The Big Creek Project Initial Development

As you will recall from our last installment, once the San Joaquin and Eastern Railroad was completed, it was time to begin construction of the actual Big Creek Project. Stone and Webster Engineering signed contracts with Pacific Light and Power to proceed with construction of the "Initial Development" of Big Creek in early 1912.

The plan for this phase of construction was to complete several parts which comprised the Big Creek project. Part one was the construction of three dams that would impede the flow of Big Creek, creating a large reservoir (now known as Huntington Lake). Part two involved the construction of three miles of tunnels and large pipe conduits, through which the water would flow down a 2100 foot vertical fall from Huntington Lake to Cascada. Part three was the building of Powerhouse #1 at Cascada, where the falling water would be discharged back into the creek after turning waterwheels connected to two 23,500 horsepower generators. Part four was the construction of a fourth dam (at Cascada), and the construction of Powerhouse #2, 1860 vertical feet below Powerhouse 1. Part Five was the construction of over 248 miles of double transmission lines to carry the power to Los Angeles.

At the time, this was a huge undertaking on many levels. It was the largest fall of water being used in the country, used the most powerful impulse wheels ever built, and the largest generators of their type. The transmission lines would be the longest in existence, using the highest voltage (150,000 volts) ever used commercially. Combine that with the fact that all the materials, personnel, and equipment necessary to build this project had to be transported by railroad up a narrow, very steep, and winding road grade, and the difficulty of the project is apparent.

Once at Cascada, the materials, workers, and equipment had to be raised to the basin of the lake via a 6000 foot long incline railroad, climbing 2100 feet in elevation. The incline was single tracked and powered by a 250 horsepower electric motor, set in an immense concrete block base at the top of the grade. A cable 1½ inches in diameter and 12,000 feet long was used to pull the "strongback" flat cars loaded with equipment and parts up the incline. These were regular flat cars except that they had heavily built wood and steel bulkheads on the ends to keep the loads from slipping off due to the steepness of the incline. The cable was wound up on huge steel drum to pull the load up the hill, and then was spooled off the drum to lower the empty cars. The company owned 112 of these special cars. The 9 locomotives used in the basin were also hauled up the incline in this fashion, including Herman Petersen's Climax locomotive, and Stone and Webster Shay #6. Please understand that the incline railroad was an 80% angle. That means for every 100 feet in distance, the elevation increased 80 feet!!! That is nearly vertical.

To make matters worse, PL&P wanted to use the water from the Spring of 1913 rains to power up the system for the first time. So, much of the heavy construction work would be done during the winter months, at nearly 7,000 feet in elevation. To achieve this enormous task, construction of all five parts of the project were begun simultaneously. 2000 men were hired by Stone and Webster, housed in work camps spread over an eight mile area.

There was a saw mill, a rock quarry, a concrete batch plant, and a construction railroad built in the lake basin to facilitate construction of the three dams. There was nearly 13 miles of railroad built in the basin and the surrounding areas. At least 9 locomotives were used by Stone and Webster in the basin, and several other small locomotives were used around Cascada to move heavy loads. The basin locomotives were mostly Porter 0-4-0 T saddle tanks used to

pull concrete trains from the batch plant to the dam sites. Two former Southern Pacific 0-6-0 locomotives were also used in the basin for heavy rock loads from the quarry. The "Basin Division" was hastily built and not meant to last. The track was uneven and kinked in places, there was no ballast, and the ties were roughly hewn from trees in the basin. And why not, it only had to last until the dams were complete?

Construction labor Camp 1, 1A, and 1C were all located in the basin of soon to be lake. Camp 1 was at the rock quarry, Camp 1A was located between Dam 1 and Dam 2. Camp 1C was located at Dam 2, and this was where the railroad at the top of the incline terminated. Camp 1B was located outside the basin, between Dam 1 and Dam 2. Camp 1D was located outside the lake basin, along tunnel 1, just below Dam 2. Camp 1E was located near Dam 3, at the extreme west end of the reservoir, mostly outside the basin.

The water impounded by the lake would enter Tunnel 1 at Dam 1, and fall via flow pipe and Penstock 1 to Powerhouse 1. Construction Camp 2 was located at the downhill side of the incline. This camp became the town of Cascada, which was the headquarters for Stone and Webster. Dam Four would create a forebay at Cascada, where the water that just dropped from Huntington Lake would be discharged, after turning the waterwheels in Powerhouse 1. From this forebay, the water would enter Tunnel 2, and travel approximately 4 ¼ miles to Penstock 2 where it would fall 1860 feet to turn the waterwheels of Powerhouse 2. Another incline was built to deliver materials down the 1860 feet elevation change to Powerhouse 2. It was nearly identical in every respect to the incline at Cascada.

Along the tunnel from Cascada to Powerhouse 2 there were several camps. Tunnel Camp 3 was approximately 1 mile below Cascada. Tunnel Camp 4 was approximately 2 ½ miles below Cascada. Camp 5 was at the West Portal of the

tunnel, near where Penstock 2 began. Camp 6 was about halfway down the incline, and was where Stone and Webster had a yard where pipe made in Germany was stored for use on the penstock. Camp 7 was located at the foot of the incline at Powerhouse 2.

There was never a time when the camps or the work sites were quiet. Workers were busy 24 hours a day, seven days a week, due to the deadlines set by PL&P. All camps and work areas were electrically lighted, so work could continue after the sun set. Crews were designated in shifts, some workers sleeping while others toiled away.

Dam and tunnel construction were the highest priority, and began in the late summer of 1912. Dam 1 was started first, and by the end of 1912, was essentially complete. By that time, Dam 2 and 3 were well on the way to completion. In the winter, pouring concrete was aided by using steam pipes to keep the mixture from freezing. Stone and Webster had a specially built rotary snowplow hauled up the incline to keep the basin railroad operating during the winter months.

The basin of the lake was covered in trees. The construction of the dams used an enormous amount of wood for forms. Herman Petersen, a logger who had been operating the Pine Ridge area, was hired to cut down all the trees in the basin. Petersen had his Class A Climax locomotive hauled up the incline with some logging cars, and he proceeded to cut trees for the sawmill. Many trees in the basin would be used for form wood, but there was so much wood in the basin that it was impossible to cut it all down in the short period of time available. As the water level rose in the new lake, loggers in boats attempted to cut down trees, leaving stumps that were sometimes 20 feet tall visible when the lake was low.

While work went on at the dams, the work on tunnels, powerhouses, penstocks, and pipeline all continued at a

fever pace. Huge cookhouses were built at each camp, with 6 rows of tables set end to end, each table over 75 feet long.

The gates at the bottom of Dam 1 were closed for the first time on April 8,1913, creating the lake that would be named after the Chairman of the Board of PL&P, Henry Huntington.

By December 1913, all dams were completed, all tunnels dug, pipelines completed, penstocks installed, powerhouses finished, and machinery was operating. The 240 mile transmission line was also complete, sending an additional 60,000 kilowatts of PL&P power to Los Angeles. With this, PL&P became one of the largest utilities on the west coast.

Of course, it goes without saying that business on the SJ&E railroad was booming during the construction of the project. From August 1912 to December 1912, 10,949 passengers were transported over the railroad, all of them Stone and Webster workers. There were no separate passenger trains, all trains were mixed trains, meaning they had both passenger cars and freight cars in their consist. More than 60,000 tons of freight had been hauled by the SJ&E during the construction period. Everyone was very satisfied with the performance of the little railroad during the construction of the project.

By the end of 1913, the "Initial Development" of Big Creek was complete. Stone and Webster personnel left the area, and traffic on the railroad dropped to a mere trickle in just a few days time. But no one thought of abandoning or dismantling the railroad. Railroad officials conducted operations as efficiently as possible, paring the workforce by two thirds and limiting the number of trips to a tri weekly schedule. Many felt that this meant they would take you up the hill this week, and try to bring you back next week.

The Big Creek hydro project had helped meet the current need for electricity. But, the power needs of Southern California were growing at an exponential rate. It would only be a matter of time before PL&P would be forced to return to the mountains and develop more hydro projects in the Big Creek area. We'll discuss those projects in our next installment.