



## SWC 2006 Construction Season a Busy One

By Jason Boyle

The 2006 construction season was another busy one for the Water Commission's construction crew. Several projects involved work in stream channels that would normally require a major effort to control the stream while the work is being done. Dry conditions throughout the summer and fall made this effort much easier and resulted in excellent working conditions and an extended construction season.

The Water Commission's construction crew made repairs and modifications at Long Creek Dam in Divide County, Harvey Dam in Wells County, Elm River Dam #1 in Steele County, Larimore Dam in Grand Forks County, Enderlin Park Dam in Ransom County, Chyle Dam in Walsh County, Drayton Dam in Pembina County, and Dead Colt Creek Dam in Ransom County. The construction crew also constructed, modified, and repaired water-recording gauges throughout the state in cooperation with the United States Geological Survey.

Construction crew members include Project Manager Darron Nichols, Dan Bahm, and John Edwards.

### **Devils Lake Emergency Outlet, Benson County**

The Devils Lake Emergency Outlet Project is a system of canals, pipelines, siphons, and pump stations on the southwest corner of Devils Lake in Benson County. Each spring the intake at the Round Lake pump

station needs to be put back into the water. Prior to sinking the intake, the construction crew modified the intake-to-pipe connection. Minor modifications were also made to the pump station and areas of erosion in the canal were repaired. Work on the emergency outlet totaled about \$26,000 and it was completed by late April.

### **Colt Dam, Mercer County**

Colt Dam is a concrete channel dam on the Knife River near Beulah that was removed by the construction crew in November 2005. Winter set in before the project could be completed, so the crew finished placing rock on the stream banks and performed site clean up in May. Total

project costs were \$52,000 and were shared between the Water Commission, the Game and Fish Department, and the City of Beulah.

### **Harvey Dam, Wells County**

With a big 100<sup>th</sup> anniversary celebration planned for the City of Harvey last summer, the Wells County Water Resource District expressed concern for those who would be recreating near the drop inlet to the spillway at Harvey Dam. The dam is located at the south edge of Harvey on the Sheyenne River. At that time, no safety precautions were in place to prevent a wayward swimmer from accidentally falling 20 feet down into the drop inlet. A steel tube railing was installed around the inlet and a string of buoys was put up to warn of the impending danger. The construction crew also removed several trees from the downstream side of the embankment. And, because of the steep slope of the embankment, the maintenance work required special equipment.

All of the work was scheduled and completed by mid-June, just in time for the centennial celebration. The cost of the work was approxi-

The new steel railing and string buoys around the Harvey Dam drop inlet.



mately \$15,500 and it will be shared between the Wells County Water Resource District, the Game and Fish Department, and the Water Commission.

### **Long Creek Dam, Divide County**

Long Creek Dam, also known as Crosby Dam, is located 5 miles north of Crosby on Long Creek near the Crosby golf course. The dam is a low head channel dam originally built in the 1930s. The dam was repaired in 1957 and again in 1980. In 2003, the Water Commission became aware of problems at Long Creek Dam, including seepage and deteriorating concrete. After several years of planning, discussing several design alternatives and gathering funding sources, the project was started in early July.

A cofferdam was constructed upstream of the dam to divert the river to one side of the dam while work was performed on the other side. To address the seepage through the dam, the upstream face of the dam was exposed, cleaned, and the cracks were filled with an epoxy material. A geosynthetic clay liner was then placed against the upstream side of the dam. The liner consists of an expandable bentonite material sandwiched between two pieces of geosynthetic material. If the tough geosynthetic material happens to tear or get punctured, the bentonite material will expand upon contact with water, thus providing a watertight seal. A concrete cap was poured on the upstream side of the dam to tie the geosynthetic clay liner into the dam.

A thin layer of broken concrete on the downstream face of the dam was removed to expose the original dam. The face of the dam was cleaned and many cracks were sealed. A thin layer of concrete was then sprayed on the downstream face of the dam in a process known as guniting or shotcreting. This involves a dry sand-cement mixture that is sent through a hose under pressure where it meets with a spray of water at the nozzle. The construction crew sprayed a three-inch layer of this mixture on the downstream face of the dam in a

very dirty and strenuous process. The cofferdam was later removed and the project was completed in mid-August.

The total cost of the project was approximately \$64,000 and will be shared between the Crosby City Park Board, the Divide County Water Resource District, the Game and Fish Department, and the Water Commission.

### **Elm River Dam #1, Steele County**

Elm River Dam #1 is an earthen flood control dam located in Steele County. It also provides flood control benefits to Traill County. The last construction joint on the downstream end of the concrete spillway pipe had somehow separated, allowing water to flow out of the pipe, which then eroded a large hole on the downstream side of the dam. Since it was unlikely that the construction crew could push the pipe back together, it was decided to install an expansion band in the inside of the pipe to seal up the joint. The expansion band proved to be a successful fix and the project was completed in September at a cost of \$7,000. Costs were shared between the Red River Joint Board, the Steele and Traill County Water Resource Districts, and the Water Commission.

### **Larimore Dam, Grand Forks County**

Larimore Dam is a large earthen dam located northeast of the City of Larimore on the Turtle River. Water quality concerns downstream of the dam prompted the Game and Fish Department to approach the Water Commission to install a device that aerates the water as it falls down the inlet. The project was completed in September at a cost of approximately \$3,000, which will be shared between the two state agencies.

### **Chyle Dam and Union Dam, Walsh County**

At Chyle Dam, surface runoff enters the river just below the dam which has caused erosion problems for many years. The construction crew



**Above:**  
The construction crew makes preparations for the pouring of the concrete cap at Long Creek Dam.

**At Right:**  
Placing rock at the downstream end of the spillway pipe at Elm River Dam #1.



The new Enderlin Park Dam in Ransom County will allow for fish passage.

removed the existing drop structure and installed a geotextile mat and rock riprap to prevent further erosion at a cost of \$9,000.

An annual inspection of Union Dam revealed a sinkhole above the spillway pipe near the downstream toe of the dam. The construction crew investigated the problem and found nothing of concern. The Walsh County Water Resource District and Water Commission will split the cost of the projects.

#### **Enderlin Park Dam, Ransom County**

Enderlin Park Dam was a rubble masonry channel dam on the Maple River that washed out in the spring of 2004. Several years of planning resulted in a design for a new dam that would incorporate the passage of fish. This is one of only a few dams in North Dakota off of the main channel of the Red River that allows for fish passage. Previously completed projects on the Red River provided prototypes for the design of this dam.

A row of steel sheet piles were driven into the streambed across the Maple River. Several loads of rock and waste concrete were then hauled into the site. Much of the rock was hauled in by the City of Enderlin from rock piles in nearby fields, providing a cost savings for the project.

Low flows on the river allowed the crew to complete the project without having to construct a cofferdam, providing further savings. It is anticipated that minor repairs will need to be made in 2007 after the spring runoff.

The City of Enderlin applied for and received a grant through the Parks and Recreation Department to construct the dam. Other partners in the project include the Ransom County Water Resource District, the Game and Fish Department, and the Water Commission. The cost of the project to date is about \$40,000.

#### **Drayton Dam, Pembina County**

Drayton Dam is the last dam on the Red River before it leaves North Dakota. A recent inspection of the dam showed that the concrete apron on the west side of the dam was being undercut and a void was present. This was probably the same problem that caused a failure at Colt Dam, so prompt action was necessary.

A hole was cored in the concrete to reach the void and a pump truck

was used to fill the void through the core hole. Fortunately, the void was not large and it was filled completely with a fluid concrete mixture. In addition, the concrete joint near the void had separated due to movement of the concrete dam. The construction crew repaired this joint and used excess concrete from the void repair as fill in front of the joint. The cost of the project was nearly \$8,000 and will be shared by the City of Drayton and the Water Commission.

#### **Dead Colt Creek Dam, Ransom County**

Dead Colt Creek Dam was one of the first sites in North Dakota to become infested with the invasive species known as Eurasian Water Milfoil. To freeze and kill the Milfoil, the reservoir was lowered significantly in the fall of 2005. As a result, the gate lift system became detached from its supports, creating issues with operation of the gate. In addition, the light-gage trash rack needed to be replaced with something stronger.

The work at Dead Colt Creek Dam was underway at the time this article was written, and completion is scheduled for the first part of January 2007. The estimated cost of the repairs is \$3,500 and will be shared between the Ransom County Water Resource District, the Game and Fish Department, and the Water Commission.

#### **USGS Gauging Stations, Statewide**

The Water Commission's construction crew repaired several United States Geological Survey gauging stations throughout North Dakota. One of the big projects involved the installation of complex radar gauges at several bridges on Devils Lake. Another project at the Westhope gauge on the Mouse River involved driving a line of sheet pile along the river bank to keep water from flowing around the gauge. Other work involved the installation of orifice lines, repair of orifice lines, installation of gauges on bridges, channel cleanout, and repairs to wire weight systems.



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