

## VIII. CONSTRUCTION AT MAJOR PROJECTS

### *Federal projects    Non-Federal projects*

Modification of dams and facilities as well as the construction of new features is a constant activity at dams. In this chapter only those construction activities that pertain directly to the operation of the projects or have a major impact on the operation of the facility are reported here.

#### **A. FEDERAL PROJECTS**

##### **1. Boise Project**

At Anderson Ranch Dam Reclamation is pursuing penstock rehabilitation in a \$105,200 contract. It was awarded on 9/17/99 for removing mineral deposits from the surface of the existing steel penstock pipe, pipe support columns and rings, and appurtenant manholes, nozzle, pipes and valves located in the left abutment of Anderson Ranch Dam.

At Arrowrock Dam and Deadwood Dam Reclamation is repairing concrete in a \$1,310,420 contract. Awarded on 9/23/99 the contract includes removing deteriorated concrete, placing replacement concrete, and reinforced concrete overlay, removing, replacing, and painting existing metal handrails, removing, reinstalling, and painting existing metal light standards, and removing and replacing electrical materials.

##### **2. Okanogan Project**

Reclamation is modifying the Salmon Creek fish ladder in a \$419,012 contract that was awarded on 8/18/99. The contract calls for construction of one additional concrete fishscreen bay, fish return slot, sampling well, and exit transition, three in-stream slope crested fish weirs, and in-stream placement of a precast stream crossing.

##### **3. Rogue River Basin Project**

Reclamation is constructing new fish ladders at the Phoenix Diversion Dam in a contract of \$298,776. Two reinforced concrete fish ladders will be constructed under the contract awarded on 6/3/99.

A \$10,800 contract was awarded by Reclamation on 9/14/99 for construction of a water supply for a future wetland project located south of Medford, OR.

##### **4. Wapinitia Project**

A \$432,790 contract was awarded by Reclamation on 8/17/99 for construction of a filter at the downstream toe of Wasco Dam and the installation of a toe drain pipe system. This project is located on Clear Creek, a tributary to the Deschutes River near Government Camp, OR

##### **5. Yakima Project**

A \$114,500 contract was awarded by Reclamation on 7/21/99 to furnish, deliver, and install a hydraulic trash rake at the Chandler power plant on a diversion canal near Prosser, WA.

On 8/25/99 Reclamation awarded a \$139,970 contract for the construction of fish bypass modification at the Yakima Diversion Bypass.

#### **B. NON-FEDERAL PROJECTS**

##### **1. Swan Falls**

Idaho Power Company's Swan Falls Project is located on the Snake River near Boise, Idaho. The project consists of a 440-foot-long, concrete gravity gated spillway, a 290-foot-long powerhouse section, and a 130-foot-long concrete gravity sluiceway. The maximum height of the spillway is 25 feet and impounds

approximately 4,800 af. The powerhouse contains two adjustable-blade pit turbines each connected through speed increasers to 13.6-MW generators. On May 23, 1998, a fault on the 138-kV transmission line resulted in a load rejection in the powerhouse. Unit 1 was on-line at the time, and the powerhouse was unoccupied. As a result of alarms, the powerhouse was inspected and it was discovered that Unit 1 had suffered catastrophic damage. Apparently, waterhammer occurred upstream of the runner and water column separation occurred downstream of the runner. At some point during the incident, the runner was suddenly stopped causing damage to the gear train. The momentum of the generator and gear train was such that the shaft coupling bolts and shear pins at the shaft coupling were sheared. Considerable damage was also sustained by the steel pit liner as a result of the apparent waterhammer. The generator and gear box have been removed, and the gear box has been returned to the manufacturer for disassembly and repair. The estimated completion date is March 2000. Total cost estimates have not been completed but are expected to be in the range of \$3 million to \$5 million.

## **2. Rocky Reach Dam**

The Rocky Reach Project, licensed to Chelan County PUD No. 1, is located on the Columbia River in central Washington, seven miles north of the town of Wenatchee. The dam, completed in 1962, consists of concrete gravity spillway, and powerhouse sections. The powerhouse contains 11 generating units with a total capacity of 1,279 MW. In an effort to reduce turbine cavitation and decrease fish mortality, the licensee initiated a turbine replacement program. This program will cost approximately \$67 million and is scheduled to be completed in 2001. To date, redesign of all turbine blades and the work on Units Nos. 2 through 7 and 9 are completed. Unit No. 8 is presently underway.

## **3. Cowlitz Falls**

The Cowlitz Falls Project, licensed to the Lewis County Public Utility District No. 1, consists of a 120-foot high concrete gravity dam (completed in 1994) that is located on the Cowlitz River in southwestern Washington State, approximately 30 miles southeast of Centralia. On February 8, 1996, a flood of record of 103,000 cfs occurred causing a number of small problems. Debris build-up on the intake trashrack caused a one-week shutdown. The draft tube area filled with rock. The left bank was eroded and possibly other rock outcroppings in the tailrace area. The tailrace pool was left higher because of downstream gravel deposits. The debris barrier was partially filled with sediment. Some repairs were completed at the time. Later work included repairing undermining of the left edge of the Spillway No. 1 chute, by facing the wall with steel forms and filling voids with tremie concrete. Weak and eroded rock seams were sealed with concrete and a concrete wall was built along the left bank to restore the access road. The wall hardened the left bank to above the flood plain, and filled a void beneath the downstream end of the left spillway training wall. Work started on September 15, 1998, and was completed on January 27, 1999 at a total cost of \$808,000.

## **4. Cushman No.1 and No. 2**

The Cushman Project, licensed to the City of Tacoma, includes two arch dams and reservoirs, Cushman No. 1 and Cushman No. 2, both on the Skokomish River. The project is located in the southeastern Olympic Peninsula, approximately 35 miles west of Tacoma, Washington. On March 25, 1999, approximately 20,000 cubic yards of material flowed into the Cushman No. 2 Powerhouse, buried the switchyard behind the powerhouse, the parking lots on either side, and filled the basement and a few feet of the main floor inside the powerhouse. The licensee immediately mobilized its own crews and a contractor to remove the slide debris. The powerhouse was returned to service within about one month. The final work to stabilize the slide was completed on November 5, 1999. The total cost of the work was approximately \$2.3 million. Approximately \$1 million of additional work was deferred pending the outcome of on-going litigation over the July 30, 1998 newly issued license.

## **5. Nisqually River Project**

The Nisqually River Project includes two arch dams, Alder and LaGrande Dams and is located in central

western Washington, approximately 30 miles southeast of Tacoma, Washington. The March 7, 1997 license to the City of Tacoma required the licensee to complete facilities to limit down-ramping below the LaGrande powerhouse and limit spills at the dam during powerhouse load rejections and other outages when the tunnel is not drained. The work included installing a flow continuation (bypass) valve in the powerhouse to provide flow continuation of 1,000 cfs out of the 2,250 cfs total power-house flow. The work consists of tunneling through the back wall of the powerhouse and down to the penstock, welding a flange on the 5-foot-diameter penstock to the power-house floor, installing a 48-inch rotary cone guard valve connecting to a 4-foot-diameter pipe section on the main powerhouse floor, installing a 42-inch jet flow gate valve on the outside draft tube deck, and installing the appropriate flow continuation controls. Work started on April 1, 1999, and is expected to be completed by the end of March 2000. The schedule is controlled by when the tunnel can be drained. Construction costs are estimated to be \$1.8 million.

## **6. Yelm Project**

The Yelm Project includes a small diversion dam on the Nisqually River, a 10-mile canal, and a 12-MW powerhouse near Yelm, Washington, which is approximately 15 miles southeast of Olympia. The March 7, 1997 license to the City of Centralia Light Department requires the licensee to complete facilities to improve the downstream fish passage at the dam, and to stop erosion damage to Thompson Creek near the powerhouse. At the diversion dam, the existing fish screen at the intake trashracks is to be replaced with a vertical inclined (V) screen in the canal and a bypass pipe back to the Nisqually River just downstream of the diversion dam. A few minor changes are proposed for the fish ladder: at the powerhouse, the canal emergency spillway is to be replaced because the existing tainter-gate side-channel spillway discharges into Thompson Creek. The new spillway will consist of a new intake with combined slide gates, including an alternate overflow bypass adjacent to the power intake, and a pipeline with reducing pipe and friction ring system down the 200-foot hill to an expanding pipe with a circular vertical stilling basin, which then overflows into the Nisqually River. The work started on April 16, 1999, and is expected to be fully completed in January 2000. The work is estimated to cost \$6,003,000.