



# Gardiner Dam Geotechnical Conditions and Design

## Geographical location

South-central Saskatchewan, between Saskatoon and Regina

## When it began or was completed

Construction began in 1958. The dam was officially opened in July 1967, as part of Canada's Centennial celebrations.

## Why a Canadian geotechnical achievement?

Gardiner Dam was constructed by the Prairie Farm Rehabilitation Administration (PFRA). It is an embankment dam; 64 m high, 5,000 m long and 1,600 m wide at the base, built on the South Saskatchewan River forming Lake Diefenbaker, a 225 km long reservoir. Gardiner Dam remains one of the largest earth-fill dams in the world.

As a result of movements in the foundation, the design was kept under continuous review and was modified as necessary to maintain an acceptable degree of safety. The outer slopes of the embankment were flattened as a result of the low shear strength of the Cretaceous clay shale. Final embankment and excavation quantities were double those estimated in earlier designs.

The knowledge gained during the design and post construction period from this project has been used as a reference for the design of similar projects founded on Cretaceous clay shale throughout western Canada.

Gardiner Dam is owned by the Water Security Agency, a Saskatchewan Crown Corporation. More than one-third of Saskatchewan's population depends on Lake Diefenbaker for various purposes including: power generation, irrigation, recreation, wildlife habitat, municipal and/or industrial use.

## Submitted by

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## Key Reference

Jaspar, JL and Peters, N. 1979. **Foundation Performance of Gardiner Dam**. Canadian Geotechnical Journal, Vol 16, pp 758–788.

## Photographs



Aerial overview of the Gardiner Dam



Gardiner Dam Spillway.



Meeting of PFRA engineers and consultants during dam construction. Top L to R: Charlie Ripley, Jim McMorrine, Jack Mollard, Gordon Watson, Arthur Casagrande; Bottom L to R: Steward Ringheim, Robert Peterson, Earl Nisbet.