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Team works to give historic preservation a helping hand

by Leslie Peterson

History is made up of only those things that happen to survive, or things people think to save. The value of history is that it reminds us of where we come from, what we have achieved and what we may have lost along the way. Tangible reminders of the past help set the course of the future. Too often they are lost…forever.

Fortunately, forward-looking folks in Western's Maintenance Office in Montrose, Colo., and staff at the Bureau of Reclama-tion's Upper Molina Powerplant took history and pride into their own hands.

When it came time to retire an aging Pelton wheel turbine from the Upper Molina plant, they didn't view it as 3.75 tons of scrap metal. Instead, they saw how it had made Federal power available to west-central Colorado and the joint roles Reclamation and Western had in making that happen.

The beginning of a life cycle

The Pelton wheel at the Upper Molina Powerplant was installed in 1964, just two years after the plant's initial in-service date. The powerplant is fed by a 2,490-foot head, the highest for any Reclamation dam. This impulse-type, single-jet turbine could drive a single 98,600-kV generator, producing nine megawatts. "We originally selected the single jet unit after evaluating several factors, such as simplicity, efficiency, building space and generator revolu-tions per minute," explained Reclamation Curecanti Field Division

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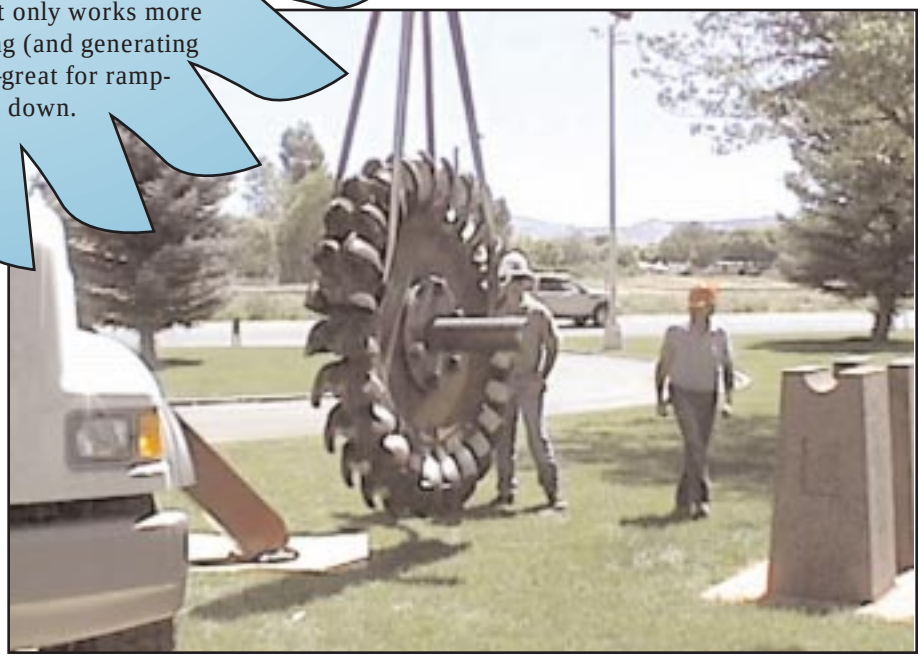
Wheel of power

The Pelton wheel was the brainchild of Lester A. Pelton. Born in 1831, he built the first Pelton wheel in Camptonville, Calif., in 1878. After patenting his invention in 1880, he perfected the design at a foundry near Nevada City, Calif. In 1888, he founded the Pelton Wheel Water Company in San Francisco. Beginning in 1899, improvements were made to the wheel's nozzle and bucket designs to improve efficiency.

The secret of the Pelton wheel is not how much or how fast water hits the wheel's buckets. It's where the water hits. Water that hits a water wheel bucket straight on turns the wheel, but much of the water splashes out—resulting in lost energy. On the other hand, if the bucket moves and the water hits at an angle, there is greater force. But only to a point—if the stream of water overtakes the bucket, the speed of rotation decreases.

That means the wheel not only works more efficiently, its rate of turning (and generating energy) can be varied—great for ramp-ing up and ramping down.



Bureau of Reclamation Maintenance Worker Joe Austin and Power Facilities Supervisor Chris Lakin help guide the 3.75-ton Upper Molina Pelton wheel to its display foundation on the Western Montrose Maintenance Office lawn. ***(Photo by Richard Girvan.)***

Manager Donald Phillips.

Constructed by the Allis-Chalmers firm in York, Penn., around 1960, the wheel consisted of plate, cast and forged steel welded together to withstand great pressure. The jet deflectors and runners were made of somewhat softer carbon steel because of lower costs and more dependable casting.

In service for almost 40 years, the wheel daily withstood the impact of 1,100 psi of water blasting into its buckets. In comparison, a typical fire hose sprays water at 110 psi, or 10 times less pressure. In addition to generating power for the Collbran Project, the wheel was also part of a water collection system providing drinking water for 66,000 people in the Grand Junction, Colo., area. The system also reduces the pressure of water de-scending from Grand Mesa Reservoir to the valley floor below.

End of an era

In time, the stress of the pounding water took its toll. Cracks developed on the back side of some buckets. "We tried, unsuccessfully, to repair the cracks," explained Electrician Brad Osburn of the Molina Power Plant, "In the end, we decided to replace it. The risk of losing one bucket was too great. At 600 revolutions per minute, it would have destroyed the generator before we could shut it down."

On Aug. 14, the 7,500-pound wheel was mounted on a pedestal on the lawn of Western's Maintenance Office in Montrose. "Fortunately the mounting of the wheel was uneventful," said **Ernie Baier**, Western facility manager in Montrose.

For 35 years, this Pelton wheel generated power for the Collbran Project. Today, it sits as a reminder of the accomplishments of both Reclamation and Western in bringing affordable hydropower to the West. ***(Photo by Richard Girvan.)***

The wheel was replaced by a unit with a stainless steel runner, which increased generation by 6 percent. The new unit now puts out 10.2 megawatts and the runner is rated at 13,150 horsepower (the original unit was rated at 12,000 hp).

Now displayed on Western's Montrose office lawn, the original Upper Molina wheel symbolizes the complementary roles of Western and Reclamation.