

Big Horn Canal Rehabilitation Project Level II

Client/ Mr. Jon Wade
Reference: Wyoming Water Development Commission
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In May 2005, Anderson Consulting Engineers, Inc. (ACE) entered a contract with the Wyoming Water Development Commission (WWDC) to provide professional services to the Big Horn Canal Irrigation District Rehabilitation (BHID) Project, located in the vicinity of Worland, Wyoming.

The canal is approximately 55 miles long and consists primarily of an earthen ditch with only minimal sections being lined. The canal system provides irrigation water to approximately 216 users who irrigate approximately 23,000 acres. Typical of many irrigation systems, the facilities of the Big Horn Canal are experiencing deterioration given their age; many of the structures were built prior to 1920. Many of them appear to have withstood the tests of time well and have endured with only superficial wear and tear. On the other hand, many critical structures have not fared as well and are in danger of collapse and failure.

In 1983, the canal experienced a catastrophic failure. At one location, the canal is confined to a very narrow strip of land between Highway 20 and the Big Horn River. At this location, the canal failed and irrigation diversion were lost back to the river. The apparent cause of failure was piping attributable to deterioration and failure of a field drainage culvert beneath the canal. A primary task associated with this project was to design the replacement of this aging structure. During field inventory efforts, ACE staff discovered the pipeline had failed and the integrity of the canal was again threatened. Consequently, the BHID reduced diversions in an effort to sustain deliveries without exacerbating the existing failure for the remainder of the irrigation season prior to emergency rehabilitation efforts.

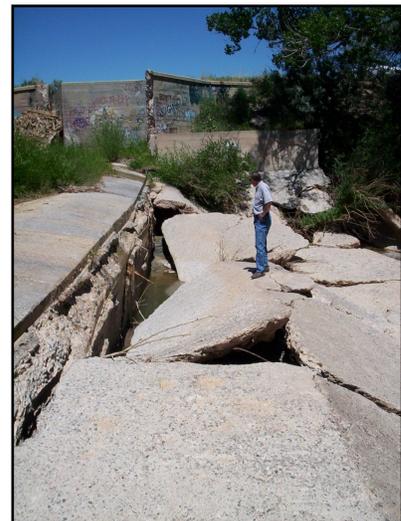
In addition, the project involved a detailed inventory of all irrigation structures on the canal. This inventory included location and assessment of all farm turnouts, siphons, culverts, drop structures, checks, etc. GPS locations were recorded and field assessments conducted using handheld Trimble GPS units preprogrammed with extensive data dictionaries. All inventory data was incorporated in the GIS environment for evaluation and analysis.

The BHID relies upon a contract with the Bureau of Reclamation for waters stored upstream in Boysen Reservoir. In light of apparent contingencies associated with renewal of the District's contract with the BOR for water stored in Boysen Reservoir, the District desires to investigate feasibility of installing measurement devices at approximately 280 farm turnouts where none currently exist.

Additional tasks included preparation of rehabilitation plan that identifies and prioritizes practical and economic improvements, specifically identifying improvements to mitigate the canal failure, evaluation of alternative sources to fund the proposed rehabilitation plan, and preparation of conceptual level designs and cost estimates and a preliminary economic financing plan to determine the financial impact on existing water users.



**Location of 1983
Canal Failure**



**Failing Siphon on
Fifteenmile Creek**