



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511

June 11, 2015

MEMORANDUM TO: Docket File WM-00043

THROUGH: Ray L. Kellar, P.E., Chief **/RA/**  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety  
Region IV

FROM: Robert J. Evans, Ph.D., C.H.P., P.E., Senior Health Physicist **/RA/**  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety  
Region IV

SUBJECT: OBSERVATIONAL SITE VISIT AT LOWMAN DISPOSAL SITE

On May 18, 2015, a U.S. Nuclear Regulatory Commission (NRC) Region IV inspector conducted an observational site visit at the U.S. Department of Energy's (DOE) Lowman disposal site in Boise County, Idaho. This site visit was conducted in accordance with guidance provided in the NRC Memorandum dated April 17, 2012 (ML120930240). The purpose of the site visit was to observe DOE's routine, annual inspection of the Lowman Disposal site. Enclosed to this memorandum is the NRC's trip report for this site visit.

In summary, the DOE representatives conducted the annual inspection in accordance with the requirements specified in the NRC-accepted Long-Term Surveillance Plan dated January 2005 (ML051250281). The disposal cell and surrounding apron appeared to be in excellent condition. No significant regulatory issues or safety concerns were identified during the site visit.

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Enclosure:  
NRC Trip Report

cc: T. Petrosky, Site Manager  
J. Kidd, District Ranger  
M. Dietrich, Administrator

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DATE		06/11/15		06/11/15					

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: WM-00043

Report: WM-00043/15-001

Licensee: U.S. Department of Energy

Facility: Lowman Disposal Site

Location: Boise County, Idaho

Date: May 18, 2015

Inspector: Robert J. Evans, Ph.D., C.H.P., P.E., Senior Health Physicist  
Repository and Spent Fuel Safety Branch

Approved by: Ray L. Kellar, P.E., Chief  
Repository and Spent Fuel Safety Branch

Attachment: Photographs Taken at the Lowman Disposal Site

Enclosure

## **NRC Trip Report**

### **1 Background**

Porter Brothers Corporation operated the Lowman mill from 1955-1960. The mill was used to recover rare-earth elements from sands excavated from the Bear Valley dredge site. The sands were processed using mechanical separation based on density instead of chemical separation. Approximately 200,000 tons of concentrates were produced. The waste product consisted of radioactive sands containing uranium, radium, and thorium.

The U.S. Department of Energy (DOE) decommissioned the site from 1991-1992. The DOE encapsulated approximately 90,000 tons of sand concentrates as well as contaminated soil, construction debris, and vicinity property material. About 222,230 dry tons of material was placed in the disposal cell. The total amount of radioactivity encapsulated in the cell was 12 curies of radium-226.

The Lowman disposal site is located about a half-mile east of Lowman, Idaho. The disposal cell occupies approximately 8.3 acres of the 18-acre property. The cell is a surface impoundment where the bottom of the disposal cell is the original ground surface. The disposed material is about 20 feet thick in the center of the cell. Because the disposed sands were mechanically processed and were not leachable, a liner was not installed between the ground and the disposed material.

The cover consists of an 18-inch radon barrier, 6-inch sand layer, and 12-inch riprap erosion protection layer. An apron consisting of coarse riprap surrounds the disposal cell base for erosion protection and diversion of rainwater. The apron ranges from 3-6 feet thick and is 30-35 feet wide.

Following construction of the disposal cell, the DOE implemented a seeding and vegetation program to help control erosion in areas adjacent to the cell; however, the results were not successful. In 1997, DOE constructed a collection ditch and three drainage terraces, also called interceptor benches, to the north of the disposal cell. The collection ditch and drainage terraces were designed to intercept rainwater runoff and divert it away from the disposal site.

The Lowman disposal site is classified as a Title I site under the Uranium Mill Tailings Radiation Control Act of 1978. The DOE maintains long-term custody of the site under the U.S. Nuclear Regulatory Commission's (NRC's) general license requirements of 10 CFR 40.27. The Long-Term Surveillance Plan (LTSP) explains how DOE will fulfill the general license requirements specified in 10 CFR 40.27. The site was transferred from the State of Idaho to DOE in 1994. The original LTSP (Revision 1) was accepted by the NRC on September 30, 1994 (ML051250281). An updated LTSP (Revision 2) was accepted by the NRC on April 6, 2005 (ML050960279).

### **2 Site Status**

The depth of the groundwater ranges from 27-78 feet below ground surface. The DOE implemented a groundwater monitoring program that consisted of pore fluid analyses (1987-1990), batch leach testing (prior to 1991), and groundwater assessment (1994-2004). Based on all available information, DOE concluded that the groundwater was not

contaminated by previous milling operations. The DOE also concluded that groundwater monitoring was not necessary. By letter dated April 6, 2005, the NRC allowed DOE to discontinue the groundwater monitoring program. Around 2006, the DOE subsequently decommissioned six monitor wells and one wellpoint.

Since 1994, the DOE has observed the encroachment of ponderosa pine and other plants onto the apron and cover of the disposal cell. The DOE, with NRC concurrence, decided to allow the encroachment of forest vegetation onto the disposal cell, in part, because the vegetation decreased water movement through the cell cover. As part of its analysis, the NRC concluded that the regulatory limit on radon emanation would not be exceeded if plant roots actually penetrated the radon barrier.

During previous site inspections, DOE staff reported that high winds would periodically blow down mature trees in the region. In response to a request from the Idaho Department of Environmental Quality, the DOE removed all trees from the cover area in 2010, although DOE was not required by the LTSP to remove these trees.

Site features include four boundary monuments, three survey/boundary monuments, two site markers, 18 perimeter signs, an entrance sign, and a site access gate. The LTSP requires DOE to inspect the Lowman site once every calendar year. The DOE inspectors typically observe the status of site features during each annual inspection.

The DOE conducted the last site inspection on July 14, 2014. At that time, the disposal cell was noted to be in excellent condition. No evidence of instability, subsidence, slumping, or cracking was observed on the cell surface. Minor erosion was noted in drainage channels west of the site, but the erosion did not impact any site features or the disposal cell. Also, stable rills were identified near the interceptor benches north of the disposal cell. The DOE inspectors noted that vegetation encroachment continued on the top and side slopes of the cell. The DOE inspectors also noted that no large trees were growing on the cover at that time. Nothing was identified that required follow up repair or maintenance.

### **3 Site Observations and Findings**

The purposes of the annual inspection are to confirm the integrity of the visible features of the site, to identify changes in conditions that may affect site integrity, and to determine the need for maintenance or additional inspection and monitoring. The detailed instructions for the annual inspection are provided in Section 3 of the LTSP.

The LTSP requires the DOE inspectors to observe three areas: the top and side slope of the disposal cell; the area between the disposal cell and the site boundary; and the outlying area within about a quarter mile of the site. To conduct the annual inspection, DOE and its contractors created an inspection checklist. The checklist included requirements to inspect the tailings cell as well as site fences, boundary monuments, site markers, perimeter signs, and entrance gates. During the site visit, the NRC inspector observed the DOE site inspectors implementing the site-specific checklist.

The inspector observed that the disposal cell appeared to be in excellent condition. No erosion or slumping was observed on or around the cell. Although vegetation was observed on the cell cover and apron, there were no large trees growing on top of the

cell. Some minor washout/erosion was observed north of the cell, but this erosion had no impact on cell integrity.

The NRC inspector conducted radiological surveys using a Ludlum Model 19 microRoentgen survey meter (NRC No. 015546, calibration due date of 07/22/15, calibrated to radium-226). With a background of 18-20 microRoentgens per hour ( $\mu\text{R/hr}$ ), as measured on the access road to the site, measurements within the 18-acre property ranged from 12-40  $\mu\text{R/hr}$ . The lowest measurements were identified up-gradient of the cell, and the highest measurement was identified in a small, abandoned concrete pit situated in the northeastern corner of the property.

The inspector also radiologically surveyed the areas surrounding the property. Two areas of elevated measurements were identified. The first area was a drainage ditch located north of the property. This area measured up to 65  $\mu\text{R/hr}$ . The second area was located in the sloped terrain southwest of the property. This second area measured up to 130  $\mu\text{R/hr}$ . Section 2.3.5 of the LTSP indicates that the Lowman disposal site is located within the Boise National Forest. The land adjacent to the disposal site is controlled by the U.S. Forest Service, with the exception of the area north of the property. The area immediately north of the site is owned by the State of Idaho. The inspector concluded that these two elevated measurements were most likely the result of runoff from the former sand piles prior to remediation. The inspector noted that the two areas were limited in size, less than 100-square meters each. The inspector also noted that both areas were not easily accessible or commonly frequented by members of the public.

A perennial spring is located adjacent to the southwestern corner of the 18-acre property. The inspector observed the spring and radiologically surveyed the area of the spring. No elevated radioactivity measurements were observed in the immediate vicinity of the spring.

#### **4 Conclusions**

The NRC inspector concluded that the DOE inspectors conducted the site inspection in accordance with the checklist, LTSP, and 10 CFR 40.27 requirements. The disposal cell appeared to be in excellent condition with no erosion, slumping, or large trees on the cell. Elevated radioactivity measurements were observed in two drainage pathways outside of the 18-acre property, but the areas of radioactivity were limited in size and not easily accessible.

#### **5 Meeting Summary**

The NRC inspector participated in a pre-planning meeting with the DOE site manager and DOE representatives prior to the site inspection. During this meeting, the NRC and DOE representatives discussed topics such as site status, inspection plan, and potential hazards. The inspector discussed the final site observations with DOE staff at the conclusion of the onsite visit.

## **6      Persons Contacted**

D. Nygard, Program Manager, Idaho Department of Environmental Quality  
T. Petrosky, Site Manager, DOE Office of Legacy Management  
P. Rekow, Assistant Superintendent, Boise County Noxious Weeds  
L. Sheader, Ecologist, Stoller Newport News Nuclear (SN3)  
D. Traub, Site Lead/Scientist, Stoller Newport News Nuclear (SN3)



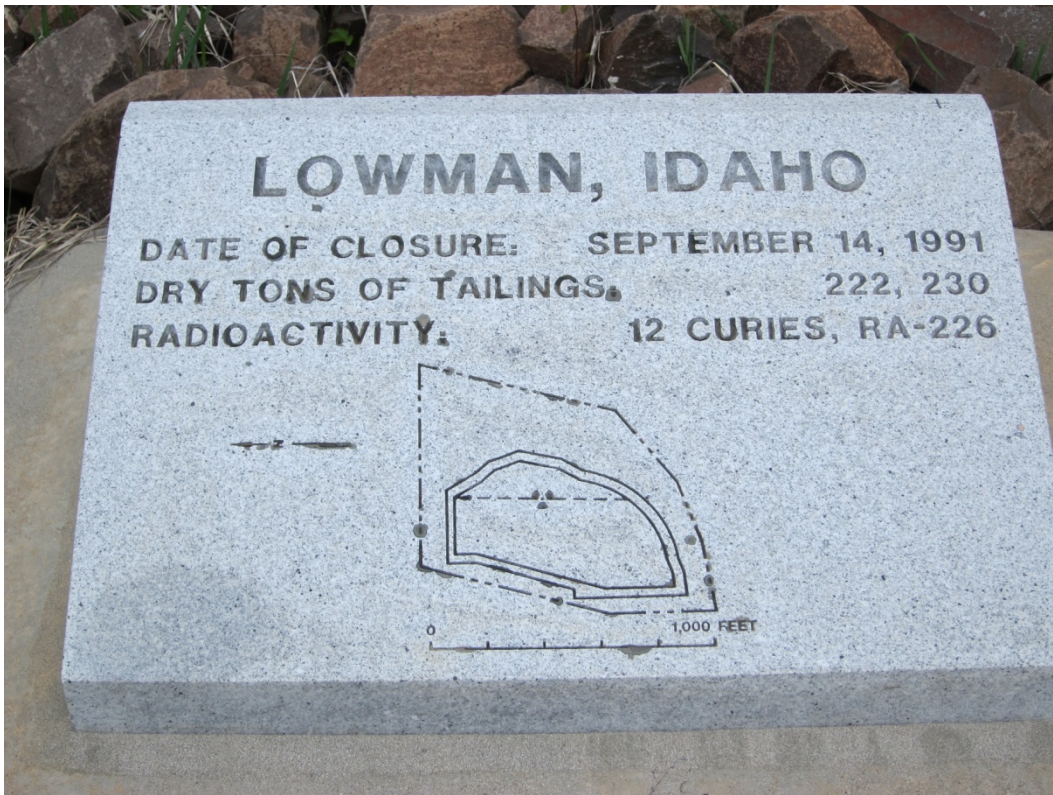


Figure 1: Lowman disposal site marker



Figure 2: Interceptor bench 2 located north of disposal cell (looking north)





Figure 3: Northwestern edge of cell looking southeast (apron in foreground)



Figure 4: Southwestern edge of cell looking northeast (apron in foreground)