



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

September 15, 2022

MEMORANDUM TO: Docket File No. WM-00062

THROUGH: Gregory G. Warnick, Chief  Signed by Warnick, Gregory
Decommissioning, ISFSI and Operating Reactor Branch on 09/15/22
Division of Radiological Safety and Security

FROM: Linda M. Gersey, Health Physicist
Decommissioning, ISFSI, and Operating Reactor Branch
Division of Radiological Safety and Security

SUBJECT: OBSERVATIONAL SITE VISIT AT RIFLE COLORADO
DISPOSAL SITE 2022-001

On August 11, 2022, the U.S. Nuclear Regulatory Commission (NRC), Region IV Office, conducted an observational site visit at the U.S. Department of Energy's (DOE) Rifle, Colorado, UMTRCA Title I Disposal Site. 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 Rifle disposal site in accordance with the instructions provided in the NRC-accepted Long-Term Surveillance Plan (LTSP) dated November 1997 (ADAMS No. ML15201A240). 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.

Docket No. WM-00062

Enclosure:
NRC Trip Report

cc: N. Keller, Site Manager, DOE

CONTACT: Linda M. Gersey, DIOR/DRSS
817-200-1299

OBSERVATIONAL SITE VISIT AT RIFLE COLORADO DISPOSAL SITE 2022-001 DATED
SEPTEMBER 15, 2022

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ADAMS ACCESSION NUMBER: **ML22258A246**

<input checked="" type="checkbox"/> SUNSI Review By: <i>LMG</i>	ADAMS <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive	<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	Keyword: NRC-002
OFFICE	DRSS: DIOR	BC: DIOR		
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**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Docket: WM-00062

Report: WM-00062/2022-001

Licensee: U.S. Department of Energy

Facility: Rifle Disposal Site

Location: Garfield County, Colorado

Date: August 11, 2022

Inspector: Linda M. Gersey, Health Physicist
Decommissioning, ISFSI, and Operating Reactor Branch
Division of Radiological Safety and Security

Accompanied By: David Camp, Summer Intern
Decommissioning, ISFSI, and Operating Reactor Branch
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 Rifle Disposal Site

NRC Trip Report

1 Background

The Rifle disposal site, also known as the Estes Gulch disposal cell, was constructed to receive wastes from two former processing sites near Rifle, Colorado. Both processing sites were previously owned by Union Carbide Corporation. The Old Rifle mill processed uranium from 1946-1958. In 1958, uranium processing operations were transferred to the New Rifle mill, and the Old Rifle mill was shut down. The New Rifle mill processed uranium until 1972. Approximately 350,000 tons (259,000 cubic yards) of tailings was produced at the Old Rifle mill, and approximately 2.7 million tons (2 million cubic yards) of tailings, ore, and upgrader products were produced at the New Rifle mill.

The U.S. Department of Energy (DOE) began constructing the Rifle disposal cell in 1993. In 1994-1995, DOE placed uranium mill tailings, contaminated mill debris, windblown material, and vicinity property material into the Rifle disposal cell. The construction of the disposal cell was completed in 1996. About 5 million tons (3.7 million cubic yards) of material, with a total activity of 2,738 curies of radium-226, were encapsulated in the disposal cell.

The Rifle disposal cell occupies approximately about 71 acres of the 205-acre property. The cell was constructed partially below grade. The cell is located on a hillside and follows the slope of the hill. The cover consists of a radon barrier, lower sand filter layer (for drainage), frost protection layer, upper filter layer, and erosion protection layer. The erosion protection layer consists of rock riprap on the top cover and slide slopes. A riprap apron and toe ditch are located at the downgradient edge of the disposal cell to help route water away from the cell. An unlined intercept trench was constructed at the uppermost portion of the cell to divert surface flow away from the cell. The cell is designed to promote rapid runoff of precipitation to minimize the potential for infiltration of rainwater into the cell.

The Rifle 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 LTSP was submitted to the NRC in November 1997 (ADAMS No. ML15201A238) and was accepted by the NRC on January 13, 1998 (ADAMS No. ML15195A435).

At the Rifle disposal site, the groundwater in the formation below the cell is characterized as limited use, which means that the groundwater is not a current or future source of potable water due to low yields and poor water quality. Accordingly, there are no requirements in the LTSP for monitoring the groundwater at the Rifle site.

In accordance with the LTSP, the DOE monitors pore-water levels in the disposal cell at standpipes SP-02 and SP-03, which are installed at the downgradient end of the disposal cell on the south side slope. This monitoring is performed to ensure that pore water in the disposal cell does not rise above a high-density polyethylene liner that was installed in the toe of the disposal cell at an elevation of 6022.50 ft during original construction. The bottom of standpipe SP-01 is at an elevation of 6023.95 ft; as such, it continues to be dry and does not require continuous monitoring. The disposal cell

dewatering system (pump) is activated when the interior pore-water elevation reaches 6018.55 ft. Circumstances other than pore water accumulation that triggers water accumulation includes (1) periods when solar-powered pumps are nonoperational (for recovery tests or maintenance) or (2) when temperatures are below freezing, preventing the pump from operating. Pore-water levels in standpipes SP-02 and SP-03 have remained below the geotextile liner at 6020 ft, preventing water from overtopping the disposal cell liner. A contingency plan for control of pore-water levels at the toe of the disposal cell was appended to the LTSP. The plan included the installation of a dewatering system and a retention pond to use when water levels reach an elevation of 6016.55 ft and the solar-powered dewatering pump is initiated at a water level elevation of 6018.55 ft.

Real-time disposal cell water elevations collected in 2018 (using pressure transducers and dataloggers) continued to indicate that daily maximum or semistatic pore-water levels in standpipes SP-02 and SP-03 exceed the 6018.55 ft pump action level. In 2019, the DOE modified the seasonal pumping regimen for year-round pumping while a long-term solution is evaluated and implemented. Data fluctuations for both standpipes observed from 2018 to 2021 are the result of partial overnight recharge due to well inefficiencies. Downhole video taken in 2020 for both standpipes revealed fouling in the perforated interval. Redevelopment of standpipe SP-02 to remove mineral scale and biofouling was completed in December 2020. Initial testing results indicate an increase in production volume from standpipe SP-02 of approximately 22%. Downhole video in standpipe SP-03 also identified approximately 7.6 ft of 6- to 10-inch diameter rock riprap at the bottom of the standpipe. Potential methods to remove the rock and redevelop the standpipe are being considered to increase production.

In fall 2020, an evaluation of the evaporation pond liner was conducted by a professional geosynthetic liner installation and inspection company. Two minor holes, approximately 2 inches in diameter, were identified at the top slope of the liner and repaired after the inspection. Evaluation of the liner by a testing laboratory indicated the liner is in good condition for its age. The DOE plans to replace the pond liner in fiscal year 2024 barring further damage that would necessitate earlier replacement.

2 Site Status – Recent DOE Activities

The LTSP requires DOE to conduct annual inspections of the Rifle Disposal Site. The DOE conducted the last site inspection on August 31, 2021. At that time, the disposal cell and all associated surface water diversion and drainage structures were in good condition and functioning as designed. No evidence of subsidence, differential settling, or slumping was identified. Other than one deep-rooted rabbitbrush plant on the cell cover, no other deep-rooted plants or noxious weeds were observed. The DOE inspectors noted that leachate water continues to be pumped from the toe of the disposal cell into the lined evaporation pond. The inspectors also noted that evaporation pond liner and the pond were in good condition at the time of the inspection. Minor fence repairs and sign replacements were necessary, but no other maintenance issues were identified.

In March 2021, the solar-powered pumping system for the three standpipes was upgraded to provide additional operation of the pumps by increasing electrical storage ability. By adding batteries to store solar-generated electricity, the pumps are able to operate throughout the night and on overcast days. This should yield a more consistent

and lower pore-water elevation and increase annual dewatering volume. The pumping system will continue to have limited availability in winter because aboveground effluent lines are susceptible to freezing. The DOE is organizing an ongoing collaborative initiative with the National Laboratory Network to identify innovative approaches to perform pore-water source investigation and accumulation mitigation strategies for the site.

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, evaporation pond, and standpipes. In addition, 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.

The NRC inspectors observed the DOE site inspectors implementing the site-specific checklist. The NRC inspectors observed that the disposal cell appeared to be in excellent condition. No erosion or slumping was observed on or around the cell. At the time of the onsite inspection, leachate water was being pumped from the toe of the cell into the evaporation pond. The water was being pumped from standpipes MW-02 and MW-03, located in the southeastern corner of the cell. A solar/battery powered pump was being used to transfer the water from the cell to the evaporation pond. The flow rate was estimated to be roughly 1-2 gallons per minute. The evaporation pond contained fluid but continued to have sufficient freeboard space. Data loggers were in service recording the water levels in standpipes MW-02 and MW-03.

The NRC inspectors conducted radiological surveys using a Thermo Scientific RadEye-G Gamma Survey Meter (SN 30932, calibration due date of 11/12/2022). With a background of 12-18 microRoentgens per hour ($\mu\text{R/hr}$), as measured on the access road to the site, measurements within the 205-acre property ranged from 12-17 $\mu\text{R/hr}$. All gamma survey measurements were at background levels.

As required by the LTSP, the DOE inspectors plan to issue a site inspection report. The report will be issued to the NRC, in conjunction with other Title I site inspections that are conducted in 2022, at a later date.

4 Conclusions

The NRC inspectors 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. The DOE continued to collect leachate water from two standpipes.

5 Meeting Summary

The NRC inspectors 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 NRC inspectors discussed the final site observations with DOE staff at the conclusion of the onsite visit.

6 Persons Contacted

N. Keller, DOE Site Manager
M. Franke, LMS Site Lead
M. Kautsky, DOE UMTRCA Program Manager
M. Cosby, State of Colorado

Figure 1: South View of Rile Disposal Site



Figure 2: Evaporation Pond at Rifle Disposal Site



Figure 3: Solar and Battery Equipment for Standpipe Pumps

