

# North Dakota NRCS Completes Construction of Renwick Dam Spillway & Park Access Road Improvements



Renwick Dam (Tonue River Watershed Detention Dam M-4),  
located approximately 5 miles west of Cavalier, ND.

Due to downstream development and proximity to the City of Cavalier (5-miles downstream of the dam), Renwick Dam is now considered a high hazard dam, which given the record setting rainfall event in May of 2013, is a title well deserved. During that rainfall event, the Tongue River Watershed received over 11 inches of rainfall within a 2-day period. With the ground still frozen, the runoff flowing into the watershed dam reservoirs was unprecedented. Numerous dams within the watershed experienced flow for the first time within their earthen auxiliary spillways. At Renwick, an emergency dike was constructed across the auxiliary spillway in an effort to save the spillway from failing, possibly jeopardizing the dam structure itself. Due to the emergency situation at the dam, a mandatory evacuation was conducted of all residents of Cavalier for a 3-day period until the emergency situation subsided at the dam.

Originally constructed in 1962, Renwick Dam is the last structure in series with nine upstream dams that were constructed as part of the agencies pilot watershed program.

The recently completed construction activity at Renwick Dam was necessary to bring the dam into conformance with criteria for high hazard dams. The construction at Renwick was actually completed in two phases.

Phase I, completed in 2012 raised the height of the existing structure by 5-feet, and installed settlement plates across the new fill material to monitor any settlement prior to Phase II construction activities. Access improvements were also made to the existing drainage system (12" perforated corrugated metal pipe) located within the downstream face of the dam.

Recently completed Phase II improvements included the excavation of a new 500 foot wide spillway located near the center of the structure (old earthen auxiliary spillway was located north of the main dam structure). Additional new drain lines were added across the new spillway. Concrete retaining walls over 20 foot in height were constructed along both sides of the new spillway. The stepped spillway itself was then constructed with air-entrained roller compacted concrete (AERCC). Containing much less water than conventional concrete mixes, the over 19,000 cubic yards of AERCC was batched onsite, delivered to the spillway with a conveyor system, spread with bulldozers, and compacted with smooth drum rollers. The 5-foot thick stilling basin at the bottom of the spillway was constructed first, then a total of (32) 1-foot thick steps, each 500 feet wide were constructed to the top of the spillway. Upon completion of the spillway construction a new 2,200 foot long AERCC road was constructed along the upstream face of the dam to provide access to Icelandic State Park located along the north side of the reservoir.

Completed on time, and under budget, the recently completed improvements to Renwick Dam will ensure that if an event similar to what occurred in 2013 were to repeat itself, the new hardened spillway at Renwick Dam will remain intact, and the controlled outflow downstream will provide a much higher degree of protection for downstream residents.