

## Innovative Water Withdrawal System

By Bentley Systems



that modifies the direction of the surface current. The system better guides the migrating fish into a fish-handling area, provides a fish-collection system, and ensures that the water released complies with state and tribal water-quality standards.

The system consists of a selective water withdrawal top structure and a selective water withdrawal bottom connected by a 40ft-diameter vertical flow conduit. The intakes dewater through two conventional V-screens supported by an elaborate steel framing with a unique geometry used to support the screens and fish facility. The selective water withdrawal bottom is anchored to the bedrock and placed in front of the existing intake structure, which contains bottom exclusion plates that prevent fish from entering the powerhouse flow. The goal is to have the system operating by the 2009 migrating season.

Because Chinook salmon, steelhead trout, redbreast trout, and bull trout are among the fish species the Federal Wild and Scenic Rivers Act protects, keeping them out of water intakes at major hydroelectric dams is critical. Simple modifications, such as installing baffles and gates, are sometimes all that is needed to keep fish from the intakes. But there are also strict water-quality regulations established by the Federal Energy Regulatory Commission (FERC) and the Clean Water Act (CWA). To comply with FERC and CWA requirements, selective water withdrawal at Round Butte Dam in Oregon required a far more complicated and innovative design.

When Portland General Electric Company (PGE) constructed Round Butte Dam in the 1960s, one of three dams that comprise the Pelton Round

Butte hydroelectric project, it also constructed an upstream and downstream migration system to maintain anadromous fish runs. However, the downstream system was deemed ineffective due to migration problems in Lake Billy Chinook, the reservoir behind the dam, negatively impacting the fish population. PGE abandoned the system in favor of a steelhead trout and Chinook salmon hatchery program. [www.bentley.com](http://www.bentley.com)

Now, as part of a 50yr FERC license period, PGE and the Confederated Tribes of the Warm Springs Reservation, which co-owns the dam, have committed to re-establishing the fish runs while meeting CWA water requirements. To accomplish the objective, CH2M HILL designed a one-of-a-kind selective water withdrawal system



*Re-engineered water intakes at Round Butte Dam protect native fish.*

