

Best Available Technology Design for a Uranium Tailings Storage Facility

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*Proceedings of the 13th International Conference on Tailings and Mine Waste, Banff, Alberta, Canada.
November 2009.*

ABSTRACT

This paper presents a best available technology (BAT) design and regulatory requirements for a proposed tailings storage facility to manage tailings for a uranium mill in an arid region of the western United States. The general design of the tailings storage facility consists of a single 30-acre (12-ha) cell with capacity for 4 to 8 years of storage, depending on ore production rates. Tailings are proposed to be placed into the cell using conventional slurry discharge methods.

The site is regulated by under the Agreement State Program with the Nuclear Regulatory Commission. To meet best available technology design, the design must meet a BAT design basis established with the agreement state. The components of the BAT designed liner system listed from the bottom to the top, are: 1) minimum 12-inch compacted clay liner, serving as the base layer, with a maximum permeability of 1×10^{-7} cm/sec; 2) secondary 60-mil HDPE geomembrane, overlaying the clay liner to form a composite liner; 3) HDPE geonet and 3-inch diameter HDPE perforated pipe for the leak detection system (LDS); 4) primary 60 mil HDPE geomembrane; 5) cushioning layer consisting of two 10 ounce nonwoven geotextiles; 6) leachate collection system (LCS) consisting of 4-inch to 8-inch diameter HDPE perforated pipe in gravel bedding; 7) minimum of 18 inch-thick layer of drainage gravel; and 8) minimum of 6-inch thick sand filter layer to separate tailings from the drainage layer. The best available technology performance monitoring and operating criteria include a maximum head on the primary HDPE geomembrane of 3 feet and a daily leak detection flow rate below the action leakage rate.

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