

Groundwater Inflow and Utilization, No. 7 Underground Mine, Grande Cache, Alberta

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Underground coal mining poses significant technological challenges with ongoing water management being one of the greatest challenges. At the only operating underground coal mine in the Western Canada Cordillera, water source and inflow control create significant operational concerns in order to mine safely and efficiently.

A detailed groundwater exploration and development program was carried out in 2004 during the initial phase of the development of the No. 7 Underground Mine. An external water source was required to provide process cooling for mining equipment in the mine. Several wells were drilled and tested and put into production during the first two years of development. A unique challenge in this environment was the high elevation (>1800m) of the mine and very cold groundwater temperatures (<2°C) which resulted in recharge freeze up and severe groundwater level decline in shallow production wells over the winter.

At the same time when the primary water source was experiencing shortfalls, the mine had developed a sufficient underground area to create down dip sumps that collected groundwater seepage from the roof, floor and walls of the mine. Over a period of several months these sumps were connected by pump and pipeline and since February 2008 all process water requirements have been met by recovered inflow seepage. With continued advancement of the mine, groundwater inflows have increased beyond the required process needs and most recovered water is now discharged to an approved surface holding pond.

This paper provides a review of the program and a demonstration of how problematic groundwater inflows were turned into a recoverable and reusable water resource.