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

September 20, 2022

MEMORANDUM TO: Docket File WM-00061

THROUGH: Gregory G. Warnick, Chief
Decommissioning, ISFSI and Operating Reactor Branch
Division of Radiological Safety and Security

Signed by Warnick, Gregory on 09/20/22

FROM: Robert J. Evans, PhD, Senior Health Physicist
Decommissioning, ISFSI and Operating Reactor Branch
Division of Radiological Safety and Security

SUBJECT: OBSERVATIONAL SITE VISIT AT GUNNISON DISPOSAL SITE

On September 7, 2022, the U.S. Nuclear Regulatory Commission's (NRC) Region IV Office conducted an observational site visit at the U.S. Department of Energy's (DOE) Gunnison Disposal Site in Gunnison County, Colorado. This site visit was conducted in accordance with the guidance provided in NRC Memorandum dated April 17, 2012 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML120930240) as amended by Memorandum dated May 20, 2019 (ML19137A005). The purpose of the site visit was to observe DOE's routine, annual inspection of the Gunnison disposal site. Enclosed to this memorandum is the NRC's trip report for this site visit.

In summary, DOE conducted the annual inspection in accordance with the requirements specified in the NRC-accepted Long-Term Surveillance Plan dated April 1997 (ML15215A681). The disposal cell and associated drainage and diversion channels appeared to be in excellent condition. No significant regulatory issues or safety concerns were identified during the site visit.

Docket No. WM-00061
License: General License under 10 CFR 40.27

Enclosure:
NRC Trip Report

cc: M. Hurt, Site Manager, DOE

CONTACT: Robert M. Evans, DRSS/DIOR
817-200-1234

OBSERVATIONAL SITE VISIT AT GUNNISON DISPOSAL SITE DATED SEPTEMBER 20, 2022

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ADAMS ACCESSION NUMBER: **ML**

■ SUNSI Review By: *RJE*	ADAMS ■ Yes ☐ No	■ Non-Sensitive ☐ Sensitive	■ Publicly Available ☐ Non-Publicly Available	Keyword: NRC-002

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	WM-00061
License:	General license under 10 CFR 40.27
Report:	WM-00061/2022-001
Licensee:	U.S. Department of Energy
Facility:	Gunnison Disposal Site
Location:	Gunnison County, Colorado
Date:	September 7, 2022
Inspector:	Robert J. Evans, PhD, CHP, PE, Senior Health Physicist Decommissioning, ISFSI and Operating Reactor Branch Division of Radiological Safety and Security
Accompanied by:	Binesh Tharakan, Technical Assistant Division of Radiological Safety and Security
Approved by:	Gregory G. Warnick, Chief Decommissioning, ISFSI and Operating Reactor Branch Division of Radiological Safety and Security
Attachment:	Photographs Taken at the Gunnison Disposal Site

Enclosure

NRC Trip Report

1 Background

The Gunnison mill operated from 1958-1962. The mill was located approximately one-half mile southwest of the City of Gunnison, Colorado. The mill processed about 540,000 tons of uranium ore. During operations, the radioactive mill tailings were stored adjacent to the mill. The tailings covered about 39 acres of the 61.5-acre property.

The U.S. Department of Energy (DOE) began construction of a permanent tailings disposal cell in 1992 at a site situated about six miles east of Gunnison. The disposal cell was constructed on land formerly controlled by the Bureau of Land Management. Between 1992 and 1995, DOE removed the tailings material, contaminated demolition debris, and contaminated soils from the mill site and placed the material in the new disposal cell. The DOE also collected contaminated vicinity property material and placed this material into the disposal cell. The DOE completed the construction of the disposal cell in 1995.

The Gunnison disposal cell currently occupies 29 acres of the 115-acre property. About 1.14 million tons (740,000 cubic yards) of material was placed in the disposal cell. The total amount of radium-226 encapsulated in the cell was estimated to be 175 curies. The cell is pentagon-shaped and measures approximately 1,200 feet by 1,140 feet.

The cell was constructed partially below grade and rises to a maximum height of 50 feet above the ground surface. The 9-foot cover includes a radon barrier, bedding layer, frost protection layer, second bedding layer, and rip-rap erosion-protection layer. A rip-rap apron surrounds the perimeter of the disposal cell, to channel surface water runoff away from the cell. The DOE also installed a rock-lined, 1,800-foot intercept ditch at the upslope portion of the site to divert surface water flow away from the cell.

The Gunnison Disposal Cell is classified as a Title I site under the Uranium Mill Tailings Radiation Control Act (UMTRCA) 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 LTSP for the Gunnison Disposal Site was submitted to the NRC for review in 1996, and the final version was issued in April 1997 (ML15215A681). The NRC accepted the LTSP by letter dated September 11, 1997 (ML2021G592).

2 Site Status

The groundwater protection monitoring plan at the Gunnison Disposal Site consists of sampling only. In accordance with Section 2.6.1 of the LTSP, the monitoring well network includes six point-of-compliance wells and two background wells. Eight additional wells were monitored for groundwater levels only. Table 4.1 of the LTSP provides the sampling frequency. In accordance with the table, after 2006, the wells were required to be sampled once every five years.

The two most recent sampling events occurred in July 2016 and July 2021. The 2016 data validation package was provided to the NRC in October 2016 (ML16362A217). The 2021 data validation package had not been submitted to the NRC at the time of the site

visit, but the sampling results were provided in DOE's 2021 site inspection report (ML22059B058). The 2016 and 2021 sample results indicate that the uranium concentrations in the point-of-compliance wells remained below the action level, suggesting that groundwater has not been contaminated by leakage from the disposal cell. The next sampling event is scheduled for July 2026. As noted in Section 4.1 of the LTSP, DOE can adjust the sampling frequency based on the effectiveness of disposal cell performance; although, a change in sampling frequency will require NRC acceptance.

The groundwater levels are measured at each well during sampling events. The 2021 site inspection report indicated that the groundwater elevations were increasing in most wells. The causes of the elevation increases were not known, but DOE planned to continue its review to identify and understand the possible causes.

The LTSP, Section 3.4, provides instructions for DOE inspectors to review two site-specific concerns. The first concern is future expansion of the adjacent Gunnison County landfill and its impact on the disposal cell. The DOE staff documented the status of this concern in each annual report. The 2021 site inspection report notes that landfill operations continued approximately 400 feet north of the site. Although landfill activities did not affect the site at that time, the report indicated that DOE inspectors will continue to monitor the location and level of activity occurring near the generally licensed disposal cell.

The second concern involved freeze-thaw effects on the erosion protection material. In response to this concern, DOE inspectors closely monitored selected test areas, to inspect the rock for deterioration due to extreme temperature changes. Section 3.4 of the LTSP states that the need for special surveillance will be re-evaluated at year 20 (2017). As noted in the 2017 annual inspection report (ML18067A215), Section 8.4.2.2, "no rock degradation has been observed in the test areas since monitoring began in 1998, therefore, in accordance with the LTSP the test areas will no longer be monitored." The NRC did not question this decision in its annual review of the 2017 inspection, as documented in the NRC's letter to DOE dated May 14, 2018 (ML18109A513). Although DOE suspended its detailed review of the freeze-thaw effects on the erosion protection material in 2017, DOE inspectors continued to monitor rock degradation across the disposal cell as part of its annual inspections.

Site features include 11 boundary monuments, three survey monuments, two site markers, 45 perimeter warning signs, one site entrance sign, an access gate, two background wells, six point-of-compliance wells, and eight groundwater level monitor wells. The LTSP requires DOE to inspect the Gunnison Disposal Site once every calendar year. The DOE inspectors observe the status of these site features during each annual inspection.

The DOE conducted the last site inspection on September 7, 2021. At that time, the disposal cell and associated diversion and drainage structures were noted to be in excellent condition and functioning as designed. No evidence of erosion, settling, slumping, or rock degradation was identified. Based on the results of the inspection, several perimeter signs were replaced, isolated patches of vegetation were treated, several prairie dog colony holes were plugged, and one monitor well concrete base was repaired.

3 Site Observations and Findings

The DOE staff conducted the annual inspection on September 7, 2022. The purposes of the annual inspection were 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 implementing the annual inspection are provided in Section 3 of the 1997 LTSP.

The LTSP requires the DOE inspectors to observe three areas: the top and side slopes 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 disposal cell (Figure 1), apron (Figure 2), and diversion channels as well as site features such as fences, boundary monuments, site markers (Figure 3), perimeter signs, and entrance gate. The NRC inspector observed the DOE inspectors implementing the site-specific checklist.

The inspector observed that the disposal cell and surrounding apron and diversion trenches appeared to be in excellent condition. No erosion or slumping was observed on or around the cell. Although minor amounts of vegetation were observed on the cell cover and apron, the vegetation of concern was recently treated by DOE representatives (Figures 4 and 5). Prairie dog holes were observed near the main gate and other locations, but DOE staff documented these features and planned to conduct follow up actions (Figure 6).

As noted above, the LTSP requires the DOE inspectors to observe the potential for onsite impacts from the operation of the Gunnison County landfill. At the time of the site inspection, the landfill was in service, but landfill activities did not appear to have an impact on the disposal site. The DOE inspectors also reviewed the freeze-thaw effects on the rocks as part of the general walk-over inspection.

The NRC inspector conducted a radiological survey using a Ludlum Model 2401-S survey meter (serial number 182780 with a calibration due date of May 6, 2023, calibrated to cesium-137). With a background of about 13 microRoentgen per hour (μR/hr), as measured on the access road to the site, measurements within the 115-acre property ranged from 12-15 μR/hr. In summary, the ambient gamma radiation measurements across the site were indistinguishable from background levels, indicating that no residual radioactivity or naturally occurring radioactivity was identified at the site.

4 Conclusions

The DOE inspectors conducted the site inspection in accordance with the site-specific checklist, LTSP, and 10 CFR 40.27 requirements. The disposal cell, adjacent apron, and diversion ditch structures appeared to be in excellent condition with no erosion, slumping, or large vegetation on the cell. The two site-specific concerns, the impacts due to the nearby landfill and negative freeze-thaw effects on cover rock, were not observed during this site inspection. The ambient gamma radiation levels across the site were indistinguishable from background levels. The DOE previously identified rising water levels in selected monitor wells, and the DOE planned to continue with its investigation of the reasons for the increases in water levels.

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 physical hazards. The inspector discussed the final site observations with DOE staff at the conclusion of the onsite visit.

6 Persons Contacted

M. Hurt, DOE, Site Manager
P. Kerl, DOE, Team Lead
J. Lobato, RSI Entech
D. Atkinson, RSI Entech
M. Cosby, UMTRCA Manager, Colorado Department of Public Health and Environment

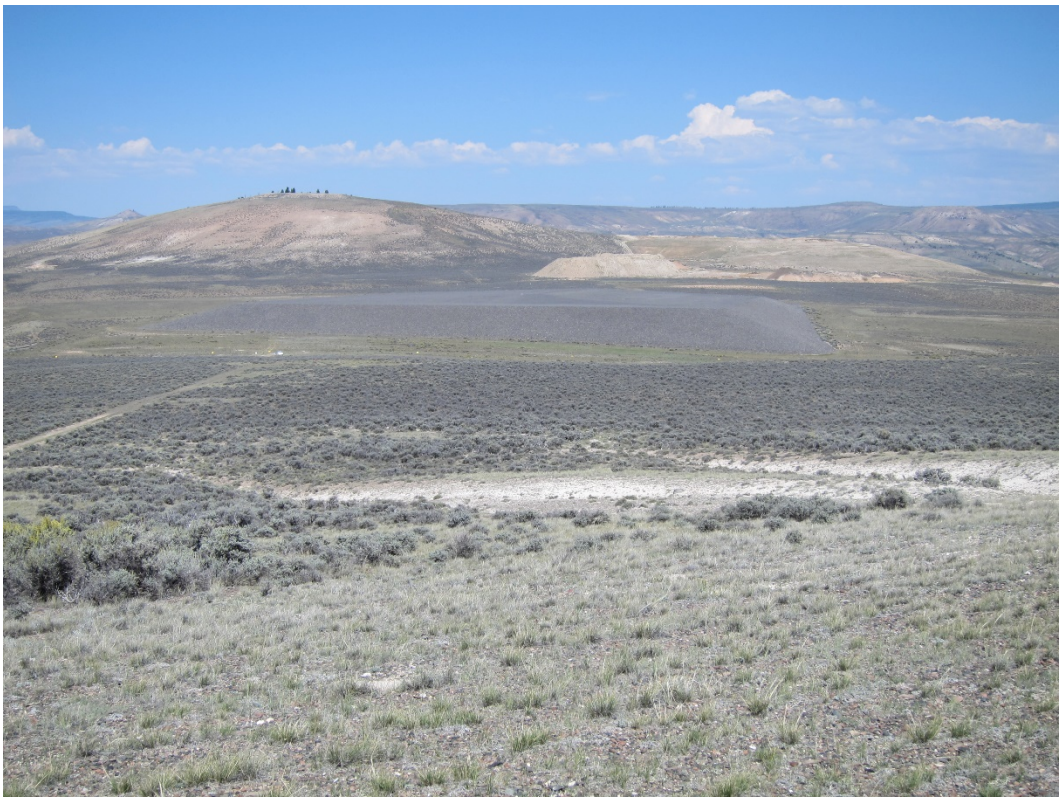

Figure 1: Gunnison Disposal Site as seen from nearby hill

Figure 2: Rock apron with disposal cell on left (looking northeast)

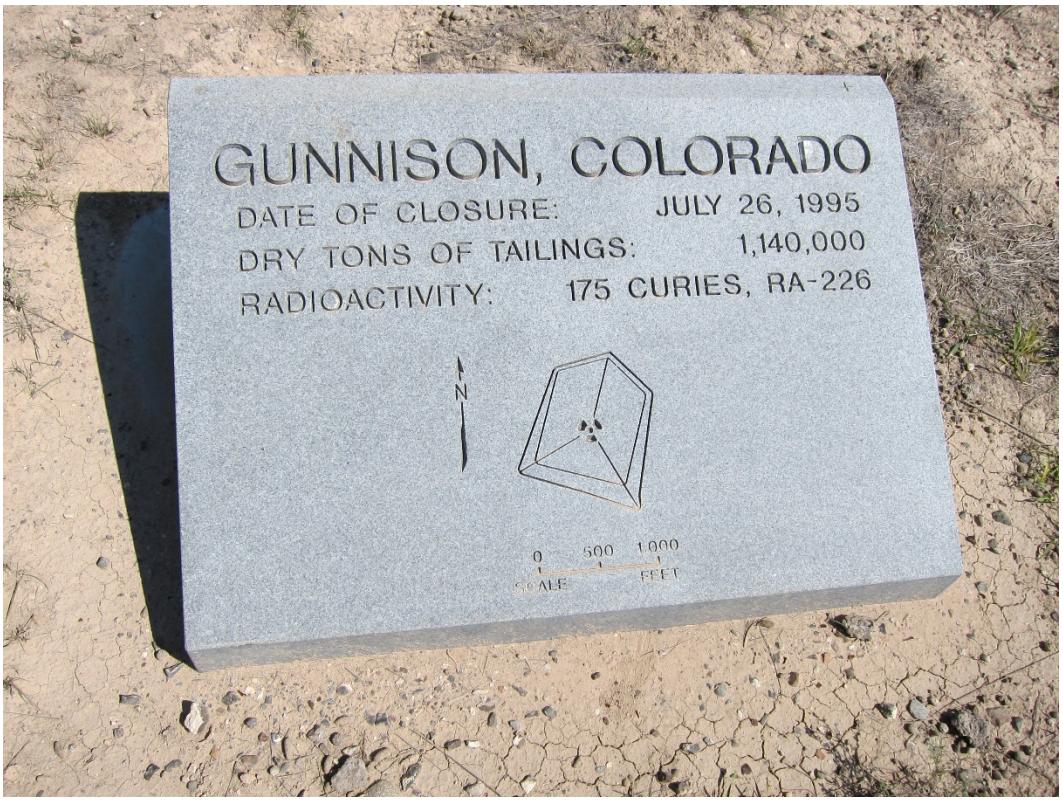

Figure 3: Site marker near front gate


Figure 4: Crest of disposal cell with light vegetation

Figure 5: Deep-rooted plant recently treated with herbicide

Figure 6: Prairie dog hole near front gate