



## 2002 SWC construction efforts

By Brad Benson

The State Water Commission (SWC) construction crew made repairs and modifications to Big Coulee Dam, Sheep Creek Dam, LaMoure Dam, and Dead Colt Creek Dam during the 2002 construction season. The crew also constructed a new Missouri River gage house at Bismarck in cooperation with the U.S. Geological Survey (USGS).

### Big Coulee Dam

Big Coulee Dam is located in Towner County in the north central portion of the state near Bisbee. Over the course of the last few years, the SWC had been closely monitoring a sinkhole that had been developing along the principal spillway of Big Coulee Dam. During regular investigations, SWC staff would note the size of the sinkhole to determine when, and if repairs would be required.

Following a routine inspection in the spring of 2002, SWC staff discovered that the sinkhole had greatly expanded in size; necessitating a more intense investigation to identify the cause of the sinkhole and make required repairs. In many cases, the presence of a sinkhole

indicates that there is a loss of subsurface material occurring, which in some instances can be a potential threat to the integrity of the dam. In the case of Big Coulee Dam, SWC engineers came to the conclusion that the most likely reason for the formation of the sinkhole was the result of a drainage system failure. When operating properly, the drainage system removes seepage from beneath the floor of the concrete chute spillway. Because seepage was not draining properly, embankment material was washing out, causing the formation of the sinkhole.

Ultimately, areas adjacent to both chute sidewalls were excavated and the damaged portions of the drainage system were replaced (see photo).

The investigation and repairs were paid for through a joint effort of the SWC, the North Dakota Game and Fish Department, and the City of Bisbee. The total cost of the effort was \$20,000.

### Sheep Creek Dam

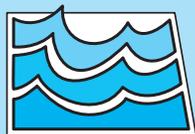
The SWC construction crew's efforts at Sheep Creek Dam, near Elgin, North Dakota, involved the replacement of the low-level draw-down system. (Low-level draw-

downs remove oxygen-deficient water that accumulates at the bottom of waterbodies.)

The existing low-level draw-down at Sheep Creek consisted of a 12-inch diameter pipe extending into the reservoir and through the embankment. This design was common during the late 1960s and 1970s when Sheep Creek Dam was constructed. The unfortunate side effect is that this type of low-level design results in pressurization of the pipe extending through the embankment. The pressurized condition, combined with the age of the pipe, can often result in a potential threat to the integrity of the embankment. If the pipe should start leaking due to corrosion, it is likely that there will be a loss of embankment material, which may lead to a catastrophic failure of the dam. Because of this potential threat at several of North Dakota's dams, the SWC has been working to upgrade deficient low-level draw-down systems for more than 20 years.

The first step in the construction was to open the existing low-level outlet in order to lower the reservoir level approximately seven feet. This was done to reduce costs associated with water control. Once construction began, an outside contractor was hired to cut a hole in the concrete drop inlet. The valve for the new low-level was then attached at this location. From the new valve, 250 feet of 12-inch diameter high density polyethylene pipe was attached and extended into the reservoir. The old low-level was taken out of service by filling the entire length of the pipe with a sand and cement grout.

The construction was completed through a joint agreement between the SWC, North Dakota Game and Fish, and the Grant County Water Resource District (GCWRD), at a cost of \$36,000.



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(Above) Workers are pouring a concrete cap on the existing rubble/masonry of LaMoure Dam.

on the James River allowed the remaining work on the dam to start during the 2002 construction season.

The work at LaMoure Dam involved the placement of a 60-foot concrete cap on the existing 90-foot rubble/masonry dam (see photo). The concrete cap performs two principal functions: 1) to stabilize the structure; and 2) a low-flow measuring section is incorporated into the design which will greatly assist the USGS in collecting accurate river flow data during periods of low flow. Additional work on the dam will continue in 2003.

### Dead Colt Creek Dam

Work at Dead Colt Creek during this past summer involved the installation of a new gate system and stem guides on the low-level draw-down. The SWC was notified by the Ransom County Water Resource District that the low-level drawdown was malfunctioning and could not be closed. As a result, water was leaving the reservoir uncontrolled, and water levels had dropped to a dangerous level—threatening the fishery. The low-level drawdown at Dead Colt Creek is now fully operational.

### USGS Gauging Stations

The SWC construction crew repaired several USGS gauging stations throughout the state. Work primarily involved the installation of staff gauges, protecting instrumentation housing structures from flooding, and repairing sheet pile control sections.

In addition to typical work performed for the USGS, the SWC construction crew also assisted the USGS with the construction of a new gauge house along the Missouri River in Bismarck. The new gauge house is located on the east bank of the river near the Bismarck Water Treatment Plant. ■



(At Left) Repairs are being made to Big Coulee Dam in Towner County.

### LaMoure Dam

The SWC also made modifications and repairs to LaMoure Dam during the 2002 construction season. LaMouore Dam is located on the James River and is used by the USGS as a primary gauging station.

Related repairs to the structure date back to 1991 and 1992, when the SWC performed major repairs to both abutments of the dam. The final repairs to the dam were delayed due to high water conditions starting in 1993 and continuing through 2001. The lower flows

The SWC also assisted the GCWRD by extending the boat ramp at the site. It was determined that the lower water levels in the reservoir from the construction at the dam would be favorable for the ramp modification efforts.



## COMMISSION MEETING MINUTES

The North Dakota State Water Commission (Commission), chaired by Governor John Hoeven, acted on several items of business and was given status reports on continuing water management projects and programs at the December 6, 2002, meeting in Bismarck. In action items, the Commission approved:

- The 2003-2005 Water Development Report with minor revisions. The 2003 report serves as an update to the 1999 State Water Management Plan.

- Modifications to the Commission's cost-share policy for irrigation. The policy now includes the following:

1. Cost-share must be limited to supporting the irrigation development efforts of political subdivisions. The primary political subdivision is the irrigation district, but could include water resource districts and a county board of flood irrigation.

2. Items eligible for cost-share are those associated with new central supply works. The central supply works could include water storage facilities, intake structures, wells, pumps, power units, primary water conveyance facilities, electrical transmission and control facilities, and engineering. Eligibility of certain items for cost-share may be addressed on an individual basis and presented to the Commission for consideration after the review of project plans by Commission staff.

3. Maintenance is not eligible for cost-share.

4. Economic feasibility of a new irrigation project is to be based on the study conducted for the creation of the irrigation district or an update thereof that would be provided with

the request for cost-share. Economic feasibility will be determined by the total project revenues from the products produced and the overall operating costs.

5. The construction of new central supply works should be funded at 40 percent of the eligible items.

- Conditional approval of a request from the City of Devils Lake for cost-share in the amount of \$4,074,202 for an extension and raise to the Devils Lake City Levee. The conditional approval is subject to the availability of funds and issuance of required permits.

- Cost-share in the amount of \$47,335 for Griggs County Drain #1A.

- A cost-share request from the North Dakota Natural Resources Trust in the amount of \$15,513.

- A request for cost-share from the Sioux Irrigation District in the amount of \$21,060.

- Cost-share for the Steele-Traill County Drain #17 in the amount of \$45,127.

- Conditional approval of a request for the Swam Creek Tributary Channel Improvement at an amount not to exceed \$58,703.

- Conditional approval of a request from the Traill County Water Resource District for cost-share participation for Traill County Drain #6 reconstruction and extension.

- Cost-share for the Walsh County Drain #30 reconstruction project in the amount of \$102,464.

- Conditional approval of rural ring dike programs for the Maple River, Rush River, and Southeast Cass Water Resource Districts in amounts not to exceed \$46,874, \$46,750, and \$259,784, respectively.

- Cost-share for a Red River Joint Water Resource District Coordinator

to include \$7,500 for six months of salary and \$1,500 for expenses.

- Cost-share in the amount of \$35,000 for Will and Carlson consulting services.

- Authorization of the State Engineer to take necessary steps to lift the moratorium on water permit applications for the appropriation of water from the Cedar, Cannonball, Grand, and Green Rivers and Apple Creek.

- \$15,000 for the SWC's share of a Devils Lake Outlet Awareness Project Manager, from January 1, 2003 through December 31, 2003.

- Cost-share in the amount of \$26,000, or 40 percent of costs, for a Devils Lake Basin Manager from January 1, 2003 through December 31, 2003.

- Cost-share for the remaining balance of a Devils Lake feasibility study that was completed by the U.S. Army Corps of Engineers in 1993.

- A request for a sole source amendment to South Heart's Southwest Pipeline Water Service Contract.

- A contract award for Southwest Pipeline Project Contract 4-1B (Final Phase of Construction at Intake, Dodge, Richardton, and Jung Lake pumping facilities). The contract was awarded to PKG Construction, Inc. for \$1,149,353.

- Reimbursement of \$41,784 from the Reserve Fund for Replacement and Extraordinary Maintenance to the Southwest Water Authority for the replacement of blow-off valves.

- A Resolution of Appreciation to Warren L. Jamison for his service as Manager of the Garrison Diversion Conservancy District from 1993 through 2002.

- Authorization of the State Engineer to sell the SWC construction shop and to make decisions related to the building, or acquisition of a new facility. ■