



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

November 9, 2017

MEMORANDUM TO: Docket File WM-00064

THROUGH: Ray L. Kellar, P.E., Chief /RA/  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

FROM: Lee E. Brookhart, Senior Inspector /RA/  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

SUBJECT: NRC OBSERVATIONAL SITE VISIT AT THE LAKEVIEW TITLE I  
DISPOSAL SITE, LAKEVIEW, OREGON

On September 6, 2017, a U.S. Nuclear Regulatory Commission (NRC) Region IV inspector conducted an observational site visit at the U.S. Department of Energy's (DOE) Lakeview Uranium Mill UMTRCA Disposal Site in Lakeview, Oregon. This observational site visit was conducted in accordance with NRC guidance dated September 7, 2012 (ADAMS Accession Number ML12213A418). The purpose of the site visit was to observe DOE's routine, annual inspection of the facility. Enclosed to this memorandum is the NRC's trip report for this observational site visit.

In summary, DOE representatives conducted the annual inspection in accordance with the Long-Term Surveillance Plan (LTSP) dated February 23, 2000 (<https://www.lm.doe.gov/Lakeview/Disposal.aspx>). No significant regulatory issues or safety concerns were identified during the site visit.

Docket: WM-00064

Enclosure: NRC Trip Report

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: WM-00064

Report: WM-00064/2017-001

Licensee: U.S. Department of Energy

Facility: Lakeview Title 1 UMTRCA Disposal Site

Location: Lakeview, Oregon

Date: September 6, 2017

Inspector: Lee E. Brookhart, Senior Inspector  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Approved by: Ray L. Kellar, P.E., Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Attachment: Photographs Taken at the Lakeview Disposal Site

## NRC Trip Report

### 1 Background

Lakeview Mining Company, built and operated a mill located approximately 1.5 miles north-northwest of Lakeview Oregon from 1958-1961. No uranium ore was processed at the site after 1961. From 1961-1968, Kermac Nuclear Fuels Corporation purchased the site which was then sold to Atlantic Richfield Company. Atlantic Richfield sold the site in 1974. A lumber company purchased the mill site property in 1978 and used some of the former uranium mill buildings and raffinate ponds in its operations. This former mill site is located on private land. Pacific Pine Products, a lumber company, now uses the former mill buildings.

The U.S. Department of Energy (DOE) remediated the processing site from 1986-1988. An engineered disposal cell was constructed seven miles northwest of the processing site. The disposal cell contains approximately 736,000 tons of contaminated materials. The contaminated materials include mill tailings and other process-related solid waste. In 1995, the NRC issued a general license to DOE, under the provisions of 10 CFR 40.27, for the Lakeview disposal site.

The disposal cell occupies an area of 16 acres on a 40-acre property. The base of the cell is approximately 1,050 feet long by 800 feet wide. The property is controlled by deed restrictions, fences, boundary markers, and locked gates. The top of the disposal cell consists of a soil and vegetation cover. Riprap was installed on the side slopes for erosion protection. The cell is on a hillside and was excavated to contain a portion of the contaminated materials below the original grade. Contaminated materials were placed on a geochemical flow liner of low-permeability clayey soil. Rock-lined diversion channel is located on the north and a rock-lined toe drain on the western end of the cell. The top of the disposal cell supports native brush and grasses.

The most recent Long-Term Surveillance Plan (LTSP) was approved by the NRC by letter dated March 30, 2000 (ADAMS Accession Number ML003696430). At that time, the NRC approved the February 23, 2000 revision. In accordance with the LTSP, DOE samples water wells every 5 years at the disposal cell location and in accordance with the Groundwater Compliance Action Plan (GCAP) (ADAMS Accession Number ML101930339), the DOE samples the water wells around the former processing site every two years.

Nine of 16 groundwater monitor wells were strategically sampled in accordance with the LTSP every five years at the disposal cell. The additional background wells were not required to be sampled because historical data had been sufficiently characterized. The sampling results for both the disposal site and past processing site were presented in the groundwater data validation packages and submitted to the NRC for review.

As discussed below, uranium concentrations and other hazardous constituents that are monitored through the GCAP at the disposal and former processing site continue to be below NRC and Environmental Protection Agency's maximum concentration limits.

## **2 Site Status**

The last annual DOE inspection of the Lakeview Disposal Site was conducted in August 2016. The DOE inspectors did not identify any significant problems at the site. The disposal cell was found to be in excellent condition. No changes were observed at the disposal cell and no immediate maintenance needs were identified.

In accordance with the LTSP, disposal cell riprap gradation monitoring has been performed annually since 1997 at random locations on the west side slope due to concerns over rock degradation. The disposal cell design called for placement of specifically sized rock (riprap) to ensure continued long-term protection of the disposal cell from erosion during a severe precipitation event. The riprap gradation monitoring is performed to determine if the mean diameter ( $D_{50}$ ) value of the riprap on the west side slope continues to meet design specifications. The  $D_{50}$  value measured during the 2016 gradation monitoring was 2.54 inches, which fell just below the original  $D_{50}$  design size range of 2.7–3.9 inches for the Type B size side slope riprap; in prior years, the measured  $D_{50}$  value has been both above and below the design specifications.

The NRC inspector reviewed the results for groundwater samples collected for both the former processing site and the disposal cell since 2009. The last NRC site visit was conducted in August of 2013. The most recent samples of the disposal cell's monitoring wells were collected in May 2014. The Data Validation Package, Groundwater Sampling at the Lakeview, Oregon, Disposal Site, dated August 2014, is available for download from DOE's web site at <http://www.lm.doe.gov/Lakeview/Disposal/Sites.aspx>. The last sampling of the former processing site was conducted in May 2016 and is also available on the DOE web site. The sampling demonstrated, that leaching of contaminants into the groundwater above established groundwater quality protection standards was not occurring. All concentrations of constituents detected in the monitoring wells were below their respective limits.

## **3 Site Observations and Findings**

To conduct the site inspection on September 6, 2017, the DOE and its contractors created an inspection checklist. The checklist included requirements for the DOE inspectors to observe of the disposal cell, site perimeter, outlying areas, vegetation, and various site-specific features. The inspection staff for 2017 included the DOE site manager and several contractors. The contractors had experience in project management, hydrogeology, and geology. The DOE staff were accompanied by a representative from the State of Oregon.

During the site inspection, the DOE inspectors checked the disposal cell for evidence of erosion, settlement, slumping, displacement, and any other features that would require maintenance or repair. The disposal cell's riprap gradation monitoring was completed at 20 random locations to comply with the monitoring requirements of the LTSP. Approximately 25 rocks at each location were sampled to determine if the size range of the rocks was being maintained above the design requirements. The results of the gradation monitoring would be documented in the site's annual report issued by the DOE.

The rock surfaces on the side slopes and the soil on the cover, were found to be in excellent condition. No ponded water was observed nor evidence of active animals

burrowing into the side slopes. No slumping, subsiding, or disturbed areas were clearly visible anywhere on the disposal cell.

At the time of the observational site visit, the property was enclosed by a barbed-wire stock fence and locked gates. Other institutional controls in place at the site included boundary monuments, survey monuments, site markers, monitoring wells, and perimeter warning signs. The institutional controls were found to be in place and in good condition. No deep-rooted vegetation was identified on the top or side slopes of the cell. In summary, the DOE inspectors did not identify any threatening or unusual site conditions involving the disposal cell that required immediate maintenance.

The NRC inspector measured the ambient gamma exposure rates using a Ludlum Model 19 microRoentgen meter calibrated to radium-226 (NRC No. 015544, calibration due date of 07/25/18). The background exposure rates ranged from 14-16 microRoentgens per hour ( $\mu\text{R/hr}$ ). The exposure rates on top of the disposal cell ranged from 14-16  $\mu\text{R/hr}$ , essentially background. The exposure rates around the disposal cell ranged at background levels as well.

#### **4 Conclusions**

The NRC inspector concluded that the DOE inspectors conducted the site inspection in accordance with the requirements specified in the LTSP dated February 23, 2000. The tailings impoundment appeared to be structurally intact, and the cover was in excellent condition. No threats to the integrity of the disposal cell were identified.

#### **5 Inspector Follow-Up Items**

During the inspection planning efforts the regional NRC inspector identified a few items that required NRC's Division of Decommissioning, Uranium Recovery and Waste Programs attention and addition regional inspector follow-up to ensure the items are adequately resolved.

- 1) In a letter from the NRC to the DOE, titled "US DOE Request for US NRC Concurrence on DOE Proposal to Approve the Groundwater Compliance Action Plan for the Lakeview Oregon Processing Site," dated May 17, 2013, (available on the DOE website <https://www.lm.doe.gov/Lakeview/Processing/Documents.aspx>), the NRC approved DOE's GCAP for the former processing site along with some conditions. One of those conditions was "that the private resident well, 0543, located within the institutional control area continued to be monitored by the DOE on a limited basis. If the monitoring data from future sampling events demonstrate that the water is no longer suitable for the current or future residents then the DOE shall provide a suitable alternative water source."

In a letter from the NRC to the DOE titled "US NRC Staff Review of US DOE Report Entitled *May 2012 Groundwater Sampling at the Lakeview Oregon Processing Site*," dated May 17, 2013 (ADAMS Accession Number ML13137A377), the NRC documented that the DOE submitted report specified that the domestic well 0543 had not been sampled by the DOE during the biennial water sampling event. The NRC stated in this letter to the DOE, "it is DOE's responsibility to secure access to the residential well located inside the institutional boundary to ensure that the well will continue to provide high quality drinking water. If domestic well 0543 cannot be

sampled in the future, the DOE should identify and sample an alternate well near domestic well 0543 during future sampling events.”

Additionally, sampling of residential well 0543 is required by the Technical Evaluation Report, titled “For the US DOE UMTRCA Title 1 Lakeview, Oregon, Processing Site: Review of Draft Groundwater Compliance Action Plan, Final Report”, dated November 2012 (ADAMS Accession Number ML12334A175). In Section *NRC Issue 1.b Domestic Use of downgradient groundwater*, it is stated, “the NRC staff believes that the DOE has made an adequate attempt to provide the one resident within the institutional boundary an alternate water supply.

While well 0543 currently provides water that is of high quality, future quality should be ensured. The NRC staff is requiring that this well be monitored on a limited frequency and at the well owners request to ensure that the water quality remains suitable for the owner(s) of the well. If the water quality is determined to be unsuitable for the current or future resident(s), DOE shall provide an alternate supply of water such as a municipal water hookup or a well drilled to a deeper depth.”

The NRC inspector noted that DOE had not performed the required limited water sampling of domestic resident well 0543 during the biennial GCAP sampling events conducted in May 2012, May 2014, nor in May of 2016. This issue was brought to the attention of the DOE Site Manager, Josh Linard, during the Lakeview Disposal Cell’s site annual inspection activities. The DOE site representative stated he understood the issue and that the domestic residential Well 0543 or suitable alternative well would be sampled as required in the May 2018 GCAP water sampling activities.

- 2) In a letter from the NRC to the DOE titled “Follow-up Letter – Lakeview Rock Degradation Analysis,” dated November 12, 2014 (ADAMS Accession Number ML14303A623), the NRC requested the DOE provide additional information related to Lakeview’s rock degradation analysis. The NRC stated that the 17 years of gradation data collection should be sufficient for DOE to propose a final solution for the side slope erosion.

In a DOE letter to the NRC, dated March 2, 2015 (ADAMS Accession Number ML15068A252), the DOE provided the NRC with the required information and proposed a final solution. The DOE stated in the letter, that adding proposed rill monitoring and removing the required riprap gradation monitoring during the annual inspections would be the most effective method for addressing any potential vulnerability of erosion on the side slope.

The Division of Decommissioning, Uranium Recovery, and Waste Programs have stated twice in formal documentation to the DOE, dated April 6, 2017 (ADAMS Accession Number ML15093A198) and again in NRC Trip Report dated September 16, 2015 (ADAMS Accession Number ML15358A071), that the staff is currently evaluating the information presented by the DOE and will provide a written response when the staff has completed their evaluation.

The DOE site representative stated during the inspection activities, that the DOE staff is still waiting on the NRC staff to provide the written evaluation of the DOE’s proposed final solution for the side slope erosion.

The NRC project manager for the Lakeview Disposal site within the Division of Decommissioning, Uranium Recovery, and Waste Programs has been made aware of DOE's request for the response to the proposed solution to address the side slope erosion and plans to discuss the rock degradation issue with the DOE in the near future.

## **6 Meeting Summary**

The NRC inspector participated in a planning meeting with the DOE site manager and site contractor prior to the site inspection. During this meeting, the participants discussed topics such as site status, inspection plan, and potential hazards.



Figure 1: Site marker SMK-2 located at crest of Falls City disposal cell



Figure 2: Top of disposal cell, covered with grass (looking north)



Figure 3: Eastern side slope with rip-rap for erosion protection (looking north-east)



Figure 4: Northern corner of disposal cell with rock drain on right (looking south)



Figure 5: Riprap gradation monitoring tests

NRC OBSERVATIONAL SITE VISIT AT THE LAKEVIEW TITLE I DISPOSAL SITE,  
LAKEVIEW, OREGON – DATED NOVEMBER 9, 2017

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ADAMS ACCESSION NUMBER: ML17303A827

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