



St. Mary River Irrigation Project Geotechnical Foundations

Geographical location

Lethbridge to Medicine Hat, Southern Alberta

When it began or was completed

The project began in the early 1900s. St. Mary Dam was constructed from 1946-1951; the main canal began operation in 1954. Additional storage dams and a new St. Mary Dam spillway were completed in the 1980s and early 1990s.

Why a Canadian geotechnical achievement?

In the early 1900s, a diversion weir was constructed on the St. Mary River near Cardston, AB. By 1919, 26,000 ha of land were being irrigated, but farmers still suffered severe water shortages during the late summer months.

Following a 1943 federal-provincial agreement, work started on a new irrigation project to irrigate 142,000 ha. This project included two main dams to form the St. Mary and Waterton reservoirs, six smaller dams, and diversion canals from the Waterton and Belly rivers to supplement flow to the St. Mary Reservoir. The project also included a 280 km-long main canal to provide reliable water supply for irrigable lands between Lethbridge and Medicine Hat.

When completed in 1951, St. Mary Dam was the largest earth dam in Canada. The associated Forty Mile Coulee Dam was completed in 1987. A new spillway for St. Mary Dam was completed in the early 1990s.

Geotechnical achievements were many during the construction of the eight dams, the water diversion works, and the canal systems. Construction included dam sites on soft clay foundations, and on Upper Cretaceous sedimentary rock units that contain relatively continuous claystone and carbonaceous shale layers with multi-directional slickensides.

The initial projects were undertaken by the Prairie Farm Rehabilitation Administration (PFRA). The headworks systems are owned and operated by Alberta Environment and Parks.

Submitted by

Bill Chin, Thomas Murray, and Brian Rogers (Klohn Crippen Berger), on behalf of the many geotechnical engineers who provided support during the design and construction of the dams and canal works that make up the St. Mary River Irrigation Project.

Key References

Chin, BG, Davison, DM, Klohn, EJ, Benson RP and Campbell, JW. 1990. **Design and Performance of the Forty Mile Coulee East Dam on a Soft Clay Foundation.** In British Dam Society 6th Conference, Nottingham, UK.

Prairie Farm Rehabilitation Administration. 1961. **St. Mary-Milk River Projects, Soil Mechanics Report on the St. Mary Dam Construction,** March 1961.

Photographs



St. Mary reservoir and new spillway during a spring flood event.



Forty Mile Coulee Dam and reservoir after completion in 1988.