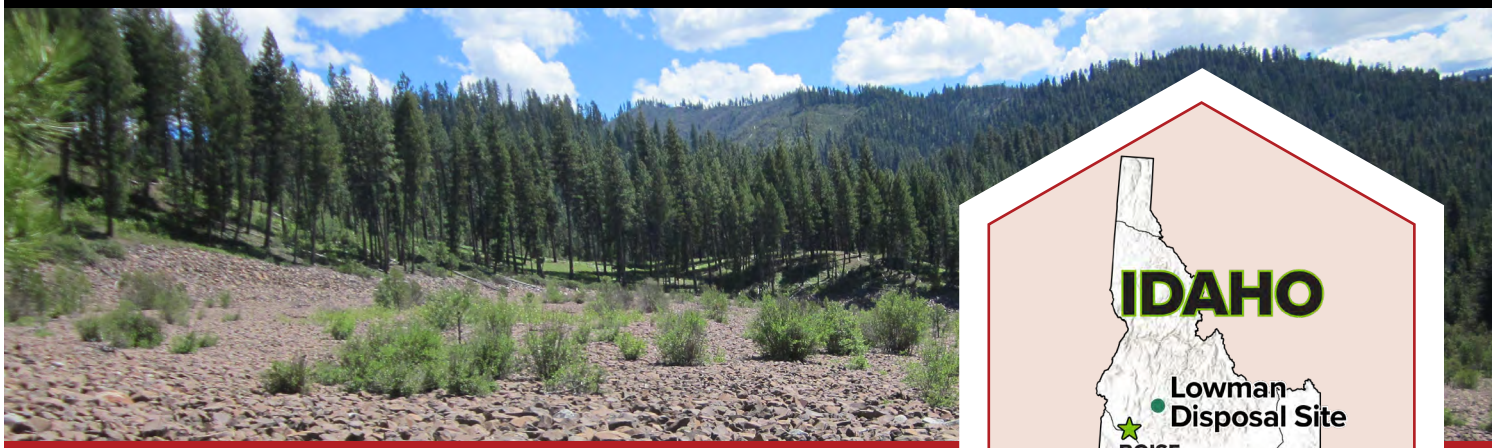
Fact Sheet

U.S. DEPARTMENT OF ENERGY | Legacy Management



Lowman, Idaho, Disposal Site

An UMTRCA Title I site

This fact sheet provides information about the **Lowman Site**. This site is managed by the **U.S. Department of Energy Office of Legacy Management under Title I** of the **Uranium Mill Tailings Radiation Control Act of 1978**.

Site Information and History

The Lowman disposal site is the location of a former mechanical concentrator for sands containing rare-earth elements, uranium, and thorium. The site is located in Boise County, Idaho, approximately 73 miles northeast of Boise and one-half mile northeast of the town of Lowman. The disposal cell is bordered by State Highway 21 to the south, Clear Creek to the west, and U.S. Forest Service land to the north and east. The land surrounding the site is mountainous and heavily forested and is used for recreation, grazing, logging, and mining.

From 1955 to 1960, the Porter Brothers Corporation operated the Lowman mill, where columbite/euxenite and monazite concentrates were separated from placer ore dredged from Bear Valley, 20 miles north of Lowman. During these operations, approximately 200,000 tons of dredge concentrates were produced. The concentrates were sent to Mallinckrodt Chemical Works at Hematite, Missouri, where niobium and tantalum pentoxides, uranium oxide, thorium-iron residues, and titanium were produced. Following the mill closure, Velsicol Chemical Corporation, formerly known as the Michigan Chemical Corporation, purchased the site. The state of Idaho acquired the land for remedial action and has transferred title to the U.S. Department of Energy (DOE).

Past milling operations generated about 129,400 cubic yards of radioactive materials consisting of uranium, radium, and thorium in residual sand, soil, and construction debris. Surface remediation consisted of consolidating and encapsulating all contaminated material from the Lowman site and local contaminated vicinity properties into an on-site engineered disposal cell. The disposal cell occupies approximately 8 acres of the 18-acre tract of land.

Regulatory Setting

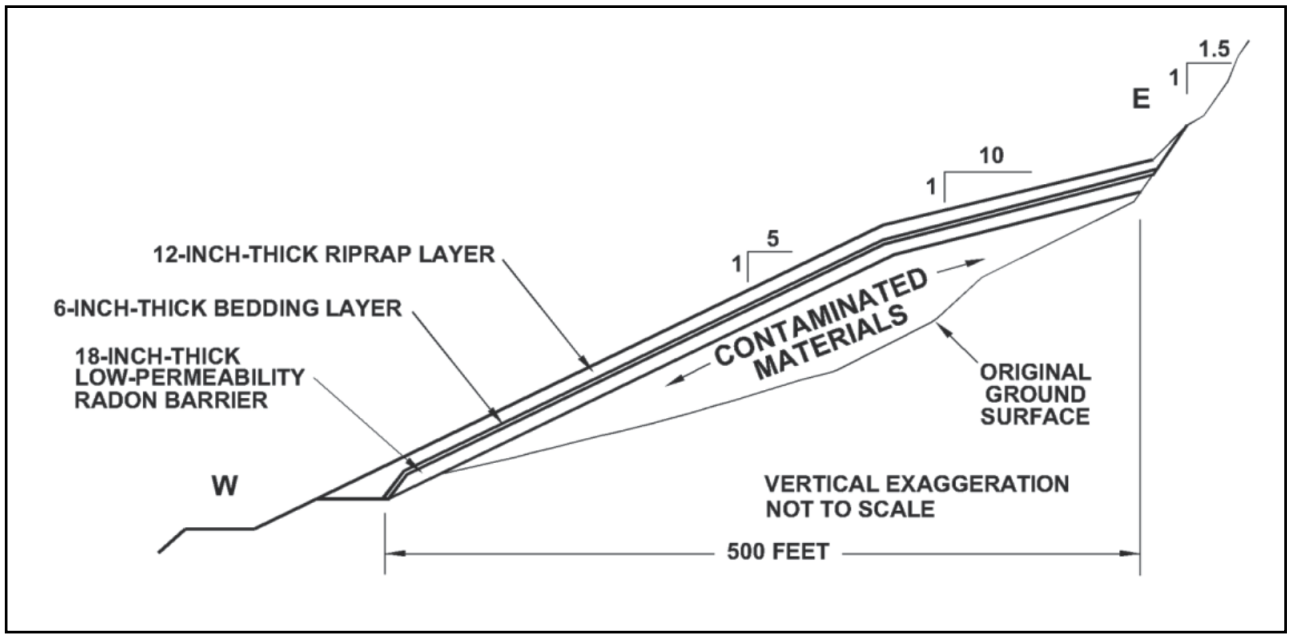
Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978 (Public Law 95-604), and DOE remediated 22 inactive uranium-ore processing sites under the Uranium Mill Tailings Remedial Action Project in accordance with standards promulgated by the U.S. Environmental Protection Agency in Title 40 *Code of Federal Regulations* (CFR), Part 192. Subpart B of 40 CFR 192 regulated cleanup of contaminated groundwater at the processing sites. The radioactive materials were encapsulated in U.S. Nuclear Regulatory Commission (NRC)-approved disposal cells. The NRC general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Lowman site was included under the general license in 1994.

Disposal Site

By 1992, the disposal cell was closed upon completion of consolidation of radioactive sands and contaminated materials from the Lowman site and vicinity properties. The disposal cell contains 222,230 dry tons of contaminated material with a total activity of 12 curies of radium-226.

The site is situated on terrace deposits 80 feet above Clear Creek. These deposits consist of approximately 45 feet of unconsolidated alluvium underlain by weathered granodiorite bedrock. Depth to groundwater beneath the site is between 27 and 78 feet. Groundwater flows west-southwest along the alluvium/bedrock contact and within a preferential flow path created by a paleochannel.

Because site groundwater has not been contaminated by processing or disposal operations, no compliance strategy for groundwater is necessary. In tests performed during



West-East Cross Section of Lowman Disposal Cell.

remedial action, no potentially hazardous constituent in pore fluids of the radioactive sands had a mean concentration that exceeded its maximum concentration limit in 40 CFR 192, and only a few had concentrations that were above laboratory detection limits. Only antimony had a pore fluid concentration that exceeded the maximum background concentration. Antimony was selected as the target analyte to indicate both groundwater compliance and initial performance of the disposal cell. Concentrations of antimony in groundwater samples from all monitoring locations between 1994 and 2004 were less than the maximum background concentration.

The Lowman site is unique among UMTRCA sites in that the milling process was mechanical instead of chemical Consequently, there were no process-related chemicals to contaminate the underlying soils and groundwater. Radioactive sands encapsulated in the disposal cell are highly resistant to weathering and chemical alteration and have very low leachability characteristics. Sampling results showed no technical rationale to continue groundwater monitoring. NRC concurred with DOE's recommendation to discontinue groundwater monitoring, and the Long-Term Surveillance Plan (LTSP) was reissued accordingly in 2005.

Disposal Cell Design

The disposal cell is a surface impoundment. The bottom or "footprint" of the cell is essentially the original surface of the ground before remedial action. There is no liner between the ground and overlying radioactive materials because the sands are not leachable. The cover of the disposal cell is a multicomponent system designed to encapsulate and protect the contaminated materials. The disposal cell cover comprises: (1) a low-permeability radon barrier (first layer placed over compacted tailings) of clay and soil mixture that also prevents the water penetration into the cell; (2) a layer of free-draining, sandy bedding material; and (3) a rock (riprap) erosion-protection layer. The cell was designed to promote the rapid runoff of precipitation.

A rock apron surrounding the perimeter of the disposal cell provides erosion protection at the toe and channels runoff away from the cell. Vehicle access is restricted by a locked gate across the entrance road.

Since 1994, ponderosa pine and other plants have encroached on the apron and cover of the disposal cell. Studies showed that established vegetation decreased water movement through the cell cover and can be useful for restricting infiltration. Also, the encapsulated radioactive sands are in a class of minerals known as "resistates," or end-state weathering products, which are highly resistant to physical and chemical weathering that might contribute to leaching of contaminants. On the basis of these observations, NRC concurred with DOE's recommendation to allow forest vegetation to encroach onto the disposal cell and this allowance was included in the revised LTSP. However, DOE determined that controlling the growth of conifers — primarily ponderosa pine — would be a best management practice. Unlike shrubs and other vegetation growing on the cell, mature conifers could potentially become uprooted during wind storms and damage the surface of the disposal cell. Conifers are controlled on an as-needed basis.

Legacy Management Activities

The DOE Office of Legacy Management (LM) manages the disposal site according to the site-specific LTSP to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site to evaluate the condition of surface features and performs site maintenance as necessary.

In accordance with 40 CFR 192.02(a), the disposal cell is designed to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. However, the general license has no expiration date, and LM's responsibility for the safety and integrity of the Lowman site will last indefinitely.

CONTACT INFORMATION

IN CASE OF AN EMERGENCY AT THE SITE, CONTACT 911

LM TOLL-FREE EMERGENCY HOTLINE: (877) 695-5322

Site-specific documents related to the **Lowman, Idaho, Disposal Site** are available on the LM website at **www.energy.gov/lm/lowman-idaho-disposal-site**

For more information about LM activities at the **Lowman, Idaho, Disposal Site**, contact:

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