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

July 29, 2015

MEMORANDUM TO: Docket File WM-00062

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

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

SUBJECT: OBSERVATIONAL SITE VISIT AT THE RIFLE DISPOSAL SITE

On June 30, 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) Rifle disposal site in Garfield County, Colorado. This site visit was conducted in accordance with guidance provided in the NRC Memorandum dated April 17, 2012 (ADAMS accession number ML120930240). The purpose of the site visit was to observe DOE's routine, annual inspection of the Rifle 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 November 1997 (ML15201A238). The disposal cell appeared to be in excellent condition. No significant regulatory issues or safety concerns were identified during the site visit.

Docket: WM-00062

Enclosure:
NRC Trip Report

cc: R. Bush, Site Manager
DOE Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

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DATE	07/24/15	07/29/15			

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	WM-00062
Report:	WM-00062/15-001
Licensee:	U.S. Department of Energy
Facility:	Rifle Disposal Site
Location:	Garfield County, Colorado
Date:	June 30, 2015
Inspector:	Robert J. Evans, Ph.D., C.H.P., P.E., Senior Health Physicist Repository and Spent Fuel Safety Branch Division of Nuclear Materials Safety
Approved by:	Ray L. Kellar, P.E., Chief Repository and Spent Fuel Safety Branch Division of Nuclear Materials Safety
Attachment:	Photographs Taken at the Rifle Disposal Site

Enclosure

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. This site is located approximately 0.3 miles east of the City of Rifle. In 1958, uranium processing operations were transferred to the New Rifle mill, and the Old Rifle mill was shut down. The New Rifle mill was located approximately 2 miles southwest of the City of Rifle. 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. The disposal cell is located approximately 6 miles north of the New Rifle mill site. The 205-acre disposal cell property was transferred by the Bureau of Land Management to DOE in 1991. 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 rip-rap on the top cover and slide slopes. A rip-rap apron and toe ditch are located at the down-gradient 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 (ML15201A238) and was accepted by the NRC on January 13, 1998 (ML15195A435).

During the design phase of the disposal cell, DOE and the NRC were concerned that transient tailings drainage and surface water infiltration would collect near the toe of the cell. For these reasons, the cell design includes a temporary synthetic liner for collecting internal leachate drainage and three standpipes for monitoring and removing standing water in the toe of the cell. An evaporation pond was constructed in 2001 for temporary storage and evaporation of water removed from the toe of the cell. This leachate drainage system is designed to maintain the water level in the base of the cell below a

certain elevation. Currently, leachate fluid is collected and pumped from one standpipe (MW-03).

The DOE performed an evaluation of the transient drainage and slope stability in 2010. The DOE subsequently submitted the evaluation to the NRC by letter dated October 22, 2014 (ML14297A347; ML14297A348). The results of the study indicate that continued pumping to remove transient drainage will last for many years, and that the stability of the slope was not a concern. In accordance with the LTSP, pumping will continue until the water level in the standpipes stabilizes at an elevation of 6,014 feet above sea level, or lower. The leachate water collection system and associated evaporation pond will be decommissioned only when the water level remains below this elevation, and trending down, for an extended period of time.

Following completion of cell construction activities in 1996, DOE implemented a re-vegetation program around the periphery of the cell. In accordance with an internal DOE guidance document, the DOE conducted a baseline soil and vegetation characterization at the Rifle disposal cell site in 2013. The study included a review of the plant species present, general vegetation composition, infestations of noxious weeks, baseline soil characteristics, and erosional features. The study was conducted, in part, in response to DOE's discovery of cattle grazing within the partially fenced property. The results of this study were submitted to the NRC by letter dated October 27, 2014 (ML14304A099). The NRC acknowledged receipt of this characterization study by letter dated December 1, 2014 (ML14324A782).

2 Site Status

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.

However, routine groundwater and surface water monitoring continues at the Old Rifle and New Rifle sites. The operation of the two mill sites resulted in contamination of the alluvial aquifer beneath the sites. The contaminants of concern include uranium at both sites. The DOE currently conducts sampling twice per year. The proposed groundwater remediation strategy for both sites is no remediation with the application of alternate concentration limits (see DOE letters dated May 30, 2013; ML13156A414 and ML13156A415). The State of Colorado acquired the Old Rifle and New Rifle sites in 1988 and transferred ownership of the two sites to the City of Rifle in 2000 and 2004, respectively.

The LTSP requires DOE to conduct annual inspections of the Rifle disposal site. The annual inspection includes a requirement for DOE staff to measure and evaluate the leachate levels in the standpipes located in the toe of the disposal cell. The DOE inspectors are also instructed to observe the status of vegetation around the cell, to determine if previous re-vegetation efforts continue to be successful. Site features include 20 boundary monuments, three survey monuments, two site markers, 26 perimeter signs, an entrance sign, and a site access gate. The DOE inspectors typically observe the status of site features during each annual inspection.

The DOE conducted the last site inspection on June 12, 2014. 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 a few small pine trees on the south slope of the disposal cell, no other deep-rooted plants or noxious weeds were observed. The DOE plans to continue to monitor the pine trees and will implement corrective actions as needed. 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 was inspected and repaired in early-2014, and the pond was in good condition at the time of the inspection. Minor fence repairs and sign replacements were necessary, but no other maintenance issues were identified.

The DOE conducts water level monitoring and informal sampling of the leachate water. The pumping system operates seasonally, typically from June through September of each year. As required by the LTSP, data loggers are used to record the water levels in standpipes MW-02 and MW-03. Records indicate that the water level in the toe of the cell has remained below the action level of elevation 6,016-feet above mean seal level since 2007. Since 2001, the uranium concentration in the fluid has generally increased, from 1 milligram per liter to approximately 3.5 milligrams per liter. As noted earlier, this fluid is routed to the onsite evaporation pond for disposal.

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. Detailed instructions for the annual inspection are provided in Section 3 of the LTSP.

The DOE inspectors conducted its annual site inspection on June 30, 2015. The LTSP requires 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 integrity of the cell as well as site fences, boundary monuments, site markers, perimeter signs, and entrance gates. The NRC inspector observed the DOE site inspectors implementing the site-specific checklist.

The DOE continued to monitor rock degradation on the cell cover. A small percentage of the rock was previously noted to be degraded. If increased rock degradation becomes apparent, one or more study plots may be established. The NRC inspector confirmed that a small percentage of the rock appeared to be degrading.

As noted in previous DOE inspection reports, minor erosion was identified at various locations around the cell. The DOE staff verbally reported that none of the locations with previously identified erosion appeared to be different from the 2014 inspection. In addition, heavy grazing by cattle was observed in certain areas in 2013-2014, but during the 2015 inspection, these areas did not appear to have been as heavily grazed as noted in previous years.

The inspector 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 standpipe MW-03, located in the southeastern corner of the cell. A solar-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 plenty of freeboard space for extra fluid. Data loggers were in service recording the water levels in standpipes MW-02 and MW-03.

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 2015, at a later date.

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 13-15 microRoentgens per hour (μR/hr), as measured on the access road to the site, measurements within the 205-acre property ranged from 12-17 μR/hr. In summary, all measurements were at background levels, and no naturally occurring radioactive material, tailings, or mill wastes were identified.

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. The DOE continued to collect leachate water from one standpipe, and the DOE plans to continue pumping leachate water from the cell for the foreseeable future.

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

R. Bush, Site Manager, U.S. Department of Energy
M. Cosby, Environmental Protection Specialist, Colorado Department of Public Health and Environment
R. Dayvault, Site Lead, Stoller Newport News Nuclear (SN3)
S. Woods, Lead, Stoller Newport News Nuclear (SN3)

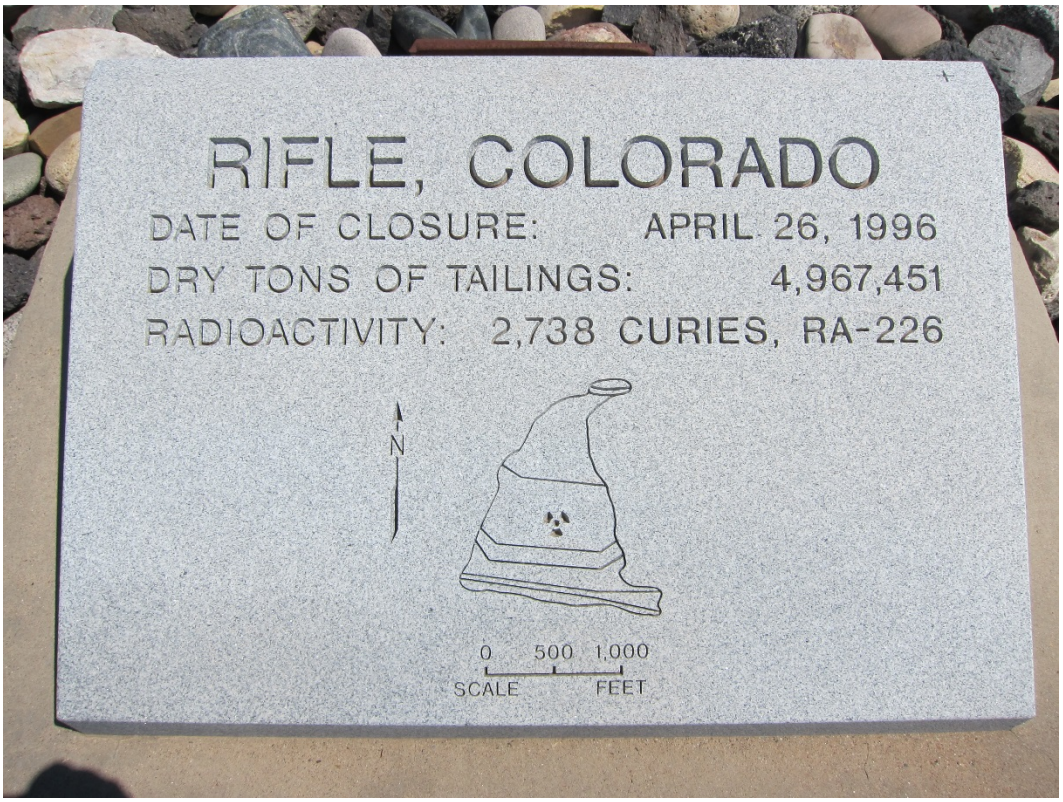

Figure 1: Rifle disposal site marker

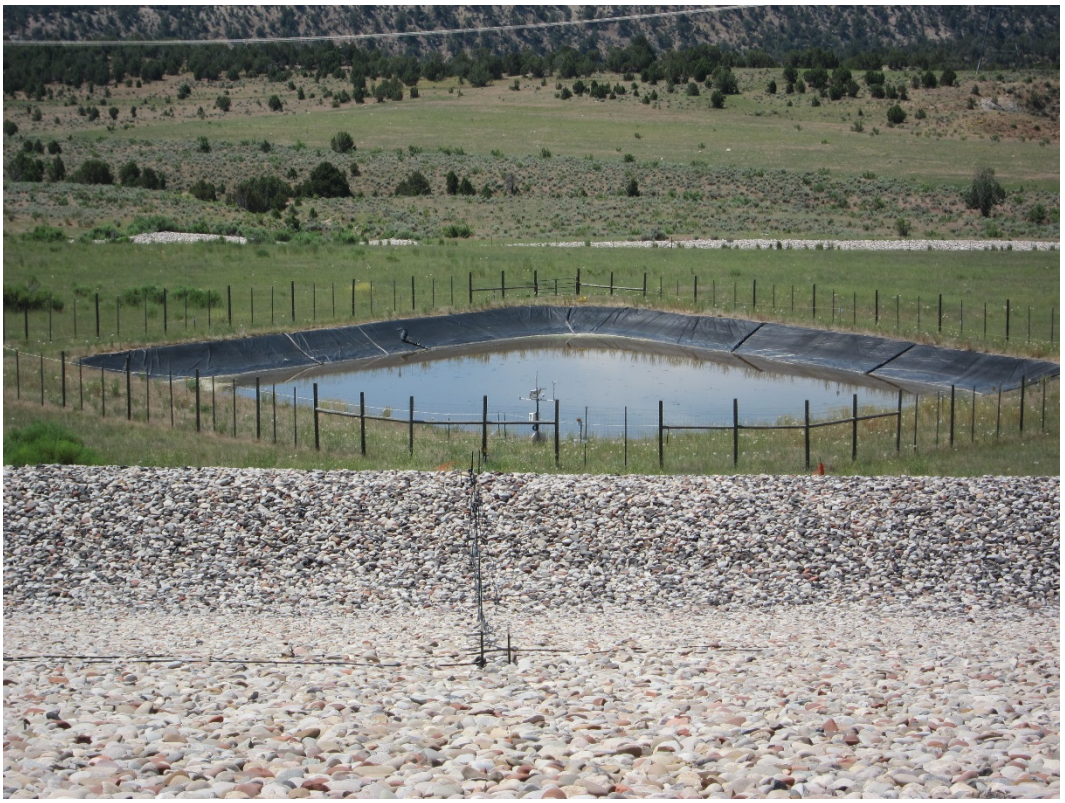
Figure 2: Evaporation pond as seen from disposal cell (looking north to south)

Figure 3: Disposal cell cover (looking north to south)

Figure 4: Disposal cell cover (looking southwest to northeast)

Figure 5: Toe ditch at base of cell (looking west to east)

Figure 6: Monitor Well MW-03 in southeastern corner of disposal cell