Newton Project

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2000

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Newton Project

In 1871, members of the Church of Jesus Christ of Latter-Day Saints (Mormons) living in Newton, a town located in northwest Cache Valley, Utah, constructed the first irrigation reservoir in the state. According to the periodical for the Bureau of Reclamation, *Reclamation Era*, it was possibly the first in the nation as well. This was done to acquire more water from Clarkston Creek, a stream that ran along the eastern edge of town. This reservoir was created through the construction of an earthfill dam that failed three times before it was enlarged in 1886, to stabilize the structure. The growth the town of Newton in the coming years, as well as the dam's somewhat crude construction, necessitated construction of a new dam and canal project that would better meet the town's water needs. This was accomplished by the Bureau of Reclamation in 1946, providing a more stable and adequate source of water for this agricultural community.[1]

Project Location

The Newton Project is located in Cache County, Utah, on Clarkston Creek, about ten miles from the Utah-Idaho border, and two miles upstream from the town of Newton. Over half of the present-day county is taken up by the Wasatch-Cache National Forest; the rest of the county is located in what is referred to as Cache Valley. The town of Newton, and the project, are located within the valley. Because the town is located in a mountain valley, it tends to receive heavy snowstorms on occasion, although overall precipitation fluctuates from year to year. In fact, the town's location itself was chosen by the early settlers specifically because there

1. Denver, Colorado, National Archives and Records Administration: Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115, "Project History for 1941, Newton Project, Utah" Volume I, 1941, 24-5, 28-30; United States Department of the Interior, Water and Power Resources Service, *Project Data* (Denver: U.S. Government Printing Office, 1981), 691-2; "Utah–Cradle of American Irrigation," *Reclamation Era* 32, no. 9 (September 1946): 198 .

are fewer snowdrifts when the winter storms arrive. Newton has remained a small agricultural community throughout its history, and even today boasts of only about 700 residents, almost all of whom are members of the Church of Jesus Christ of Latter-day Saints. The project consists of one storage reservoir and three canals totaling 7.4 miles.[2]

Historic Setting

Prehistoric Setting

Cache Valley was once a bay on ancient Lake Bonneville. This body of water, approximately 20,000 square miles on the surface and 1,000 feet deep, covered much of Utah and Eastern Nevada, about 25,000 years ago. Its only outlet was Red Rock Pass, about six miles south of present-day Downey, Idaho, where it connected to the Columbia and Snake Rivers. Lake Bonneville receded over time, until all that is currently left of this massive body of water is the Great Salt Lake.[3]

Historic Setting

Prior to 1824, the region where the Newton Project is located was inhabited primarily by bands of Northwestern Shoshone, or So-So-Goi, although Ute tribes would occasionally foray into the area. The Shoshone lived as nomadic hunter-gatherers, roaming with the animal herds along the rivers and stream beds. In the spring and summer, the Shoshone would gather seeds and berries, and hunt small game; in the winter, the valley was used for ceremonies, while the tribes gathered in "warm camps" near hot springs and tree groves.

The valley's harsh weather was responsible for the disappearance of a large herd of buffalo. The Shoshone chief Sagwitch recalled that in 1774, snowstorms began falling with

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2. I. Donald Jerman, "Pioneer Dam Replaced in Utah," *Reclamation Era* 31, no.10(October 1941): 278; U.S. Bureau of the Census, Subcounty Population Estimates, Utah, 1990-8; United States Department of the Interior, *Project Data*, 691.
3. "Project History for 1941, Newton Project, Utah," Volume I, 1941, 16-7.

great frequency in early autumn, piling as high as fourteen feet and driving many of the Shoshone to the south near the Great Salt Lake. When they returned the following spring, only seven buffalo could be found alive, the last remnants of what had once been a great herd. The killing of these last animals for food marked the end of the buffalo in Cache Valley, although their bones would frequently be found by Anglos during the pioneer migrations of the mid-1800's.[4]

In 1822 and 1823, a company of men, employed by the Rocky Mountain Fur Company and under the command of Major Andrew Henry, trapped along the Yellowstone and Big Horn Rivers, before moving south along the Green River. Trapping in this part of the country proved to be very good so, to better take advantage of the river's branching streams, Henry divided his men into separate groups, sending one group under William Sublette's leadership down the Bear River. These men, including a young Jim Bridger, followed the Bear River into "Willow Valley," the name first given to the area by these trappers. Because they used nearby Hyrum Canyon (its modern-day name) to store, or "cache" their furs for seasonal trading rendezvous, the region soon became known as Cache Valley.[5]

After the arrival of the Latter-day Saints in Utah in 1846, the leader of their church, President Brigham Young, sent many church members on settlement assignments throughout Utah and other parts of the Rocky Mountain and desert southwest. On July 24, 1855, Young sent a group of twenty-three men and two women under Bryant Stringham to an area of Cache Valley

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4. "Project History for 1941, Newton Project, Utah," Volume I, 1941, 17-9; Kerry Brinkerhoff, "Short History of the Northwestern Band of the (So-So-Goi) Shoshone Nation," *Northern Utah Shoshone History* [database on-line] (Utah: Friends of the Native Americans of Northern Utah, 17 March 2000); available from http://users.efortress.com/geneaology/page1.htm; Internet; accessed 1 June 2000; Alvin Josephy, *The Civil War in the American West*, New York: Vintage Books, 1991, 255-60.

5. "Project History for 1941, Newton Project, Utah," Volume I, 1941, 20-1; Author Unknown, "Visitors Center," *County History* [database on-line] (Utah: Utah State University, date unknown); available from http://utahreach.usu.edu/cache/visitor/index.htm; Internet; accessed 25 May 2000.

called Haw Bush Spring, by the Blacksmith Fork River, with the goal of grazing 3,000 cattle during the summer months. Plans for a permanent settlement went awry when the area was struck by early snowstorms, and the settlement was subsequently abandoned. The following year, Mormon settlers again attempted to form a community, this time agricultural, in Cache Valley. Led by Peter Maughan, they established what became known as Wellsville. The success of this settlement led to the establishment of other towns in Cache County's valleys, including Clarkston in 1864. However, the settlers struggled to adapt to the harsh winter weather that piled snow in great drifts. They also suffered from occasional raids by the Northwestern Shoshone, whom they had dispossessed from the area. Some settlers in Clarkston, wishing to improve their living conditions, moved south from Clarkston to Newton after having the town site surveyed by County Surveyor James H. Martineau.[6]

The "new town" immediately encountered problems obtaining a reasonable amount of water to ensure crop growth. Although Newton was located on the banks of Clarkston Creek, very little water came downstream to irrigate crops, due to the water rights that allowed the first settlers, who were living upstream in Clarkston, access to a larger share of water. Like many other settlements in Cache Valley, successful agricultural development was often impeded by poorly prepared farmlands, and inadequate facilities such as leaky ditches and temporary makeshift dams that made water control in the region difficult. When the valley was struck by a particularly heavy snowstorm, it could be devastating to the farmers' livestock as well as their crops. In addition, precipitation levels in the region fluctuate severely from year to year. Without a proper irrigation system, years with low moisture levels were devastating to farmlands

6. I. Donald Jerman, "Pioneer Dam Replaced in Utah," *Reclamation Era* 31, no.10: 278; Linda Thatcher, "Cache County," *Utah History Encyclopedia* [database on-line] (Utah:University of Utah, date unknown); available from http://www.media.utah.edu/medsol/UCME/c/CACHECOUNTY.html Internet; accessed 1 June 2000; Author Unknown; "A Brief History of Cache County," *County History* [database on-line] (Utah: Utah State University, date unknown); available from http://www.utahreach.usu.edu/cache/visitor/history.htm; Internet; accessed 25 May 2000.

and livestock alike. A harsh drought in 1870 led to a public meeting in March of 1871, when Newton residents voted to build a dam and reservoir. Farmers were to receive water from the project in proportion to the work they invested in building the dam.[7]

Construction on this project began in 1872. The community effort, typical of early Mormon settlements, provided much-needed security for Newton's farmers in the coming years. Although completion of the earthfill dam would not occur for several years, the reservoir was put into use holding a small amount of storage water in 1874. The dam and storage reservoir was constructed primarily with ox and horse-drawn scrapers and other farm tools; the reservoir itself was the first of its kind in the state of Utah, and is believed to be the first large storage reservoir used for irrigation in United States' history as well. The dam stood twenty-eight feet high, was 127 feet long, and held 1,566 acre feet of water in a reservoir that stretched for one and a half miles. Unfortunately, due to its crude construction, the dam failed three times, prompting the town's citizens in 1886 to enlarge the structure, reinforce it with wooden beams, and construct a wooden flume and spillway. The final structure would serve the Newton community for another 45 years, but was rendered slowly obsolete as the town grew and the farmed land increased.[8]

The increased use of the dam also prompted organization of the Newton Irrigation Company (NIC) on January 14, 1890. The company would be responsible for distribution of waters owned by the company in Clarkston Creek and the new reservoir; this distribution would be proportionate to the amount of stock owned by the stockholders. The initial 10,000 shares were sold at the equivalent of $1 a share, with payment represented by the transfer of water

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7. Leonard Arrington & Linda Wilcox, "From Subsistence to Golden Age: Cache Valley Agriculture, 1859-900," *Utah Historical Quarterly*, 57 vol.4(Fall 1989): 346-50; "Project History for 1943, Newton Project, Utah" Volume III, 1943, 32; "Project History for 1941, Newton Project, Utah," Volume I, 1941, 24-5.
8. Leonard J. Arrington and Thomas C. Anderson, "The "First" Irrigation Reservoir in the United States: The Newton, Utah, Project," *Utah Historical Quarterly*, Vol. 39, no.3 (Summer 1971), 211-2; I. Donald Jerman, "Pioneer Dam Replaced in Utah," 278; "Project History for 1941, Newton Project, Utah," Volume I, 1941, 25-6.

rights from the individual farmers to the collective control of the NIC. The NIC eventually was able to control the water rights to all of the reservoir as well as one-fourth of Clarkston Creek. Concerning the latter, a deal was struck whereby 15 out of 20 days, water would go to Clarkston, while Newton would gain access to the creek for the remaining five days. The NIC was also granted a fifty-year charter that would expire January 14, 1940.[9]

Project Authorization

The growth of Newton, and its agricultural industry, over the next thirty years, prompted a series of investigations into expansion of the dam and its facilities. The first of these was conducted in 1892 by a Dr. Fortier and his student, T. H. Humphreys, of Utah Agricultural College; the study recommended raising the dam. In 1918, Humphreys conducted surveys for a new reservoir that could be placed downstream from the existing dam and reservoir. Over the next 20 years, private engineers as well as the Utah State Engineer conducted subsequent surveys, before turning the data over to the Bureau of Reclamation in 1938, for the purpose of further study and possible construction. However, construction costs prevented building the project, because the financing was in excess of the Newton residents' ability to pay.[10]

This problem was remedied with the passage of the Water Conservation and Utilization Act in 1939, popularly known as the Case-Wheeler Act. Under the provisions of this law, water conservation and utilization projects would be financed by any number of federal agencies. Much of the cost of the project would be absorbed by the agencies as make-work projects that provided labor for the unemployed, while the reimbursable costs would be based upon the ability to pay of those who would benefit from the project.[11]

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9. "Project History for 1941, Newton Project, Utah," Volume I, 1941, 26, 45-6.
10. "Project History for 1941, Newton Project, Utah," Volume I, 1941, 26-7, 62.
11. "Project History for 1941, Newton Project, Utah," Volume I, 1941, 27; United States Department of the Interior, "Water Conservation and Utilization Act," *Federal Reclamation and Related Laws Annotated*, Volume I,

(continued...)

With these provisions in place, the Newton Project was authorized on October 17, 1940. Although the total estimated cost of the project was to be $618,000, the water users would only be responsible for repaying $350,000 of the costs. The $350,000 reimbursable cost was to be paid in 40 equal installments of $8,750 a year, interest-free under the provisions of the Case-Wheeler Act, starting the year following the completion of the project's development period. Further costs, as well as the necessary labor, would be provided through the Works Progress Administration, except when Civil Service employees were called to the work site for various skilled labor duties. To expedite the contractual obligations of the project, the Newton Irrigation Company was reorganized on May 7, 1941 as the Newton Water Users Association (NWUA), for the specific purpose of contracting with the United States for the construction of the larger dam on Clarkston Creek. The transfer of water rights to the NWUA was accomplished by a quitclaim deed filed by the NIC in November of 1942. Stockholders in NIC would surrender their water rights through the process of surrendering their stock in NIC; when 95% of the stock was surrendered, the NWUA would subsequently surrender the stock to the United States. Assessments levied against this stock would help to fund the 40-year repayments, as well as operation and maintenance of the irrigation system.[12]

Construction History

The proposed project was to consist of an earthfill dam 90 feet high, with a crest length of 1200 feet, half across the Clarkston Creek channel and half across the right side to act as a "blanket." The right abutment would contain a 2,100 foot dike up to 15 feet high, and a 1000 foot long emergency spillway. The foundation would contain a conduit outlet structure of

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11. (...continued)
Through 1942(Washington, D.C.: United States Government Printing Office, 1972), 668-79.
12. Arrington and Wilcox, "From Subsistence to Golden Age," 217; "Project History for 1941, Newton Project, Utah," Volume I, 1941, 31-3, 46-8; "Project History for 1942, Newton Project, Utah," Volume II, 1942, 10.

reinforced concrete, a 4,000 foot long canal from the end of the outlet works, and a rock masonry parapet and pole curb wall along the top of the dam.[13]

To commemorate the construction of the dam, a ground-breaking ceremony was held on September 3, 1940. Sponsored by the Logan Chamber of Commerce and the Newton Water Users Association, the speakers included T. H. Humphreys, who had spent much of his early career surveying the Newton Dam site and was now seeing his recommendations for a larger dam and reservoir about to come to fruition. On March 10, 1941, engineer I. Donald Jerman was placed in charge of the Newton Project, after closing the Upper Snake River Project office in Idaho. After several spring meetings with various federal officers in Denver and Utah regarding the project, construction commenced on August 29, 1941. Four days previous, on August 25, a contract to provide three electrical power lines to the site was awarded to the Utah Power and Light Company. President Franklin Roosevelt officially authorized construction to begin on September 11; the letter confirming this arrived at the site on September 19.

Most of the construction that occurred during the remainder of the year was devoted to site preparation: construction of the necessary shops for blacksmiths, carpenters, and the machine shop were completed, as well as a building for storage of oils and greases. Workers stripped and undertook excavation of a 3300 ft. diversion canal; the excavations would be completed in 1942. The canal itself had a carrying capacity of approximately 100 cfs., and diverted water through the headworks structure while the dam's earth embankment was put into place.[14]

The dam saw further progress made in early January of that same year, when the excavation and first placement of concrete was accomplished for the outlet works, as well as the

13. Arrington and Wilcox, "From Subsistence to Golden Age," 217-8.
14. "Project History for 1941, Newton Project, Utah," Volume I, 1941, 8, 11, 49, 53-4.

placement of steel and forms. There was considerable work done on the conduit between January and June of 1942. Three hundred twenty-six yards of concrete were placed in the structure, which was constructed 25 feet above the natural stream bed of Clarkston Creek on the left abutment. Protection was provided for the conduit with backfill, and then the backfill was hand stamped with power hammers. This was repeated until the embankment was about a foot above the conduit, then the process was continued using heavy equipment such as trucks and sheepsfoot rollers. The embankment for the conduit, when finished, sloped from the left abutment to the stripped foundation of the dam at approximately a 4 to 1 grade.[15]

Some seepage was found over a large area of the site, mostly in the vicinity of the trashrack, as well as at a higher location on the bank. This led to the placement of gravel around the back of the trashrack, which diverted water around the structure and into the reservoir. The dam's foundation continued to be stripped throughout the year, to a point of practical completion, while excavation was undertaken for a 1000 foot emergency spillway. This would absorb any excess water from the headworks, should an overflow occur. Spoil materials from the foundation stripping were also put to use as a cofferdam, then pushed back to the upstream face of the earth embankment when it was completed in 1942. The spoil materials would act as an additional seepage blanket.[16]

The involvement of the United States in World War II steadily drained away labor and affected dam construction in many areas. The loss of WPA labor continued at a rapid pace throughout the year; when operations on the project were suspended November 30, there were only four WPA employees left at the site. This led to the assignment of skilled Civil Service employees to these tasks beginning June 19, 1942. While concrete work on cut-off trench

15. "Project History for 1942, Newton Project, Utah," Volume II, 1942, 1, 31.
16. "Project History for 1942, Newton Project, Utah," Volume II, 1942, 32.

excavation continued, embankment placement suffered from lack of operators for earth-placing heavy equipment. All work on the project had to be shut down due to the onset of severe winter weather, and the War Production Board issued an immediate "Stop Work" order on December 24. This order preceded the eventual abolishment of the WPA in February of 1943. Abolition of the WPA led to a change in the nonreimbursable portion of the project's appropriation, with $275,000 granted by the Secretary of the Treasury on August 31, 1943 for labor and materials, and another $35,000 to cover inflation of the costs for material, and overhead for reimbursable funds.[17]

On January 24, 1943, a spring thaw and flood occurred at the old Newton Dam. This collapsed the wooden spillway that had been constructed, and threatened to overflow the embankment. In July, Reclamation learned the War Production Board would release the Newton Project for construction and completion, to provide food production deemed necessary for the war effort. Some work resumed in August 1943, but on a very limited scale until official notice was given in September. Although the WPA had been abolished earlier in the year, and the war effort was now in full swing, Reclamation acquired enough common and skilled labor from nearby Cache Valley towns to accomplish a great deal of work during the remainder of the year. Both the auxiliary outlet works and the main outlet works conduit were completed, as well as much of the earth embankment, which was finished in 1944.

The embankment was constructed with Zone One and Two materials: Zone Two was a gravel mixture installed on the outer embankments, while Zone One comprised the inner core, an impervious clay mixture that included silt and rock fragments, and prevented water from escaping downstream when installed. The Zone One mixture was also installed in the spillway

17. "Project History for 1942, Newton Project, Utah," Volume II, 1942, 11, 15, 32-3; "Project History for 1943, Newton Project, Utah," Volume III, 1943, 22, 39.

cutoff trench, the auxiliary outlet backfill and dike, and the right abutment blanket. Both mixtures were also placed along the west abutment. Materials for the mixtures were subjected to penetration tests before they were rolled with sheepsfoot rollers, to ascertain the reliability of their placement. Two eight-inch toe drains were installed through a downstream portion of Zone Two material in the dam. Additionally, the temporary diversion canal was enlarged to the capacity that it would carry a normal spring flood, and the quarry for the dam's outer layer of rock riprap was relocated five-and-a-half miles to the southwest. Riprap from this quarry was placed three feet thick on top of the right abutment blanket.[18]

After a three month stoppage on construction for the winter months, work again resumed April 3, 1944. During the year, workers placed most of the rock riprap on the dam's earth embankment, making sure to place it concurrently with the downstream slope of the embankment, due to the two-and-one-quarter to one slope, which would have made placement after completion of the embankment difficult. This was not necessary on the upstream slope, however, due to the three to one slope of its placement. As work on the embankment progressed through 1944, the toe drains installed the year before were extended along the embankment. The end of the year also marked a milestone in the dam's construction period, when the first 350 acre feet of water were stored in the new reservoir in December.[19]

Workers commenced on the rock parapet wall at the top of the dam by excavating a three foot wide trench into the compacted earth embankment, three feet three feet in height from the top of the embankment. The material used for this wall consisted of untrimmed rock at the tapered base which was backfilled, while the wall proper was constructed with hand-picked rocks, trimmed smooth on the outside surface of the wall and joined with cement mortar. A

18. "Project History for 1943, Newton Project, Utah," Volume III, 1943, 8, 18, 39, 42-4.
19. "Project History for 1944, Newton Project, Utah," Volume IV, 1944, 8, 38, 52.

concrete cap was placed on top of this parapet.[20]

Workers started on the canal system during 1944, as well. The Main Canal (called the Highline Canal until a separate designation was made the next year) was completed, while a 24-inch reinforced concrete pipe siphon was constructed that would serve the East Canal. Excavation began on the Highline Canal, and progress on the turnouts, road crossings, and cross drains continued through 1945. Throughout its four-mile length, the Highline Canal contained eleven 15-inch turnout structures, while the East Canal had one 24-inch and one 15-inch turnouts; in addition, a total of sixteen farm crossings, four county road crossings, one state highway crossing, and twelve cross drains were installed on these two canals.[21]

Most of the final work on the parapet wall would be completed in June and July of 1945. One of the side projects completed during 1945 was a rehabilitation of the old Clarkston Creek diversion dam, which had been serving existing project canals for 18 years. The concrete in the structure had deteriorated badly, so a nine-inch concrete wall was placed on the upstream face of the dam, complete with screw lift wooden gates that were salvaged from the old Newton Dam. This small project was completed in November and December of 1945. There was also work completed on a three mile stretch of county road which had been relocated, while the highway across from the dam was graveled.[22]

The year 1946 saw final touches on the main structure of the project. The biggest jobs during this last mop-up period included the installation of measuring devices in the outlet works chutes. For these structures, a concrete stilling well with a staff gauge was placed at the right side of the chute well, while a V-notch plate steel weir was placed at Station 6÷34, which would

20. "Project History for 1944, Newton Project, Utah," Volume IV, 1944, 41; "Project History for 1945, Newton Project, Utah," Volume V, 1945, 22.
21. "Project History for 1944, Newton Project, Utah," Volume IV, 1944, 39-41; "Project History for 1945, Newton Project, Utah," Volume V, 1945, 23-4.
22. "Project History for 1945, Newton Project, Utah," Volume V, 1945, 22-4.

measure irrigation and waste water discharged from the chute to the outlet works.

Workers also focused on construction of the Parshall flume, which came on the heels of an excavation for Highline Canal drop structures in April of 1946. Representatives from the Newton Water Users Association asked engineer E. J. Wick to stop construction along the Highline, and it was decided to end the canal at Station 244÷96.92. This lead to the construction of the Parshall flume, along with a division box structure at the end of the canal. The Parshall flume also replaced a lined portion of the Highline canal at Station 0÷20, and would measure irrigation water released into the Highline. On June 13, 1946, construction on the Newton Project was completed, and Reclamation subsequently reported in the project history that all 2,225 acres of project land targeted for irrigation was receiving its requisite supply of water.[23]

The Newton Project was built as an earthfill structure on Clarkston Creek, approximately two miles north of Newton. Although Reclamation officially completed the dam in 1946, an additional service spillway, located to the west of the dam, was built from 1948-1949. There are two spillways. The service spillway is a concrete-lined chute at the left abutment and is controlled by a 14 by 7 and a half-foot radial gate. On the right end of the dam, a 1,000 foot long concrete overflow crest acts as the emergency spillway. The reservoir has a capacity of 5,600 acre feet, covering a surface area of 297 acres, and there are three canals: the Main Canal, East Canal, and Highline Canal. The Main Canal is directly linked to the dam, releasing water for 0.6 miles before branching into the East and Highline Canals. The East Canal runs two miles and serves the land between the canal and Clarkston Creek. The Highline Canal runs for four miles and serves farmland on the west side of Newton.[24]

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23. "Project History for 1946, Newton Project, Utah," Volume VI, 1946, 8-9, 19-21.
24. *Project Data*, 693; United States Department of the Interior, Bureau of Reclamation, " Management Summary, Newton Dam," *SEED Report on Newton Dam, Newton Project, Utah, Upper Colorado Region*, September 1982, 1.

Post-Construction

After Reclamation completed construction on the project, it abolished the project office in 1947, and transferred operations to the Logan office. On January 1, 1948, operation and maintenance of the Newton Project was transferred to the Newton Water Users Association. That same year, some stockholders in the NWUA forfeited their share of stock in order to dry-farm. This left about 85% of the stock in the hands of stockholders, resulting in higher assessments on the stock that was still held, to make the payments on the project. Fortunately, this was not serious enough to significantly impact the payment schedule. The repayment contract would be amended in 1964, when Congress authorized extension of the repayment period for reimbursable costs and establishment of a variable repayment schedule. As outlined in Senate Bill S. 1584, annual payments would be dependant upon the amount of water delivered to the project users each year, rather than the fixed payments that had been established under the previous repayment contract.[25]

The service spillway was constructed soon after the project was completed. The need for this had been apparent since 1946, when the upper two feet of the reservoir filled in two hours due to an early thaw and heavy precipitation. Serious damage was averted by the USBR water caretaker at the time, who constantly monitored the level of the water, and opened the emergency spillway gates at certain intervals. A similar event occurred under the NWUA in February 1948. These floods posed a threat to the dry-farming lands in the area (there had already been a lawsuit brought by an Alphonso Christensen in April, 1946, seeking compensation for lands damaged by waters that had overflowed the outlet works). In June 1948, bids were issued for a contract to

25. "Project History for 1947-1950, Newton Project, Utah," Volume VII, 1947, 1; United States Department of the Interior, "Amended Contract With Newton Water Users Association," *Federal Reclamation and Related Laws Annotated* Volume III, 1959-66 (Washington, D.C.: United States Government Printing Office, 1972), 1745.

build a new service spillway. The contract was awarded to Thatcher Construction on July 21, 1948, and construction began a month later.[26]

The company immediately encountered problems. Weather delays forced the construction of a temporary dike to prevent water from flowing through the partially completed spillway. Although the deadline to complete the spillway was originally set at February 14, 1949, the head of the project was forced to ask for a continuance twice because of poor weather and work site conditions that impeded progress. These continuances were granted both times, and Thatcher was able to complete work on the spillway by July 7th, 1949.[27]

In 1949, other significant work was completed that provided aesthetic enhancement of the project. In July, a foundation monument was completed for a name plate commemorating the construction of Newton Dam. In addition, low precipitation levels allowed the NWUA to install a reservoir level gage, which until then had not been possible due to high levels of water in the reservoir. This was accomplished after 960 acre feet of water was released from the reservoir on October 11 through the 21. The paperwork ensuring rights of way for the project was completed by the close of 1950, after it was discovered that no work on the issue had been done since the transfer of the project's paperwork to the Logan office in 1947.[28]

Apparently recognizing the potential for the area as a recreation facility, there were some early attempts to stock the reservoir with fish, and occasional boating activity occurred, as well. However, the fish plantings proved ineffective due to large reservoir drawdown, warm water, and lack of oxygen. The drawdown of the reservoir also limited boating trips to early summer. Formal, organized efforts at capitalizing on the project's recreational possibilities would not

26. "Project History for 1947-1950, Newton Project, Utah," Volume VII, 1947, 2-4; "Project History for 1946, Newton Project, Utah," Volume VI, 1946, 16.
27. "Project History for 1947-1950, Newton Project, Utah," Volume VII, 1947, 4-5.
28. "Project History for 1947-1950, Newton Project, Utah," Volume VII, 1947, 11-3.

occur until May of 1965, when William Durrant of the Logan Development Office and Dean Bischoff, Area Engineer, began reviewing plans for development with the chair of the Cache County Recreation Board, Professor H. B. Hunsaker. This development, designed to increase visitation to the reservoir, was authorized November of 1966.[29]

It took some time for the project's recreational facilities to come into wide use. By 1980, the number of recreational use days had risen from 1,975 in 1969, to 4,110 in 1980, and then 5,125 during 1989; while the percentage of locals who took advantage of the activities available rose from 70% to 95%. In addition, the jurisdiction of the project's recreational use was transferred from Cache County to Utah State Parks in 1987. Today, the recreational activities enjoyed at the Newton Project include picnicking, boating, and fishing.[30]

The first widespread use of sprinkler irrigation, as opposed to gravity irrigation, occurred after 1955, and became more prominent as the years passed and technology improved. By June of 1981, it was reported that 95% of the fields irrigated under the Newton Project had converted to side-roll sprinkler systems. Not only has the use of sprinkler irrigation been touted as a means of saving already limited water supplies, it is even more relevant for the farmers of the Newton Project because of the shortages of the water supply that the project has suffered, in spite of carry-over storage that at one point reached about 50% of the active capacity during the late 1960's.[31]

The need for water conservation was made abundantly clear in 1976, when only 7.68

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29. "Project History for 1951-1959, Newton Project, Utah," Volume VIII, 1959, 7-8; "Project History for 1965-1966, Newton Project, Utah," Volume X, 1966, 5, 8.

30. "Project History for 1969-1970, Newton Project, Utah," Volume XII, 1970, 5; "Project History for 1979-1980, Newton Project, Utah," Volume XVII, 1980, 10; "Project History for 1987-1990, Newton Project, Utah," Volume XXIII, 1990, 7, 156.

31. Charles F. Wilkenson, *Crossing the Next Meridian: Land, Water, and the Future of the West*, (Washing ton, D.C.; Island Press, 1992), 287; "Project History for 1951-1959, Newton Project, Utah," Volume VIII, 1959, 13; "Project History for 1969-1970, Newton Project, Utah," Volume XII, 1970, 2, 14; "Project History for 1981-1982, Newton Project, Utah," Volume XVIII, 1982, 22.

inches of precipitation were recorded for the entire year; and again in 1988, when the area suffered through one of the worst droughts on record. The year-long dry spell in 1976 was the lowest amount of precipitation on record since 1892, and affected so many states throughout the nation that Congress passed the Emergency Drought Relief Act in April of 1977. The 1988 drought led the Cache County administration to investigate cloud seeding to increase precipitation and consider applying for drought relief from the federal government.[32]

Since completion of the dam in 1946 and the service spillway in 1948, there have been relatively few repairs or modifications done on the dam. The first conservation work was done in 1953. The Soil and Moisture Conservation Service (S&MC), in order to reduce erosion in the structures, seeded and terraced the dam and the Highline Canal, as well as the east fork of Clarkston Creek. In 1956, seepage was noticed in some alfalfa fields; this was corrected when rodent holes were discovered by the adjacent reach of the Main Canal, and repaired in 1957. The S&MC was called into action again when a reservoir spill on February 12, 1962, caused damage and erosion to some of the project structures. In March, the canals were cleaned of silt and debris that had accumulated during the spill, and rehabilitation work was done on the rock drop structure at the junction of the East Highline Canal and the east tributary of Clarkston Creek.[33]

The next important modification came in July of 1968, when 3,250 feet of the West Highline canal was realigned and lined with concrete. In relation to the conversion to sprinkler irrigation, this was meant to reduce wasted water by reducing absorption through the natural

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32. "Project History for 1977-1978, Newton Project, Utah," Volume XVI, 1978, 7; "Project History for 1987-1990, Newton Project, Utah," Volume XXII, 1990, 130-1; United States Department of the Interior, "Amended Contract With Newton Water Users Association," *Federal Reclamation and Related Laws Annotated* Volume IV, 1967-82 (Washington, D.C.: United States Government Printing Office, 1989), 3032-7.
33. "Project History for 1951-1959, Newton Project, Utah," Volume VIII, 1959, 8, 11-3; "Project History for 1960-64, Newton Project, Utah," Volume IX, 1964, 8-9.

earth lining of the canal. In 1976, the NWUA signed a repayment contract to line 2.6 miles of concrete in the canal system; 1,520 feet for the East Canal, 12,500 for the Highline Canal. This work was accomplished in 1978. In 1981, it was discovered that the lining of the Highline was only one and a half inches thick, as opposed to the three inches that had been recommended in the 1976 contract. This led to cracking in the lining that required extensive maintenance in the coming years.[34]

The lining of the canal system in 1978, marked the beginning of more extensive modifications and repairs on the aging project. The primary catalyst for this was the passage in November, 1978, of the Reclamation of Safety of Dams Act, written in response to the failure of the Teton Dam in Idaho in 1976, the act authorized the dispersement of funds up to $100 million per fiscal year for the repair of dams built by the Bureau of Reclamation. Under this act, $5.5 million was authorized for repairs and modifications on Newton Dam, specifically the emergency spillway.[35]

A Safety Evaluation of Existing Dams report (SEED) in 1978, found that an extra three feet had been added to the top of the emergency spillway, with a material of an unknown quality. The report stated that the presence of the extra height posed a serious threat to the dam–if the surface elevation exceeded 4,780 feet, rapid seepage would occur on the dam's crest. In addition, if a water flow of 5,760 cubic feet per second at a depth of 1.7 feet occurred while the dam was at its maximum elevation, the flow would pass over the emergency crest. The report also identified the presence of a one-foot flashboard, a temporary barrier meant to increase the reservoirs storage capacity, had been anchored to the top of the service spillway gate since 1963.

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34. "Project History for 1967-1968, Newton Project, Utah," Volume XI, 1968, 8; "Project History for 1977-1978, Newton Project, Utah," Volume XVI, 1978, 7; "Project History for 1981-1982, Newton Project, Utah," Volume XVIII, 1982, 17.
35. "Project History for 1981-1982, Newton Project, Utah," Volume XVIII, 1982, 19-21.

Requests to remove the flashboard since this time had been ignored or badly enforced, and it was admitted to the evaluators that even if the apparatus was removed, it would be replaced soon after. In addition, it was discovered that the hoisting equipment on the service spillway was not properly installed, and that modifications on the structure that had been recommended as far back as 1963 had not been done. In September of 1979, the addition to the emergency spillway and the flashboard were both removed from the dam structure. This proved to be timely when a flood occurred at the site in January the next year. Although the overall damage from the flood was not devastating, it did damage a dairy farm in the project's vicinity. It was also serious enough that the auxiliary spillway was used for the first time since its installation in 1948. After the reservoir filled and spilled again in June of 1984, Reclamation drew up an Emergency Preparedness Plan and presented it in July of 1985 to officials of the NWUA and the town of Newton.[36]

Other modifications that took place in the 1980's included a weather station installed at the outskirts of the town of Newton in June of 1981, for the purpose of obtaining planting dates for the farmers, soil moisture data, and climatological data from Utah State University in nearby Logan. With the assistance of this station, an irrigation schedule was developed for the 1982 planting season. After a year of this experiment, it was determined by the farmers that the use of the station was less efficient and flexible than the methods developed by the farmers through years of experience. Also installed in 1982 was an aerator, designed to improve the visual water quality for the recreational users, and after four core samples for a SEED report was taken from the dam, four porous-tube piezometers were installed where the samples were extracted.[37]

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36. "Project History for 1977-1978, Newton Project, Utah," Volume XVI, 1978, 64-70; "Project History for 1979-1980, Newton Project, Utah," Volume XVII, 1980, 6, 80; "Project History for 1985, Newton Project, Utah," Volume XXI, 1985, 6.
37. "Project History for 1981-1982, Newton Project, Utah," Volume XVIII, 1982, 22-4.

In 1986, the first major modification project at Newton Dam was undertaken. The 1982 SEED report had determined, and the June 1984 spill confirmed, that Newton had fallen short in several aspects on safety, mainly in the auxiliary spillway. The SEED evaluation stated that Newton could not pass the updated inflow design flood, because the unlined auxiliary spillway was not designed to handle these updated flows; if flow out of the auxiliary spillway was obstructed, the dam could potentially overtop and fail.[38]

Thus, an overall modification scheme was authorized for the project, which included the following improvements: raising the crest three feet, to 104 feet in total height; reconstructing the paved county road, including the parapet wall, safety barrier, and guardrail; constructing a concrete grade sill for the spillway crest; creating an embankment training dike, with a pipeline and two road crossings; modifying the service spillway gate operating mechanism; and removing the auxiliary outlet works, which had been abandoned in the late 1970's. In August of 1986, a $1.8 million construction contract was awarded to Raymond Construction Company of Logan, Utah, while site prep work was awarded to LeGrand Johnson Construction. Construction of the main modifications began in October of the same year, after site preparation was undertaken in September. Areas of the site were prewet for excavations, stockpiles for riprap created, and trees and brush were cleared from the area upstream of what would be the auxiliary spillway.[39]

In October and continuing through the shutdown of construction for the winter, excavations were begun for the auxiliary spillway, training dike, concrete grade sill, and keyway trench. Riprap was placed on the left shoulder of the auxiliary spillway, and the removal of the abandoned auxiliary outlet works was completed. Construction began again in June of 1987, and by the end of July, all excavations save for the key trench were completed. From July until

38. "Project History for 1986, Newton Project, Utah," Volume XXII, 1986, 31.
39. "Project History for 1986, Newton Project, Utah," Volume XXII, 1986, 8, 21-4, 35.

September all structures, including the key trench, were placed with riprap, and the county road was stripped and asphalted. In addition to the riprap on the dam modifications, Zone One material was hauled and compacted between Stations 0÷00 and 17÷23. In September and October, the apparatus for the service spillway radial gate was installed, followed by the electrical equipment to run the gate. Lastly, material was spread and compacted on the dike and county road embankments as an aggregate base course, and the modifications of 1986-1987 have held up rather well. In 1998, an examination report on Newton Dam revealed that the only significant deficiency was the large amount of trees and brush that had accumulated on the dam, especially the upstream face. It was recommended that the vegetation be removed so that the root systems did not create seepage paths for the dam.[40]

Settlement of the Project

The Newton Project did not target any lands for settlement. The project was intended to stabilize the water source for the town of Newton and irrigate 2,225 acres of farmland. In fact, the growth of the town and its agricultural resources was the catalyst for the dam's construction, which replaced the original structure that had served the town since 1874. Newton's population has remained stable at about 600 residents or so since the turn of the century.

Uses of Project Water

The storage facilities stabilized the water supplies of a struggling town and provided 2,861 acres of land with irrigation water. The project is strictly used for irrigation purposes; there are no hydroelectric facilities. The project is administered by the Newton Water Users Association, and assessments on the stock in the company help to pay for the cost of building the

40. "Project History for 1986, Newton Project, Utah," Volume XXII, 1986, 35; "Project History for 1987-1990, Newton Project, Utah," Volume XXIII, 1990, 43-5; Memorandum from Wayne N. Young, Civil Engineer, P.E., to Manager, Inspections Emergency Management Group, "Examination Report for the Comprehensive Facility Review of Newton Dam–Newton project, Utah–Upper Colorado Region," August 31, 1998, United States Department of the Interior, Bureau of Reclamation, Reclamation Service Center, Denver, Colorado.

project, and most recently, modifications and maintenance not covered by the 1978 Safety of Dams Act. Newton Reservoir is also administered by Utah State Parks, and although fishing opportunities have been limited due to the shifting temperatures of the reservoir, there are also facilities available for boating and picnicking in the area.

Conclusion

The original Newton Dam demonstrated that water could be diverted from streams and stored for future use by settlers in the arid West. Although not as glamorous as Hoover Dam or as massive as Glen Canyon Dam, the historical precedents that this early structure set in demonstrating that large-scale water diversion and irrigation storage, was influential and far-reaching. The success of the early Newton settlers helped make future projects, such as Hoover and Glen Canyon, as well as local efforts such as the Central Utah Project, possible. More importantly, the Newton Project provided the means for the small agricultural community of Newton to survive, and in the spirit of the original Newton Dam, continues to represent what a united community can accomplish.

About the Author

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