



# Downie Slide

## Very Large Rockslide Stabilization Project

### Geographical location

Along west side of Revelstoke Reservoir; 65 km north of Revelstoke, British Columbia.

### When it began or was completed

Downie Slide was identified in 1956; investigations and initial drainage works began in 1974; the main drainage system was installed between 1977 and 1981; monitoring, assessment and maintenance continues.

### Why a Canadian geotechnical achievement?

Downie Slide is located on the Columbia River within BC Hydro's Revelstoke Reservoir. The slide is in mica schist/gneiss bedrock with multiple water levels. At nearly 10 km<sup>2</sup> in area, 250 m deep and approximately 1.5 billion m<sup>3</sup> in volume, this is the world's largest known landslide stabilization project.

Construction of the Revelstoke Dam was contingent on the stabilization of Downie Slide. Key safety issues were the potential for reservoir blockage, a landslide-generated wave, and upstream flooding of Mica Dam, approximately 70 km to the north. After a thorough site investigation by BC Hydro and many consultants, and an extensive public consultation, drainage was selected as the appropriate method for stabilization

The drainage included 2,450 m of adits, primarily located in the bedrock slide mass, and 24,000 drain holes advanced from within the adits. The achieved drainage has been calculated to have increased the stability of the slide by nearly 10%, and more than offset the raising of the reservoir which impounded the toe of the slide. The stabilization allowed the construction and the safe operation of the Revelstoke Dam and reservoir for over 30 years.

Monitoring and maintenance of the drainage system is the responsibility of BC Hydro.

### Submitted by

Tom Stewart (BC Hydro)

### Key References

Imrie, AS, Moore, DP and Enegren, EG. 1991. **Performance and maintenance of the drainage system at Downie Slide.** In *Landslides*, D Bell (editor), Balkema, Rotterdam.

Kalenchuk, KS, Hutchison, DJ and Diederichs, MS. 2009. **Downie Slide - Interpretations of complex slope mechanics in a massive, slow moving, translational landslide.** Proceedings, Canadian Geotechnical Conference Halifax, NS, pp 367-374.

### Photographs



Aerial view of Downie Slide (outlined in red) looking up the Revelstoke Reservoir and Columbia River valley.



Typical conventional drill and blast, horseshoe-shaped, extensively supported adit