1, 1962. The contract was supposed to have been completed by May 6, 1962, but was extended fifty-six days because of bad weather.

A construction contract for Blue Mesa Dam and Powerplant was awarded to Tecon Corporation, of Dallas, Texas, on April 4, 1962. Reclamation gave the contractor notice to proceed on the 23rd of April, and work began shortly thereafter.

Excavation of tunnels at the damsite was subcontracted out by Tecon Corp. to Quad Construction Co., of Golden, Colorado, which began work on tunnel excavation April 24, 1962. At first just one hundred men were employed in the task, but by the end of the year, 290 were employed to cut the tunnel. The river diversion tunnel was holed through September 7, 1962. Also holed through in 1962 was the horizontal reach of the spillway tunnel. By the end of the year, excavation of the inclined portion of the spillway tunnel was complete.

The first concrete placement on the Blue Mesa Dam project was made on October 23, 1962, with the placing of concrete in the bottom sixty degrees of the diversion tunnel inlet. The contractor completed placing of concrete in the invert section of the diversion tunnel and the horizontal reach of the spillway tunnel by the year's end. The aggregate for the concrete was produced by subcontractor Nielsons, Inc., of Dolores, Colorado. The aggregate came from the Sapinero borrow area, and was stockpiled in the vicinity of the damsite. Tecon also entered into a contract with Dearborn Machinery Movers, Inc., of Michigan, for production of the metalworks, penstocks, and manifold of the dam. In an area near the damsite, Dearborn began fabrication of these products in August of 1962. Very little progress was made by the end of the year.¹⁸

In April of 1963, relocation of U.S. highway 50 resumed under contract with Schmidt Construction. Schmidt Construction completed excavation, embankment, and rip rap placement during the months of May and July, and placed bituminous pavement in August. The entire second stretch was opened to the public in September 1963. The contract for the fourth segment of the highway relocation project went to Colorado Constructors, Inc., of Denver, in May 1963. The excavation and embankment work outside of the Gunnison River Canyon began first, and was complete by the end of the year. The excavation of rock cuts in the

18. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume II, 1962, 19-24.

canyon, and the placing of material in embankments began, and was seventy-five per cent complete by the end of the year.

Excavation of the inclined portion of the Blue Mesa Dam spillway tunnel reached completion in April of 1963. Excavation of the outlet works tunnel was completed in June. Placing of concrete in diversion and spillway tunnel carried on throughout year, with concrete placements in horizontal and inclined portions of the spillway tunnel complete by July.

Drilling and grouting of Blue Mesa Dam foundation began on March 7, and continued throughout the year. The diversion inlet structure and outlet flip bucket structure were completed by the early fall, as were inlet and outlet channels to the diversion tunnel. The diversion of the Gunnison River through the diversion tunnel occurred on October 8.

Once the river had been diverted, and the dam foundation area unwatered, the foundation was excavated to bedrock. Rock material was placed in upstream Zone III embankment, and excavation for the grout cap started in December.

Tecon Corp. terminated their contract with Dearborn Machinery in January of 1963, as their work had been unsuitable on the fabrication of steel penstocks and manifold. Tecon organized their own fabrication crews, and by the end of the year fabrication was seventy percent complete, and eight sections had been installed in

the outlet works tunnel.

Reclamation awarded a contract for the relocation of Sapinero Cemetery to Western Vault Co, on October 16, 1963. The cemetery had to be relocated because it was in the area of the Blue Mesa Reservoir. Notice to proceed was given October 21, and work began October 23, under the supervision of the president of the firm, a licensed mortician in the state of Colorado. Thirty-eight remains were disinterred and moved to either a new cemetery or another existing cemetery. All work was finished and accepted November 1, 1963.

During 1963, twenty-three more parcels of land were purchased for Blue Mesa Reservoir. By the end of the year, sixty-four of sixty-nine required parcels of land had been acquired for the project.¹⁹

In the last week of February, 1964, Colorado Constructors, Inc., resumed rock excavation on the fourth segment of the U.S. highway 50 relocation project. In April, the same construction firm was awarded a contract for construction of the third section of the highway relocation. By May, excavation for both the third and fourth sections was complete. The subgrade surfacing was placed in June, and finished in July on both segments. Bituminous paving began in July, and finished in August. On September 18, a dedication and ribbon cutting ceremony was held at Gunnison River Bridge, marking completion of U.S. highway 50 and state

19. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume II, 1962, 19-24.

highway 149 relocation projects.

On April 16, 1964, bids were opened for relocation of Gunnison County Road. A low bid of \$229,892, submitted by Vern W. Smith Construction Co., was accepted and awarded the contract. Construction started June 26, 1964, and by August the new road area had been cleared. Excavation, embankment, and final grading of roadway was complete by November, and Reclamation accepted the whole contract as complete on December 28, 1964.

In January of 1964, Tecon Corp. worked on excavation of the Blue Mesa Powerplant area, powerplant access road, and grout cap of dam foundation, which was all finished by April. Excavation of both abutments began May 8, and was completed September 7. The excavation of the inlet area and outlet works was also started in May, and was completed in July. Tecon workers placed rockfill in downstream Zone III embankments to elevation 7,244 in January. Initial placements of Zone I and Zone II embankments were made on April 21 and April 10, respectively. This continued until May 8, then began again in September 8, and continued until November 10.

Beginning in January of 1964, and continuing through August of that year, 2,439 cubic yards of concrete were placed in the spillway tunnel and outlet works tunnel of Blue Mesa Dam. Concrete placements in the powerplant intermediate

structure started in October, and totaled 1,665 cubic yards through December. Concrete placement in the powerplant substructure started in November, and totaled 2,077 cubic yards through December.

Fabrication and installation of steel liners and manifold sections continued from the previous year through April of 1964. Installation of steel penstock sections resumed in July, and continued through September, with, at that point, all sections of penstock in rough position up to the last field joint before the flanged section. Both radial gates were roughly assembled in September, and field welding was complete by November. The Blue Mesa Dam outlet works structure, including the access bridge, were completed in December.²⁰

Placement of earthfill and rockfill on the upstream face of Blue Mesa Dam resumed in April of 1965. All three zones had placements made throughout the spring, summer, and early fall of 1965. Zone I placements were complete October 27, Zone II on October 29, and Zone III on November 11. Limited use of the road across the dam was available on November 6. The contractor completed Zone III material placement on the downstream face of the dam on December 12.

Closure of the diversion tunnel at Blue Mesa Dam occurred when the upstream material placement was complete. Stop logs were dropped into position on October 26, and regulation of the river through the diversion tunnel commenced

20. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume IV, 1964, 18-28.

with operation of a five-foot by six-foot pressure gate. As of December 31, 1965, storage in Blue Mesa Reservoir amounted to 85,200 acre-feet, with the water surface at elevation 7,342.

Concrete placement in the powerplant substructure was completed on April 28, 1965. Concrete placement in the powerplant superstructure, and the tailwater control structure, completed on August 24, and August 27, respectively. The precast concrete roof slabs of the Blue Mesa Powerplant were installed between August 31 and September 3. More powerplant work continued in the fall of 1965. The six draft-tube gates and lifting frames, trashracks, and butterfly valves were all installed in October. Installation of the ring-follower gates was completed in November, as was the painting of the powerplant superstructure steel. By the end of December, both the controls for the butterfly valves, and the fixed wheel gates, were more than ninety percent installed. By the end of 1965, work on Blue Mesa Powerplant was almost ninety-five percent complete.

Notice to proceed on clearing Blue Mesa Reservoir was received January 27, 1965. The contractor began work on February 10, and worked throughout the year. On December 15, the project was accepted as complete.²¹

Diversion of the Gunnison River through the permanent outlet works of Blue

21. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume V, 1965, 21, 34-5, 44.

Mesa Dam was started on January 31, 1966. Final closure of the diversion tunnel was completed on February 7, 1966. Work on the powerplant access road was resumed on March 28, and completed in May. All work under contract for the construction of Blue Mesa Dam was accepted as fully complete as of October 19, 1966.

On March 31, 1966, a rock roughly one cubic yard in volume slid off the south canyon wall and struck the Blue Mesa Powerplant wall, knocking an eighteen inch hole and damaging a six-foot by eight-foot section of the inside wall. Less than a month later, on April 29, a rock slide of thirty to fifty cubic yards caused further damage to the concrete wall in the same area. To correct the problem, Reclamation decided to stabilize the rock slope on the south canyon wall above the powerplant with rock bolting. Rock bolting started April 30, on a three shift, seven day week schedule, and it was completed May 16, 1966. Beginning on July 25, the contractor repaired the damaged powerplant wall.

The contractor took delivery of the government-furnished power transformer for Blue Mesa Powerplant at the railhead in Pueblo, Colorado. From there, the contractor shipped the transformer by rail to Salida, Colorado, at which point it was loaded onto a truck for delivery to the damsite. On September 15, 1966, the transformer was damaged in transit on U.S. highway 50 near Monarch Pass.

Instead of being shipped straight to the damsite, the transformer was sent to Denver, pending a decision as to what to do about the damage. It was decided to load it onto a train and ship it to Houston. From Houston, the damaged transformer was shipped, via ocean-liner, to Sweden, where the unit was made; it arrived there on November 23, 1966. Repairs were then made to the transformer.²²

The last section of the concrete deck for Turbine Unit Two at Blue Mesa Powerplant was placed on January 11, 1967. This completed all the second-stage concrete in the powerplant structure. This work was done under a separate contract than the original work on Blue Mesa Dam; this contract for further work on Blue Mesa Powerplant was with Eagle Construction Corporation, awarded in 1966. The broken transformer that had been sent to Sweden for repair was returned in March of 1967, and installed. All work on this contract was accepted as substantially complete April 14, 1967. Permanent facilities at Blue Mesa Switchyard (part of this contract) were energized at 4:00 PM on May 17, 1967.²³

On February 16, 1968, all work at Blue Mesa Powerplant and Switchyard was accepted as fully complete. Facilities at Blue Mesa Dam and Powerplant were transferred to Operation and Maintenance status by the Bureau of Reclamation

22. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume VI, 1966, 18-9, 34, 44, 46.

23. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume VII, 1967, 17-9, 37-8.

April 1, 1968.²⁴

Reclamation negotiated a contract with Jericho Construction on October 8, 1968, for construction of protective fencing, metal building construction, and pipeline painting at Blue Mesa Dam. Notice to proceed was given to Jericho on October 16, and all work was accepted as complete on the eleventh of January, 1969.²⁵

On September 15, 1970, Reclamation awarded a contract to Electrical Dynamics, Inc, for additions to Blue Mesa Switchyard. Notice to proceed was given September 24, and work began October 3. The work concentrated on excavating structure foundations, forming and placing concrete foundations, and backfilling around structure foundations in preparation for erection of steel structures. On November 20, work was suspended for the winter, with the project less than nine percent complete.²⁶

In March and April of 1971, the contractor pulled the transmission cable from the switchyard to the powerplant. Excavation of structure footing and concrete placements took place during May and June. The steel structures of the switchyard were erected, bolted, and welded in July. Lighting and power cable

24. United States Department of Interior, Bureau of Reclamation, *Blue Mesa Dam and Powerplant - Technical Record of Design and Construction*, (Denver, U.S. Government Printing Office, 1975), 417.

25. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume VIII, 1968, 16, 20.

26. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume X, 1970, 19-22.

was installed in August, and work on the switchyard was accepted as substantially complete August 27, 1971.²⁷

Morrow Point Dam

Work also began on Morrow Point Dam in 1961. In August, foundation drilling began at the damsite. Test pits were established in the borrow area of the damsite, and samples of proposed aggregate were shipped to Reclamation's Denver laboratories for testing. The proposed area for the construction facilities for the dam was also surveyed and mapped.²⁸

On June 26, 1962, Reclamation awarded a contract to Mountain Builders, Inc., of Morrison Colorado, for excavation of an exploratory tunnel at Morrow Point Powerplant. The purpose of this contract was to construct a tunnel into the area of the proposed underground powerplant, and to construct drilling chambers in this area so that existing rock could be investigated and tested. The contractor received notice to proceed on July 7, 1962, and began construction immediately, and completed all work by September 5, 1962.

On September 7, 1962, Reclamation awarded a contract to Kunz Construction Co., of Arvada, Colorado, for the construction of an office, laboratory, warehouse, and garage for Morrow Point Damsite. The contractor

27. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XI, 1971, 18-20, 80, 91.

28. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume I, 1961, 9-13.

received notice to proceed on September 18, 1962, and began work on September 26. Reclamation accepted the project as complete on December 21.

On October 29, 1962, Reclamation awarded a contract to Charles Taylor and Sons Tree Service, of Arvada, Colorado for clearing of Morrow Point Reservoir area, gave notice to proceed on October 30, 1962, and at end of year, the clearing project was fifty-five per cent complete, in eighteen per cent of the time.

By the end of the 1962, thirty-three land parcels had been bought for Morrow Point Reservoir, including a Colorado Fish and Game Department property near West Elk Creek, and one large cattle ranch near Iola, Colorado. The other parcels were small resorts, cabins, and small cattle operations. At this point, all required parcels for the reservoir were purchased.²⁹

The contractor discontinued work clearing Morrow Point Reservoir site because of bad weather on January 4, 1963. Work resumed April 1, with all cutting, piling, burning and cleanup accepted as complete June 20, 1963.

Reclamation awarded a contract for the construction of Morrow Point Dam and Powerplant on May 14, 1963, to a joint venture of Al Johnson Construction Co. and Morrison-Knudsen Co, Inc. Reclamation gave notice to proceed to the contractor on June 13, 1963. At this point, the contractor established field offices at Cimarron, Colorado, and began work on June 18. Thirty workers were

29. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume II, 1962, 19-24.

employed initially on the project, and this number was inflated to 117 by the end of the year. Work during 1963, consisted of excavation of the powerplant access road and crest access road, and excavation of the diversion tunnel. The crest access road was eighty percent complete by the end of the year, and the powerplant access road was twenty percent complete. Diversion tunnel excavation was twenty-five percent complete. By the end of the year, almost seven percent of the entire work on Morrow Point Dam and Powerplant was complete, but fourteen percent of the time allotted for completing the contract had passed.³⁰

The Morrow Point Dam diversion tunnel was holed through on January 20, 1964. The excavation required for enlargement of the tunnel was completed in April, and concrete lining of the tunnel, including concrete headwalls and wingwalls, was completed in early May. On May 9, 1964, the contractor diverted the Gunnison River through the diversion tunnel.

Keyway excavation of the left abutment started at the end of July of 1964. Grouting of rock bolts to stabilize rock in the right abutment above the crest service area, and along crest road, started on September 22, 1964, and continued through the first half of December. Work on the right keyway was started on August 25. Excavation for the powerplant started August 6, and installation of ungrouted rock bolts to stabilize powerplant open-cut rock slope below crest road

30. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume III, 1963, 23-9.

was started August 27, and continued throughout the year. As of December 31, 1964, seventeen percent of the work on Morrow Point Dam was complete, in thirty-nine percent of the time.³¹

Excavation for the switchyard area of Morrow Point Dam finished in February of 1965. Excavation in the access tunnel started February 2, and ended in March. The powerplant exploratory tunnel was holed through to the cable tunnel on April 15. The cable tunnel had been started in March, and was finished in May. By the end of December, 37,829 cubic yards of material had been removed from the powerplant chamber. The excavation of the right abutment grouting and drainage tunnel began on March 25, and finished in July. This same work began on the left abutment in March, and finished in December. The excavation of penstock tunnels one and two continued intermittently throughout 1965, and concluded in January and February of 1966, respectively.

The construction of the main concrete mixing plant and the initial stocking of cement and aggregate bins was completed in August of 1965. The first bucket of concrete was placed in Morrow Point Dam on September 3, 1965; concrete placement continued throughout the year, and by November 27, 1965, when placement ceased for the winter because of inclement weather, 43,261 cubic yards of concrete had been placed in the dam. As of December 31, 1965, thirty-eight

31. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume IV, 1964, 18-28.

percent of the work on the dam had been completed, in sixty-four percent of the time.³²

Excavation of penstock tunnels one and two of Morrow Point Dam was completed in January and February, 1966, respectively. The contractor finished concrete lining of the cable tunnel in January, and concrete placement in the outside portal structure of the cable tunnel ended in February. Excavation of the right keyway foundation tunnel was completed in February, and the same work was completed on the left keyway foundation tunnel in March.

Placement of concrete in the dam structure resumed March 23, 1966, and continued through October 28, 1966, for a cumulative total of 281,837 cubic yards of concrete placed.

Excavation for the Morrow Point Powerplant chamber ended on March 31, 1966. The contractor placed the first concrete in the powerplant chamber in the sump floor slab on April 18, 1966. Concrete placed in the powerplant chamber totaled 3,412 cubic yards in 1966. Installation of the steel liners for the penstocks started in April and finished on November 30, 1966. The contractor initiated concrete placements around the steel liners in the penstock tunnels in July, and

32. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume V, 1965, 21, 34-5, 44.

finished in December.³³

Morrow Point Powerplant saw its last concrete placement on January 31, 1967, raising the cumulative total of concrete to 3,538 cubic yards. Drilling of three-inch holes for installation of post tensioned tendons was started in January, and completed in April of 1967. On July 18 and 19, 1967, each of the twenty-five tendons was stressed to 250-kips and grouted. Excavation for the base slabs of the penstock intake structure started in January and completed in March of 1967. Drilling and grouting of foundation “B” holes for penstock intake structures was started in March and completed on April 5. Concrete placements in penstock intake structures one and two were started April 21 and 28, respectively, and finished in September. Drilling and grouting “A” holes in the intake structure was started November 20, and completed December 4, 1967.

On March 27, 1967, Al Johnson Construction Co. and Morrison-Knudsen Co., the contractors, began concrete placement in the Morrow Point Dam structure after the winter’s hiatus. The final concrete placement was made on September 14, 1967. On May 5, 1967, while trying to unplug the formed drain in block ten of the dam by applying 300 pounds per square inch of water pressure to the drain, the concrete cracked across the top four lifts of block ten, about eight-feet from the

33. “Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project,” Volume VI, 1966, 18-9, 34, 44, 46.

upstream face of the dam. Repairs began immediately, and were finished on June 3, 1967. As of December 31, 1967, all work on the Morrow Point Dam contract was ninety-nine percent complete, with ninety percent of the contract time elapsed.³⁴

The diversion tunnel at Morrow Point Dam was closed at 5:00 p.m. on January 24, 1968. Controlled releases through the dam's tandem outlets started around 10:15 a.m. on January 25.

The contraction joints and the cooling coils of the diversion tunnel plug were grouted on March 12. The eighteen-inch drain pipe was filled with concrete on March 13, and grouted March 14. In April, spillway fixed-wheel gates were lowered into position, and three of the spillway gate hoists were installed. By May, all of the hoists were installed. Installation of the access stairs on the downstream face of the dam was started in May, and finished in June. On October 7, 1968, construction work on Morrow Point Dam was accepted as fully complete.³⁵

Turbine pits on Morrow Point Powerplant were installed in 1969. The first concrete placed in Turbine Pit Unit One was placed on June 10, 1969, and the last concrete was placed in the pit on November 7, 1969. In Turbine Pit Unit Two, the

34. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume VII, 1967, 17-9, 37-8.

35. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume VIII, 1968, 16, 20.

first concrete was placed on July 3, 1969, and the last concrete placed on December 19, 1969. The initial base slabs for both units had been placed on April 7 and April 10, respectively. The turbine shaft for Unit One arrived at the jobsite on November 6, 1969. Crews cleaned the turbine parts and installed the turbine wheel, shaft, and non-embedded turbine parts, including the bearing hub. This work was finished on December 24, 1969, and made the generator foundation and the rotor erection area available to the generator contractor.

Excavation for the entrance and visitor centers for Morrow Point Dam began in 1969. By the end of the year, common excavation was ninety percent complete, and rock excavation was seventeen percent complete. In July, placement of the concrete wall around the center, and sidewalks, were completed.

Excavation of the holes for the 13.8-kV wood-pole transmission line for the Morrow Point Switchyard started on June 16, and was completed in September. The framing of the wood-pole structures began on July 17, and also finished in September. Stringing and sagging the conductor and overhead ground wire on the 13.8-kV line was started on August 13, and completed in October. All of the wood poles required for the 230-kV line were set by the end of 1969, but had not been framed.³⁶

Installation of air, water, and oil piping for Turbine Units One and Two at

36. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume IX, 1969, 15-7.

Morrow Point Powerplant began in March of 1970. By October, 1970, both Units were essentially complete. All work to permit power generation with adequate control and instrumentation and transmission of power to the switchyard was accepted as substantially complete for Unit One on December 22, 1970, and Unit Two, on January 29, 1971.

During January of 1970, Operation and Maintenance personnel tested the 13.8-kV and the 15-kV line. The 13.8-kV line was energized on January 31, 1970, for delivery of construction power at the jobsite. The erection of switchyard steel structures started in January of 1970, and was completed in March of 1970. The equipment installed in the switchyard included five disconnecting fuses, a 14.4-kV disconnecting switch, three 15-KV lighting arresters, a 230-KV coupling capacitors, 230-KV disconnect switch, and potheads at the termination of underground 230-KV cable system. The Morrow Point Switchyard was accepted as substantially complete on October 19, 1970.

Excavation for the 230-KV cable trench for Morrow Point Powerplant began in the Morrow Point Switchyard on May 20, 1970, and finished on August 20 at the powerplant cable tunnel. The 230-kV cable was delivered to the jobsite July 15. In the two days of August 31 and September 1, 1970, the three 230-kV cables were pulled from the powerplant cable tunnel to the switchyard terminal. Sand

backfill was placed and compacted over the majority of the length of the trench by the year's end.

Installation of the expansion bolts and fastening of chain link fabric to the canyon wall below the crest access road to protect the visitor facility at Morrow Point Dam resumed on April 20, 1970. This task finished in June. Work on the entrance and visitor facilities themselves resumed on May 6, 1970. Concrete placements for walls, floor, and roof of the visitor building started in June of 1970, and work was completed on October 23, 1970. As of December 31, 1970, the visitor facility was twenty-eight percent complete.³⁷

Work on electrical, plumbing, heating, and ventilation systems all were completed at Morrow Point Powerplant in 1971. Testing of powerplant generators also took place in the winter of 1971. The bearing run was conducted on January 13, and balancing of the generator units was started on January 14, and finished the next day. The generator unit was synchronized on January 18. By February 4, operational testing was complete at Morrow Point Powerplant.

At the entrance and visitor center site at Morrow Point, rock facing work was completed in 1971. The concrete retaining wall was also placed. The roof of the visitor center was completed in 1971, and the area was landscaped.³⁸

37. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume X, 1970, 19-22.

38. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XI, 1971, 18-20, 80, 91.

All that was left to be done at Morrow Point Dam in 1972 was miscellaneous work. A contract for a number of small projects was drafted in late December of 1971, and all work was done in 1972. The contract work consisted of building walkways to piers, installing handrails on the retaining wall, and installing some access ladders and handrails. All work was complete by May 12, 1972, when the contract was accepted as one-hundred percent complete.³⁹

Crystal Dam

On July 9, 1964, bids were opened for Crystal Dam borrow area excavation. A low bid of \$31,300, submitted by Earl Troop, was accepted by Reclamation. Reclamation gave notice to proceed with the project on August 29, 1964, and excavation for test pits began August 31. Work continued from here, and was accepted as complete on November 14, 1964.⁴⁰

Reclamation awarded a construction contract on April 28, 1965, to H. E. Lowdermilk Company, for construction of the Crystal Dam access road. Notice to proceed was given the very next day, and clearing operations were instigated on May 20. This part of the project was completed in September, as was subgrade excavation. Select subbase and gravel surfacing were essentially completed in October, and all work was accepted as complete on November 30, 1965.

39. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XII, 1972, 21-2.

40. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume IV, 1964, 18-28.

A construction contract was awarded to Kuchler and Gleaves Drilling Co. on November 12, 1965, for exploratory drilling at Crystal Damsite. Notice to proceed was given November 30, and work began on December 7. As of the end of the year, this contract was fifty-one percent complete, in forty-one percent of the time.⁴¹

Reclamation accepted as fully complete the Crystal Dam access road on January 12, 1966. Also accepted as fully complete was work on exploratory drilling at Crystal Damsite, on February 10, 1966. No work was done on the Crystal Dam Project for another five years.⁴²

On April 9, 1971, Reclamation awarded a contract to Groneman's General Contracting, of Orem, Utah, for the construction of an office, laboratory, and two six-bay garages at the Crystal damsite. The contractor received notice to proceed on April 12. The excavation and grading of the field station area and access road began in May, and finished in June. All concrete work was done in July and August. The office building, and garages, were erected in August and September, with the plumbing, heating, and electrical work being done in October. All work on this contract was accepted as substantially complete October 7, 1971.

Bids on Crystal Dam opened May 25, 1971. The low bidder claimed an

41. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume V, 1965, 21, 34-5, 44.

42. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume VI, 1966, 18-9, 34, 44, 46.

error in his bid, after it was accepted, and his claim was allowed. All bids were then rejected as being too high, with new bids to be taken at a later date. The dam was to be a double-curvature thin arch concrete dam, whereas, originally, when the project was planned more than ten years previous, Crystal Dam was designed as an earth dam. On November 23, 1971, Reclamation opened bids for the construction of Crystal Dam diversion and foundation tunnels.⁴³

The contract for Crystal Dam diversion and foundation tunnels was awarded to Al Johnson Construction Co., on January 6, 1972. Notice to proceed was given to the contractor on January 10. The first work done on this section of the project was construction of bridges to upstream and downstream portals of the diversion tunnel. Excavation of the portals themselves began in April of 1972. The portals were complete, and diversion tunnel excavation started, in June of 1972.

Excavation proceeded from both ends of the tunnel simultaneously, and it was holed through August 23, 1972. In September, the contractor placed the first concrete in the invert section of the diversion tunnel, and placement of concrete in this tunnel was complete by November of 1972. In June, as well, the foundation tunnel excavation began, which continued throughout the year.

On August 30, 1972, a contract was awarded to Tri-O, Inc., of Salt Lake

43. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XI, 1971, 18-20, 80, 91.

City for extension of the Curecanti-Crystal 115-kV transmission line. The only work on this performed in 1972, was the excavation of pole structures and installation of the guy anchors. Work at the jobsite was discontinued for the winter in November.⁴⁴

In June of 1973, Reclamation finally awarded a contract for construction of Crystal Dam and Powerplant. The contract went to J. F. Shea Company, Inc. On June 18, Reclamation gave the contractor notice to proceed. In June, the contractor began rehabilitating the roads to the bottom of the canyon. This was completed in July, and work continued throughout the year on an access road to the top of the dam, and on a service road to the powerplant area. Scaling operations began in June, and by the end of August, scaling on both the left and right abutments was completed.

In November, 1973, cofferdam construction began on both the upstream and downstream sides of the dam. This work continued throughout the year. Trouble was experienced with leakage through the upstream cofferdam, and so holes were drilled in order to attempt to grout the area to control leakage.

During 1973, work continued on the foundation and diversion tunnels, which had begun in 1972. The foundation tunnel was completed in January of 1973. Later in the year, pressure grouting for the diversion tunnel was completed,

44. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XII, 1972, 21-2.

and all work on the tunnel contract was accepted as complete on February 16, 1973.

Work resumed in May of 1973 on the Curecanti-Crystal 115-kV transmission line, after being shut down for winter. Structures were set, and conductor and overhead ground wire strung during June and July. All work on this project was accepted as substantially complete on August 3, 1973.⁴⁵

Dam access road work continued at the Crystal damsite in 1974, and was completed in April. On March 14, excavation for the access road tunnel was begun, and holed through on March 27.

Cofferdam work also continued into 1974. The contractor placed material from the access road excavation in the downstream cofferdam. On February 6, the contractor discontinued the grouting program that began the previous year, in an attempt to control leakage at the upstream cofferdam. In a further attempt (and yet again unsuccessful) to dewater the area, the contractor brought in a subcontractor, Becker Drilling Co., which drilled twenty-four inch diameter deep wells at the downstream toe of the upstream cofferdam. Fourteen-inch diameter casing was installed in the holes, and they were backfilled with rock.

The concrete aggregate plant, and batch plant, were both constructed in June of 1974. Before this point, concrete had been mixed elsewhere and carried to the

45. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XIII, 1973, 20-2.

jobsite by cement mixer trucks.

Excavation for the powerplant structure, on the left abutment of the dam, began in 1974, and finished by June of that year. The contractor made the first placement of concrete in the powerhouse structure on August 1. This continued until work closed for the season in November.

The dam foundation excavation went on through the early months of the 1974, and finished by early July. After excavation clean-up, and construction of bulkhead forms, the contractor made the first concrete placement in Crystal Dam on July 31, 1974. The placement of concrete continued until November 22, 1974, when weather necessitated the end of this practice.⁴⁶

On April 15, 1975, J. F. Shea, the contractor, initiated removal of the insulation blankets that had been placed on Crystal Dam blocks as winter protection. On April 29, the contractor made the first placement of concrete for the season. This continued through until October 17, when winter weather ended the process.⁴⁷ Originally, the dam was supposed to be finished by December of 1975. However, by the summer of 1975, it became apparent that work was significantly behind schedule. Although both the contractor and Reclamation blamed each other for the delays, there was never any official decision as to whom had caused the

46. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume IV, 1974, 17.

47. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XV, 1975 & 1976, 45.

delays, or any legal or contractual action taken. The only apparent factor in the delays was the collapse, on August 19, of the boom of the crane used to place the concrete. The crane tipped off its tracks due to overloading, and the boom struck the top of the dam, causing the crane to fall heavily into its tracks, snapping its counterweight. Repairs were soon made so that work could continue, but the dam was not finished in 1975.⁴⁸

The first concrete placement on the Crystal Powerplant of the 1975 season was made on April 17. Work continued unabated until December 5, 1975. The powerplant, as well, was also now behind schedule, and would not be finished in 1975.

The aggregate plant began operating on the sixteenth of April, 1975. The contractor stored the aggregate upstream of dam until needed. Early on, the plant operated a twelve-hour day, but as placements in the powerplant and the dam increased, and necessitated more concrete, the aggregate plant bumped up to a sixteen hour production-day in July. Plant shutdown for the winter occurred November 12, 1975.

The contractor finished the permanent lighting system on the lower part of the dam and energized it in October of 1975. In September, J. F. Shea completed

48. *Montrose Daily Press*, "Crystal work behind schedule, crane wreck damage \$150,000," Montrose, Colorado, August 21, 1975.

the outlet piping of Crystal Dam; bellmouths, ring-follower gates, and the embedment of the fifty-four inch pipe all were a part of this. The continuously-leaky cofferdam on the upstream side of Crystal Dam still created a problem for the contractor in 1975. To control the problem, the contractor installed electric pumps at the cofferdam to get rid of excess water. With this, the contractor succeeded in dewatering the area.⁴⁹

Concrete placement at Crystal Dam resumed in April of 1976 with placement of concrete in the dam outlet structure. The first placement for the season in the actual dam blocks was made on May 3. By July, all concrete work in the dam blocks was complete. Concrete in the roadway section of the dam then was placed, and finished on August 6. The rest of the month of August saw final concrete placements made in the parapet walls, retaining walls, switchyard structure, and other miscellaneous structures. Finally, on August 30, 1976, almost a full year behind schedule, J. F. Shea finished Crystal Dam.

The first placement in Crystal Dam Powerplant for the 1976 season was made on March 11. In July, the last first-stage concrete placement was made in the powerplant. With this done, the powerplant's one-hundred ton overhead crane was installed in July, and the roof was constructed. A waterproof three-ply membrane

49. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XV, 1975 & 1976, 46.

was applied, and a coat of asphalt was placed over this, completing the roof of the powerplant. The first second-stage concrete in the powerplant was placed in October 1976. The turbine draft tube was embedded in second-stage concrete in November of 1976.⁵⁰

At 10:00 a.m. on March 14, 1977, Reclamation closed the stoplogs on Crystal Dam diversion tunnel, thereby beginning the filling of Crystal Reservoir. At 3:00 p.m. on March 14, Reclamation opened the gates at Morrow Point Dam, letting 350 second-feet of Gunnison River water into Crystal Reservoir. These remained open until the reservoir reached elevation 6,589.⁵¹ Five days after the reservoir began to fill, on March 19, Reclamation placed the outlet works at Crystal Dam in operation, letting the river flow downstream. On April 12, Reclamation placed a concrete plug where the stoplogs that originally kept the river from flowing through the diversion tunnel were, thereby permanently blocking the Crystal Dam diversion tunnel.⁵²

The collapse of Teton Dam in Wyoming, on June 5, 1976, prompted various public and private agencies to criticize Reclamation for the way in which they monitored their dams. Human miscalculation, investigators had decided, caused Teton Dam to be designed improperly for its geologic situation. This sharp

50. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XV, 1976, 90-1.

51. *Ouray County Plaindealer and Herald*, "Crystal Dam Filling," March 17, 1977.

52. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XVI, 1977, 49.

criticism prompted the Federal Government to make changes in the way its bureaus built, inspected, and operated dams and reservoirs. Several projects were singled out for special attention from the government. Crystal Dam was one of these, partially because, as was Teton when it collapsed, Crystal was just beginning to fill. Teton had been filling at a rate of four times the average rate when it collapsed. With this in mind, Crystal's filling rate was monitored very closely.⁵³

Crystal Powerplant construction continued in 1977, after the reservoir began filling. In the spring of 1977, the contractor installed the turbine in the powerplant. In July, the generator was installed. In the spring of 1978, the entire powerplant was finally complete, and it began to produce power.⁵⁴ The powerplant's completion was a year and a half behind schedule. Part of the reason for this was a fire that occurred in the construction warehouse of the contractor, J. F. Shea. On March 5, 1977, a major fire broke out at the construction warehouse where the contractor stored equipment and project materials. Included in the parts damaged (that amounted to more than one million dollars) by the fire were many of the electrical parts for the as-yet-incomplete powerplant. Shea Construction employees initially attempted to put out the fire, but were unsuccessful, and the

53. *Gunnison Country Times*, "Filling of Crystal Dam will be among those watched," Gunnison, Colorado, January 10, 1977.

54. *Montrose Daily Press*, "Crystal Dam nears completion," Montrose, Co, January 26, 1978.

entire building burned before the local Fire Department finally ended the fire.⁵⁵

Reclamation opened bids on June 7, 1977, for clearing of the upper-reaches of Crystal Reservoir. Milo Werner Co. was awarded the bid, and began work that summer.⁵⁶ The contractor worked on clearing the already-filling reservoir through December of 1977, when work ceased due to the weather. In late spring of 1978, Werner began work again, and finished clearing the reservoir in the fall of 1978. This was the last work to be done on the Crystal Dam and Powerplant. In December of 1978, Crystal Dam and Powerplant were accepted as complete. After seventeen years, the three-feature Wayne Aspinall Unit of the Colorado River Storage Project was complete. Crystal Dam was complete, and its powerplant was producing power around the clock. President Jimmy Carter created the Western Area Power Administration (WAPA) in the fall of 1977. When Crystal Powerplant went online in 1978, its power was marketed not by the Bureau of Reclamation, as had been the case at Reclamation's previously constructed powerplants, but by WAPA. This also became the case with all other Reclamation power projects.⁵⁷

Post-Construction History

By the fall of 1978, when Crystal Dam was finally officially completed, its reservoir and stilling basin had been in use for a year and a half. As part of the

55. Montrose Daily Press, "Crystal warehouse fire damages \$1 million," Montrose, Colorado, March 7, 1977.

56. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XVI, 1977, 49.

57. *Montrose Daily Press*, "Crystal Dam nears completion," Montrose, Colorado, January 26, 1978.

effort to pay special attention to the structural integrity of Crystal Dam as its reservoir filled, Reclamation ordered an inspection of the dam's upstream face. On October 23, 1978, divers arrived at the damsite to inspect the dam. They spent the next month inspecting the surface of the dam for any signs of stress. Instead of contracting out the job to a commercial diving outfit, as is usually done, Reclamation trained some of its engineers - ones that understood the construction of a double-curvature thin arch dam - to dive. This way, the divers would know exactly what they were looking for as they inspected the dam. The divers used underwater videotape - a rather new technology at the time - to photograph the entire dam. The report that followed verified that Crystal Dam was in perfect condition, and no damage occurred during construction. Although some debris was found in the stilling basin - pieces of cable, metal debris, logs, etc. - the divers identified no damage to the structure of the dam.⁵⁸

In the spring of 1979, a series of landslides above Crystal Reservoir occurred. At the time, Reclamation worried that landslides of this nature could create problems for the Crystal Dam access road. When slides covered the road, the dam became inaccessible, except by boat, which only could be used in the warmer months, because the reservoir freezes in the winter. Also, a landslide

58. United States Department of the Interior, Bureau of Reclamation, Montrose Projects Office, Press Release, "Scuba Divers Inspect Crystal Dam," Montrose, Colorado, November 14, 1978.

could harm a passing motorist, and conceivably strand someone out at the dam. At the time, the prevailing thought was that the action of drawing down the reservoir - lowering the water level according to river and power demands - was what induced the landslides. Much debate occurred about what was to be done about the problem, and how to safeguard against slides. On October 1, 1980, a test was carried out to determine if drawdowns were actually the root of the problem. After drawing the reservoir down, no change in the canyon wall's stability occurred. It was determined at this point that drawdowns were not the primary cause of landslides. Little was decided on the matter, except that the reservoir needed to be watched, and the road needed to be closed to vehicle traffic during periods of wet weather. Also, it was advised that an active list of available road clearing agencies, public and private, needed to be kept at hand, in the event of a road-blocking slide.⁵⁹

On June 19, 1980, Reclamation opened bids for road work on the Crystal Dam access road. The contract was awarded to Corn Construction Co., of Grand Junction Colorado. The contract included seal coating, paving, and minor repair work for damage done by landslides to the existing seven-and-a-half mile access road. Work began later in that summer, and was accepted as complete in July of

59. United States Department of Interior, Water and Power Resource Service, Engineering and Research Center, Memorandum from Assistant Commissioner to Regional Director - Salt Lake City Office, December 15, 1980.

1981.⁶⁰

On October 3, 1980, a Congressional Bill, submitted by Colorado representative Gary Hart, was passed, officially renaming the Curecanti Unit of the Colorado River Storage Project the Wayne Aspinall Unit. Hart had announced the bill in February of that year, but it did not become official until October. The next summer, on July 18, 1981, a dedication ceremony was held at the unit to celebrate its new name. Aspinall, eighty-five years old at the time, was in attendance. Aspinall was instrumental in the passage of the Colorado River Storage Project Act in the House of Representatives, in 1956. He was a Democrat from Palisade, Colorado, who represented that state's fourth district in the House of Representatives for twenty-four years. The last fourteen of those, Aspinall served as the chairman of the House Interior and Insular Affairs Committee, before he was defeated in a primary election in 1973.⁶¹

On March 4, 1981, a \$4,103,189 contract went to Grand Construction, of Montrose, Colorado, for a number of improvement features at the Curecanti National Recreation Area. The contract included work at five Gunnison River recreation areas, creating and expanding day-use facilities, one of which required the building of a pedestrian underpass under U.S. highway 50. The contract

60. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XVIII, 1981-1982, 86.

61. *Denver Post*, "Reservoir Named for Aspinall," July 17, 1981.

provided for addition of fifty-five campsites to Stevens Creek Campground, and ninety campsites to Lake Fork Campground. Other contract additions included at Lake Fork Campground: a Ranger contact station, an amphitheater, a fish cleaning station, a boat dock, a breakwater, and all the necessary road work and utility extensions. At the Cimarron Campground, the contract provided for twenty-five new campsites, a Ranger station, picnic shelters, an amphitheater, an historic train exhibit, and also the extension of roads and utilities to the new features. The contractor began work on the contract at Cimarron Campground, where the weather was least harsh, one week after the contract's approval.⁶²

In January 1982, the National Park Service dry dock on Morrow Point reservoir sank. What exactly caused the structure to sink was unknown. The forty-foot steel platform was used to dock the *Shavano* boat, which the Park Service used to give tours of the reservoir in the summer months. To correct the problem, in early March of 1982, two local divers attached cables to the submerged dock, over a period of five days. The cables were then used to hoist the dock out of the water with a Western Area Power Administration crane, so that repairs could be made, and the dock floated again.⁶³

Several routine spot checks of the water in Blue Mesa Reservoir in the

62. *Montrose Daily Press*, "Firm here awarded \$4.1 million Curecanti recreation work," March 5, 1981.

63. *Montrose Daily Press*, "Local divers aid recovery of BuRec dock," March 9, 1982.

summer of 1981 indicated high levels of acidity in the reservoir. In order to verify these high levels, which were thought to be caused by acid rain and other pollution, Reclamation instituted a weekly sampling test in the spring and summer of 1982. Weekly, samples were taken from each of thirty selected sites on the reservoir, and from thirty additional sites on tributaries. When the results were compiled in the fall of 1982, it was determined that pH levels were actually within acceptable limits. Reclamation decided that nothing needed to be done about the matter at that point, although, pH levels required continuous monitoring.⁶⁴

A rock slide on June 8, 1984, deposited 55,000 cubic meters of earth and boulders on Crystal Dam access road. The slide presented a problem for the dam, as the access road provides the only access to the dam, and a crew is required at the dam daily. The only way into Crystal Dam, at this point, was by boat. A four-man Reclamation crew began clearing the road on June 8, the day of the slide. However, by August 3, when it was determined that a significant amount of work was still required to clear the road - 4,000 worker-hours - Reclamation applied for emergency funding to hire crews to clear the road. This was required to clear the road before winter temperatures came, the reservoir froze, and made the dam inaccessible. With this in mind, emergency funding was procured, and a crew

64. *Denver Post*, "Blue Mesa Acidic Levels Safe," September 7, 1982.

brought in to clear the road.⁶⁵ The removal process began on September 4, 1984, and finished on January 5, 1985.

In the fall of 1984, it was discovered that water passing through the Blue Mesa Dam spillway tunnel was causing cavitation of the concrete in the tunnel. In order to fix this, the Cementation Company of America, of Arizona, was contracted to repair the minor damage done to the spillway tunnel. They also cut a three-foot diameter air tunnel in the spillway, to aerate the water as it passed through the spillway. The goal of this was to cause the water to not beat so hard on the concrete as it passed through. This contract was completed in the first half of 1985, and was successful. At the same time that this work was being done, Gears, Inc., of Crested Butte, Colorado, was contracted to place additional uniform rip rap on the north face of Blue Mesa Dam. This work was done mostly for cosmetic reasons, with the goal of making the outer layer of the earthen dam more aesthetically pleasing and structurally sound looking. In a sense, it was done to reassure the public that the earth-fill structure was more than just a pile of rocks sitting in a riverbed, and was actually a carefully engineered structure.⁶⁶

In 1985, Reclamation awarded a \$341,000 contract for replacement of a Crystal Dam Powerplant turbine runner, to a Yugoslavian manufacturing company,

65. United States Department of Interior, Bureau of Reclamation, Memorandum from Regional Director - Upper Colorado Region, to Contracting Officer, August 13, 1984.

66. *Gunnison Country Times*, "Spillway repair at Blue Mesa Dam," September 4, 1984.

Titovi Zavodi Litostroj. By the contract, a model of the turbine runner was produced and tested, before the full-scale runner was manufactured, and later installed.

Between June 11 and 13, 1985, all three dams at the Aspinall Unit, and their appurtenances, were examined, and found to be in excellent condition.

Avery Structures, Inc., was awarded a contract, in the amount of \$485,250, for construction of Morrow Point bridge and road repairs, on July 30, 1985. Work began on this project on August 12, 1985.⁶⁷ In January of 1986, the Morrow Point bridge and road construction was completed. The repairs and construction created a two lane, double span, center piered structure, approximately 120 feet in length. This replaced a fourteen-foot diameter culvert that washed out in 1984.

A fire in the station service switchgear at Blue Mesa Powerplant occurred on March 24, 1986. The fire was the result of an electrical short in an overhead crane. The fire was in the station service board that provided power to the plant, forcing a shutdown of plant power. No water was released from Blue Mesa Dam for over three hours, but no environmental or wildlife damage occurred in the river bed, as Morrow Point Reservoir was backed up all the way to Blue Mesa Dam, at the time. Repair work began immediately, and was finished in about one week.⁶⁸

67. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XXI, 1985, 26-7.

68. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XXII, 1986, 21.

The rockslides that plagued Crystal Dam and Reservoir throughout its existence continued to be a problem in 1990. On April 20 of that year, a rockslide occurred approximately 0.1 miles downstream of the left abutment of the dam. The slide, as with others in the past, blocked the access road, and threatened to disrupt power and possibly water service to large portions of the Montrose valley. Without easy access to the dam, the basic daily functions that needed to be performed at the dam to ensure power and water delivery became more difficult. The slide, it was believed, was caused by intense rainstorms, in conjunction with snow runoff. Removal of the 28,000 cubic yards of material began on May 16, 1990, under a \$75,000 emergency fund appropriation.⁶⁹

The dams of the Aspinall Unit underwent, and passed, several tests in 1990 and 1991. On November 15, 1990, Reclamation prepared a Structural Behavior Report for Crystal Dam. It was the first report like this for Crystal. The data showed that Crystal Dam was performing in a satisfactory and predictable manner. In 1991, all three Aspinall Unit dams underwent Review of Operation and Maintenance Examinations and Safety Evaluation of Existing Dams (SEED) exams.⁷⁰

Settlement of the Project

69. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XXVI, 1990, 13-5.

70. "Annual Project History, Wayne Aspinall Unit, Colorado River Storage Project," Volume XXVII, 1991, 30.

The Wayne Aspinall Unit of the Colorado River Storage Project was not developed to provide irrigation for any project lands. Although there are diversions for irrigation purposes below the three dams of the Aspinall Unit, most notably the Uncompahgre Project, which was built before the Aspinall Unit, none of these diversions are directly tied to the unit itself.

Uses of Project Water

The Wayne Aspinall Unit has fully developed the power potential of the Gunnison River along a forty mile stretch of the river between Gunnison, Colorado, and the Black Canyon of the Gunnison National Park. The three powerplants on the three dams of the project have the capability to generate a maximum of 340,000 kilowatts of electricity; Blue Mesa Powerplant has a capacity of 86,400 kW, Crystal Powerplant has a capacity of 28,000 kW, and Morrow Point has a capacity of 173,334 kW.⁷¹

All totaled, the energy from the Aspinall Unit is enough to satisfy the daily power needs for a city of almost 300,000 people. The switchyards built at the powerplants of the unit deliver the power to the Colorado River Storage Project transmission system. This system interconnects with the powerplants of the Glen Canyon, Flaming Gorge, and Navajo Units of the project. From there, power is

71. United States Department of Interior, Bureau of Reclamation, Project Dataweb - Colorado River Storage Project, <http://dataweb.usbr.gov/html/crsp.html> - accessed 7/20/2000.

sold to preference and other customers throughout the area serviced by the Western Area Power Administration.

The Aspinall Unit also provides flood control benefits to the lower Gunnison River. Of the three dams of the project, Blue Mesa alone has flood control capability. The reservoir has an active capacity of 748,000 acre-feet, and another almost 200,000 acre-feet of flood control capacity. The total flood control benefit, in dollars, from 1964 to 1999, amounted to \$9,836,000.⁷²

The other benefit of the Aspinall Unit is recreation. The recreation areas of the Aspinall Unit are managed as the Curecanti National Recreation Area by the National Park Service. The three reservoirs provide the prime attraction to this recreation area. Blue Mesa Reservoir is touted as the largest lake, albeit an unnatural one, in the state of Colorado. The recreation area offers boating, fishing, water skiing, ice-fishing, as well as hiking, biking, and hunting on the surrounding lands. The reservoirs are generally stable for ice fishing during the months of January, February and March.

Reclamation, in conjunction with the Park Service, developed visitor features at the recreation area. Campsites, amphitheaters, Ranger stations, visitor centers, boat ramps, docks, and trails abound at Curecanti National Recreation

72. United States Department of Interior, Bureau of Reclamation, Project Dataweb - Colorado River Storage Project, <http://dataweb.usbr.gov/html/crsp.html> - accessed 7/20/2000.

Area. In recent years, the area has averaged about 1,100,000 visitors annually, with most of the visitors between Memorial Day and Labor Day.⁷³

Conclusion

The Wayne Aspinall Unit is just one piece of the entire Colorado River Storage Project, which is one of the largest water projects in the country. It provides for the development of the Upper Colorado River basin, and furnishes water storage and power for the region. Although, in terms of repayment and water and power allocation, the individual projects of the Colorado River Storage Project are considered to be a whole, they were constructed, and are managed individually. The Aspinall Unit was the last of the Colorado River Storage Project units to be completed, as it did not reach full completion until 1978. The Aspinall Unit provides water storage for municipal, industrial, and agricultural water users of the Colorado River's Upper Basin, and also provides hydroelectric power for nearby cities. As with the whole of the Colorado River Storage Project, the power revenues from the Aspinall Unit are used to fund water development in the Upper Basin.

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73. <http://www.nps.gov/cure/> accessed 7/21/2000.

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