



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

June 22, 2018

MEMORANDUM TO: Docket File WM-00041

THROUGH: Ray L. Kellar, PE, Chief /RA by RJEvans Acting for/
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

FROM: Linda M. Gersey, Health Physicist /RA/
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

SUBJECT: NRC OBSERVATIONAL SITE VISIT AT THE SALT LAKE CITY, UTAH
DISPOSAL SITE 2018-001

On May 29, 2018, the U.S. Nuclear Regulatory Commission (NRC), Region IV Office, conducted an observational site visit at the U.S. Department of Energy's (DOE) Salt Lake City Disposal Site in Clive, Utah. This observational site visit was conducted in accordance with the NRC's guidance dated September 7, 2012 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML12213A418). The purpose of the site visit was to observe the DOE's representatives conducting the annual inspection of the Salt Lake City site in accordance with the instructions provided in the NRC-accepted Long-Term Surveillance Plan (LTSP) dated September 1997 (available online at https://www.lm.doe.gov/salt_lake/). Enclosed to this memorandum is the NRC's trip report for this observational site visit.

In summary, the DOE representatives conducted the annual inspection in accordance with the guidance provided in the LTSP. No significant regulatory issues or safety concerns were identified during the site visit. The DOE's staff continues to monitor degradation of one rock species used on the disposal cell cover.

Docket: WM-00041

Enclosure:
NRC Trip Report WM-00041/2018-001

cc:
J. Nguyen, Site Manager, DOE

CONTACT: Linda Gersey, DNMS/FCDB
817-200-1299

**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Docket: WM-00041

Report: WM-00041/2018-001

Licensee: U.S. Department of Energy

Facility: Salt Lake City Disposal Site

Location: Clive, Utah

Date: May 29, 2018

Inspector: Linda Gersey, Health Physicist
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

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

Attachment: Photographs taken at the Salt Lake City Disposal Site

Enclosure

NRC Trip Report

1 Background

The Salt Lake City disposal site was included under an NRC general license in 1997. The disposal site is located approximately 81 miles west of Salt Lake City and 2.5 miles south of Interstate 80 on the eastern edge of the Great Salt Lake Desert. The disposal cell is surrounded by EnergySolutions, Inc., a commercial low-level radioactive materials disposal site. The area is sparsely populated, and the nearest residences are at least 15 miles from the site. Vegetation in the area is typical of semiarid low shrub land. The disposal cell encapsulates about 2.8 million cubic yards of radioactive tailings and other contaminated materials with a total activity of 1,550 curies of radium-226.

The rectangular disposal cell measures approximately 1,115 feet by 2,110 feet and occupies 54 acres of the 99-acre site. The unlined cell extends approximately 9 feet below ground surface and rises 35 feet above the surrounding terrain. A security fence with locked gates encloses the site, and the perimeter is marked with warning signs.

The cover of the disposal cell is a multicomponent system designed to encapsulate and protect the contaminated materials. The cover comprises (1) a low-permeability radon barrier (first layer placed over compacted tailings) consisting of a densely compacted silty clay, (2) a sandy bedding layer placed as a capillary break, and (3) a rock (riprap) erosion protection layer. The sloped disposal cell cover promotes rapid runoff of precipitation to minimize leachate. Riprap-armored drainage ditches around the base of the disposal cell intercept runoff and direct the flow into the natural drainages west of the site.

Regulation 10 CFR 40.27(c) states that the DOE shall implement the long-term surveillance plan (LTSP), and care for the disposal site in accordance with the provisions of the LTSP. The most recent LTSP for the Salt Lake City Disposal Site is dated September 1997 (available online at https://www.lm.doe.gov/salt_lake/). The DOE used this version of the LTSP during its 2018 annual inspection.

2 Site Status

The site is completely surrounded by an active radioactive waste disposal facility that is operated by EnergySolutions. A perpetual right-of-way easement is in place that ensures DOE and its representatives have continued access across the EnergySolutions property to the site. DOE provides EnergySolutions access to the site to perform periodic maintenance activities, as needed, through a signed access agreement and license. Per the agreement, EnergySolutions is required to provide a minimum 48-hour notice to DOE before accessing or conducting maintenance activities at the site.

The site consists of a disposal cell located within a fenced boundary. Three entrance gates and three personnel gates are present on the boundary fence. The disposal cell was constructed with a rip-rap layer, bedding layer, and radon barrier over the contaminated materials. The DOE installed 19 warning signs, 4 boundary monuments, and 2 site markers around the disposal cell. There are 9 settlement plates placed in three rows across the top of the cell, although settlement monitoring is not required at

this time. The DOE also installed two site markers on the site property. One marker was installed on top of the cell, and the second marker was installed adjacent to the main gate.

The cell cover was constructed with a 2 percent grade slope that flows to the north and east. Runoff water flows down the 20 percent grade side slopes into a rock apron that surrounds the cell. The runoff exits the cell through three toe drains that discharge into existing arroyos that are located to the north and east of the cell. (An arroyo is a steep-sided gully cut by running water in an arid or semiarid region.)

The last annual DOE inspection was conducted on May 16, 2017 (ADAMS Accession No. ML18067A214). The purposes of the inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that might affect the conformance with the LTSP, and to determine the need, if any, for maintenance or additional inspection and monitoring. During that inspection, no significant changes were noted from the previous year's inspection. DOE inspectors identified a routine maintenance need but found no cause for a follow-up inspection. No problems were identified that required immediate contingency action.

One of several types of rock used for the disposal cell erosion protection riprap layer has exhibited minor degradation since the disposal cell was constructed. As a result, eight 1 square meter rock quality monitoring plots were established in 2010 to monitor for continued rock degradation. The rock type exhibiting degradation constitutes approximately 1 to 10 percent of the riprap material; degradation of this less competent rock is thought to be a result of freeze-thaw weathering. Rock quality monitoring plots are visually monitored and documented with photographs annually.

Approximately 1 to 10 percent of the rock in the plots exhibited signs of weathering during the 2017 annual inspection, with no significant changes from the previous 2016 annual inspection. Comparisons to the initial 2010 rock quality plot photographs indicate very little (if any) additional rock degradation since monitoring began in 2010. Only one of the several rock types used in the erosion protection riprap layer continues to show signs of degradation. The minimal rock degradation observed to date has not reduced the effectiveness of the riprap cover. Rock quality monitoring plots will continue to be visually monitored annually to ensure that the riprap continues to protect the integrity of the disposal cell.

3 Site Observations and Findings

To conduct the annual inspection, the DOE created an inspection checklist. The checklist included requirements to inspect the fences, boundary monuments, site markers, perimeter signs, entrance sign, entrance gates, and the eight rock quality monitoring plots. Also, the DOE inspectors were required to check the condition of the disposal cell top, side slopes, diversion channels, the area between the cell and the site boundary, the outlying areas, and vegetation.

During the inspection, the DOE observed that the site fences and postings were intact, all markers and monuments were in place, the entrance and personnel gates were intact. The disposal cell appeared to be in excellent condition. The DOE inspectors took pictures of the eight rock quality monitoring plots for comparison to previous inspections.

The NRC inspector measured the ambient gamma exposure rates using a hand-held survey meter (Ludlum Model 19, NRC No. 015530, calibrated to radium-226, calibration due date of July 25, 2018). With a background of about 15 microRoentgens per hour ($\mu\text{R/hr}$), the highest measurement on top of the disposal cell was noted to be 20 $\mu\text{R/hr}$. The inspector noted that the radiation readings were 50 $\mu\text{R/hr}$ at the northwest end within the fenced boundary. The inspector attributed these readings to the adjacent EnergySolutions' low-level radioactive waste cell in which active work was in progress.

4 Conclusions

The NRC inspector concluded that the DOE inspectors conducted the site inspection in accordance with LTSP and 10 CFR 40.27 requirements. The condition of the site was nearly identical to the condition that was reported during the previous year's DOE inspection, as documented in the 2017 annual report.

5 Meeting Summary

The NRC inspector participated in a safety meeting and review of the Radiation Work Permit with the EnergySolutions staff and DOE's site manager and contractors prior to the site inspection. During this meeting, the participants discussed topics such as site status, inspection plan, and potential hazards.

6 Persons Contacted

J. Nguyen, Site Manager, DOE Office of Legacy Management
S. Hall, Site Lead, Navarro Research and Engineering, Inc.
T. Allen, Safety Department, EnergySolutions
V. Rogers, Compliance Department, EnergySolutions



Figure 1: Site marker on top of Salt Lake City disposal cell



Figure 2: Top of disposal cell



Figure 3: One of the eight rock quality monitoring plots

NRC OBSERVATIONAL SITE VISIT AT THE SALT LAKE CITY, UTAH DISPOSAL SITE,
DATED JUNE 22, 2018

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ADAMS ACCESSION NUMBER: ML18173A168

<input checked="" type="checkbox"/> SUNSI Review By: LMG	ADAMS <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive	Keyword: NRC-002
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