

GSE - December 10, 2002 Talk

TOPIC: Beaver Dam Geotechnique and Mine Reclamation

PRESENTATION BY: Gord McKenna, Syncrude Canada Ltd.

The 1991 failure of the Matachewan Tailings Dam in northern Ontario should have been a wake-up call to the mining industry. Beavers blocked the outlet of this abandoned tailings dam causing the reservoir to overtop, releasing toxic tailings into the Ottawa River. A decade later, most miners remain unaware of the risk of beaver dams to post-closure landscapes. There is little guidance about how to assess the risk of beaver dams and how to design reclaimed landscapes to endure beaver activity. As part of its investigations into creating sustainable landscapes at its oil sands mining operations, Syncrude conducted an interdisciplinary study of beaver dams in northeastern Alberta. The program included site investigations at over 70 beaver dams and 29 lake outlets, cataloguing of 784 dams from aerial photographs, and review over 350 books and articles on beaver dam-building behaviour, stretching back to antiquity. Beaver activity, especially dam building, has a profound effect on the natural landscape. Beaver dams block streams and lake outlets, attenuate flows, divert streams, flood large areas, trap sediments, create beaver meadows, trigger landslides, and significantly alter the boreal forest ecology. Beaver dams can reach three to four metres high and be over a kilometre long. No stream is too small to dam; few rivers are too large. Significant dams can be constructed in a few days and can be repaired overnight. Beaver colonies can consume a hectare of deciduous forest each year and a beaver pond can affect tens of hectares of forest. Outburst flooding of abandoned beaver dams has caused numerous cases of damage to infrastructure and several deaths. Beavers remain the consummate dam builders and there are still lessons from beaver geotechnique of interest to human geotechnical and landscape designers. Reclaimed landscapes must be designed to encourage, discourage, or in most cases accommodate beaver behaviour. The talk provides a summary of typical and extreme beaver behaviour and landscape design strategies. Several strategies are presented. The increased costs of building landscapes to accommodate beavers can be significant. Retrofitting previously reclaimed areas is even more expensive. Even given the best design and construction, residual risks remain owing to extreme beaver behaviour and the prohibitive cost of designing for all risks.

Venue: Royal Glenora Club, 11160 River Valley Road, Edmonton, Alberta

Time: Lunch at 12:00 noon

Date: Tuesday, December 10, 2002

Cost: \$15 GSE Members, \$20 Non-members, \$10 Students