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SWAN FALLS DAM

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When large scale lode mining came to Silver City, scarcity of wood or coal hampered development of major Florida mountain silver properties, particularly the Trade Dollar and the Black Jack. Not too much timber grew in that rather arid section. Shortage of fuel became "a source of expense and embarrassment" during the Panic of 1893. Hydroelectric power offered a possible answer to the problem. Success of a hydroelectric transmission line from Oregon City to Portland, followed by a similar development from Niagara Falls to Buffalo, suggested an answer for the Trade Dollar and the Black Jack. Similar systems began to spring up over the country. In 1894, a Boise mining engineer, A. D. Foote, set out to locate a good Snake River power site for Silver City. He examined Thousand Springs, an area with the potential necessary for his project. But electrical engineers pointed out that none of the transmission lines ran anywhere near the hundred miles and more that separated Thousand Springs from Silver City. So the next year, Foote set out with A. J. Wiley to find a closer site. His final choice was Swan Falls, only twenty-eight miles from the mines. Unable to finance such a venture, Foote finally found a mine management position in Grass Valley, California. But Wiley, a young Boise engineer starting out on an outstanding career, kept up his interest in Swan Falls power. Wiley was running a Snake River fine gold dredge at Grand View in the summer of 1898 when a local electric plant began operation in Silver City and when the Trade Dollar and Black Jack managers began to show interest in bringing in electric power from Swan Falls.

In the summer of 1898, L. B. Stiwell, electrical manager of the Niagara Falls Power Company, and Thomas T. Johnston, an hydraulic engineer noted for designing the Chicago drainage canal, came to Silver City as consultants for the mining companies. They endorsed the Foote-Wiley Swan Falls project, and in the summer of 1900, construction was authorized. A. J. Wiley designed the dam, and by December, he had most of the plant and concrete portion of the dam finished.

Wiley's $250,000 project took advantage of a rock shelf which ran across the river. He put a concrete dam, forty-five feet wide on the north side, and placed his power plant on top of that dam. With a fall of only about five feet in the river, he depended upon his dam to provide most of the power. To close the entire channel, he started a crib dam 424 feet wide, twelve feet high, forty-three feet thick on the bottom and six feet thick on top. The main channel on the south, sixty feet wide and twenty feet deep, presented a serious problem. Using rock filled 4' x 4' x 20' cribs made from 8" x 8" lumber, he spent several weeks getting the gap narrowed from sixty to forty-two feet. One crib after another was swept downstream. So Wiley had Thomas T. Johnston--one of the nation's "most eminent hydraulic engineers"--return to look at the situation. Finally a large crib boat--sixty-four feet long, thirty-two feet wide, and thirteen and one-half feet deep--was built on the north side. With 45,000 board feet of 8" x 8" lumber and four to five tons of iron bolts and pins, this oversized crib was guided from both banks into the gap, March 30, 1901. Just before going into place, the boat hooked on a rock and turned endwise. Fortunately the timbers all held, and the gap was closed in spite of this accident. Rock immediately was hauled into the boat to sink it into place, and power generation commenced. (The power plant already had been in limited use to run arc lights to keep construction going day and night that winter.) On April 3, the transmission lines to Silver City were tested successfully with 20,000 volts. But then the rock filled boat unexpectedly slipped thirty-two feet downstream, April 4. Somehow it lodged on the base of the permanent dam, and the project went ahead. The crib dam held, so that the permanent dam could be completed. This allowed the Blaine mill to convert to electric power, April 10. Then the compressor for the 400 foot Florida mountain tunnel went electric, April 12. Electric lighting and electric mine cars were installed in the tunnel, and a 75 horsepower motor for the Black Jack mill began to utilize Swan Falls power, April 15. The Black Jack shaft and most of the other major power consumers switched away from steam, and Silver City quickly became a thoroughly modern mining camp just at the turn of the century. Delamar soon got power also.

In the original Swan Falls Plant, four vertical turbines turned a shaft which was belted to three generators. Each produced 300 kilowatts of 500 volt alternating current. The turbines had a seventeen foot head of water. The permanent dam finally consisted of a 136 foot long powerhouse, together with an additional 288 foot concrete wall to close the main channel and to deepen the river by twelve feet.

Construction of Boise valley electric interurban railroads brought new outlets for Swan Falls power in 1906. Although the Trade Dollar Consolidated (formed in 1899 in a merger of the Trade Dollar and Black Jack mining companies) did not go into retail power distribution, a 4,400 volt line ran from Swan Falls to the interurban at Nampa and Caldwell. An extension to Pierce Park served the Boise part of the interurban as well. Distribution companies were acquiring wholesale power from the Trade Dollar, and in 1907 two additional 650 kilowatt 550 volt generators were added, powered by two Dayton globe vertical turbines. An additional concrete building prepared for this larger plant still forms part of the Swan Falls powerhouse, but in 1918 this equipment was replaced. During severe overloads which sometimes occurred in lightening storms, wooden teeth from bevel gears at the top of the turbine shafts would break and fly around the plant at high velocity.

In 1910, when mining at Silver City was coming to an end, the Trade Dollar Consolidated investors organized the Swan Falls Power Company and installed 1,700 kilowatts in additional capacity to the plant. Two new generators (three phase instead of the previous two phase), each 850 kilowatts with side discharge vertical turbines, contributed this additional power, and the distribution system was extended from Pierce Park into Boise in 1910. Although these turbines lasted only until 1945, the 1910 generators, with enlarged capacity, still are in use. The next year, the original plant was replaced by a new powerhouse which accommodates four additional turbines and generators, each rated at 1,759 horsepower. Two of them were installed in 1913, when a twenty-five mile, 66,000 volt line brought service to some new irrigation district pumps farther down Snake River. Two new spillways were built in 1914, and extensive repairs were made to the 1901 cribs. Much of the original rock fill had been lost, requiring rock, gravel, and concrete replacement.

After a couple of corporate reorganizations, the Swan Falls installation was included in a general consolidation of companies which formed Idaho Power in 1916. New generators were added, and by 1910, Swan Falls had the largest generating capacity (8,000 kilowatts) in Idaho. Then in 1920, a new fourteen foot concrete dam, 300 feet long, had to be built immediately below much of the 1901 wooden structure.Finally in 1936, the rest of the 150 foot high rock outcrop was removed from the river (making an additional spillway), and ten new gates were installed. The water level was raised to make a twenty-four foot drop through the turbines, and the plant's capacity was enlarged. Some small additional changes have increased Swan Falls to 12,000 kilowatts. The powerhouses of 1907, 1910, and 1913, the interior of 1918, and the renovation of the dam in 1936, give Swan Falls the general appearance it has today. As a modest enlargement of Snake River's original hydroelectric dam, Swan Falls no longer compares in output with later power producers. But in a scenic canyon of Snake River, evidence of much of the earlier history of hydroelectric development in Idaho can still be seen.

Prepared largely from information provided by T. R. Heikes, Idaho Power Company.

Publications-450 N. 4th Street, Boise, ID 83702-208.334.3428