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

May 12, 2017

MEMORANDUM TO: Docket File WM-00068

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

FROM: Linda Gersey, Health Physicist ***/RA by RJEvans Acting For/***
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

SUBJECT: NRC OBSERVATIONAL SITE VISIT AT THE GREEN RIVER, UTAH DISPOSAL SITE

On March 21, 2017, the U.S. Nuclear Regulatory Commission (NRC), Region IV Office, conducted an observational site visit at the U.S. Department of Energy's (DOE) Green River disposal site, located in Emery County, Utah. This observational site visit was conducted in accordance with NRC guidance dated September 7, 2012 (ADAMS Accession No. ML12213A418). The purpose of the site visit was to observe the DOE's routine inspection efforts at the Green River site. 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 Long-Term Surveillance Plan dated July 1998 (ML17128A459). No significant regulatory issues or safety concerns were identified during the site visit.

Docket: WM-00068

Enclosure:
NRC Trip Report

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NRC OBSERVATIONAL SITE VISIT AT THE GREEN RIVER, UTAH DISPOSAL SITE – DATED MAY 12, 2017

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ADAMS ACCESSION NUMBER: ML17111A586

■ SUNSI Review By: **LMG**	ADAMS ■ Yes ☐ No	■ Publicly Available ☐ Non-Publicly Available	■ Non-Sensitive ☐ Sensitive	Keyword: NRC-002
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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	WM-00068
Report:	WM-00068/17-001
Licensee:	U.S. Department of Energy
Facility:	Green River Disposal Site
Location:	Emery County, Utah
Date:	March 21, 2017
Inspector:	Linda M. Gersey, Health Physicist 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 Green River Disposal Site

Enclosure

NRC Trip Report

1 Background

The Green River disposal site is located about 0.5 mile east of the Green River and 1.5 miles southeast of the city of Green River, Utah. The site consists of an engineered disposal cell and surrounding property where a former uranium mill and tailings pile were previously located.

Union Carbide Corporation constructed the uranium mill in 1957 and operated the facility from March 1958 through January 1961. Union Carbide owned the mill site property until the State of Utah acquired ownership in 1988. The U.S. Department of Energy (DOE) owns the disposal site, and the State of Utah owns the rest of the processing site property. The mill operated as an upgrading facility for uranium ore. During its three years of operation, the mill processed 183,000 tons of ore and generated an estimated 114,000 cubic yards of radioactive tailings, a predominantly sandy material that covered about 9 acres to an average depth of 7 feet.

The processing site was remediated from November 1988 through September 1989, and all mill tailings and other contaminated materials were stabilized in an onsite disposal cell. The cell also received contaminated material from 17 vicinity properties. The area of the former tailings pile and all areas disturbed at the site during remedial action were backfilled, graded to promote surface drainage, and re-vegetated. The former processing site area has no current use. Several of the mill buildings were cleaned up and remain on the site. These buildings are abandoned and in disrepair.

The Green River disposal site is classified as a Title I site under the Uranium Mill Tailings Radiation Control Act of 1978. The U.S. DOE maintains long-term custody of the site under the U.S. Nuclear Regulatory Commission's (NRC's) general license requirements specified in 10 CFR 40.27. The site was transferred from the State of Utah to the DOE in 1998. The Long-Term Surveillance Plan (LTSP) explains how DOE will fulfill the general license requirements specified in 10 CFR 40.27. The current LTSP is dated July 1998. By letter dated August 20, 1998, the NRC accepted the LTSP.

2 Site Status

The last annual DOE inspection of the Green River Disposal Site was conducted in March 2016. The DOE inspectors did not identify any significant problems at the site. The disposal cell was found to be in excellent condition. The DOE staff identified missing perimeter signs that were subsequently replaced.

The DOE has been monitoring groundwater and surface water at the site since completion of the disposal cell. Upon approval of the compliance strategy, DOE will continue to collect groundwater and surface water samples annually. The effectiveness of the strategy and monitoring frequency will be re-evaluated at the end of 5 years. Groundwater samples will be collected from monitoring wells screened in the Browns Wash alluvium and in the Cedar Mountain Formation; surface water samples will be collected from locations in Browns Wash and Green River.

During 2011, the DOE submitted a Groundwater Corrective Action Plan to the NRC to request alternate concentration limits (ACLs) for nitrate, uranium, arsenic, and selenium.

These constituents are found in concentrations above the Environmental Protection Agency maximum allowable limits for groundwater. The groundwater is naturally not suitable for any type of use. The NRC Project Manager anticipates that the ACL request will be completed by the end of FY2017.

At the request of DOE Office of Legacy Management and with concurrence from the Utah Division of Radiation Control, the State of Utah Division of Water Rights has included into their Area of Concern (AOC) program an area that falls mostly within a circle of approximately 3,000-foot radius and centered on the disposal cell. The AOC is established to restrict the use of groundwater within this prescribed area.

The disposal cell measures 450 feet by 530 feet at the base, rises 41 feet above the surrounding land, and occupies 6 acres on the 21.5-acre site. The cell contains about 382,000 cubic yards of contaminated material with a total activity of 30 curies of radium-226. A posted security fence surrounds the disposal cell. The cell was excavated to bedrock and lined with 6 feet of low-permeability soil. Most of the contaminated materials are below grade. The cell cover is a multi-component system designed to encapsulate and isolate the contaminated materials. The cover consists of: (1) a low-permeability radon barrier (first layer placed over compacted tailings); (2) a granular bedding material layer; and (3) a layer of rock (rip-rap) placed on granular bedding material above grade.

The cell design promotes rapid runoff of precipitation to minimize infiltration. The excavated walls around the edge of the disposal cell are lined with rip-rap and bedding material. A large rip-rap apron extends outward from the edge of the disposal cell for about 20 feet. Precipitation flows down the 20-percent side slopes into the surrounding rock apron. The disposal cell was located and designed to prevent or minimize erosion from storm water. The cell is located 75 feet above the Browns Wash floodplain. Existing gullies were filled and re-graded during cell construction, and all disturbed areas surrounding the disposal cell were re-seeded with native vegetation.

3 Site Observations and Findings

To conduct the site inspection, DOE and its contractors created an inspection checklist. The checklist included requirements for the DOE inspectors to observe 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 Utah.

During the site inspection, the DOE inspectors checked the disposal cell for evidence of erosion, settlement, slumping, displacement, and any other feature that required maintenance or repair. The rock surfaces on the side slopes and the soil on the cover were found to be in excellent condition. No slumping, subsiding, or disturbed areas were visible anywhere on the disposal cell.

At the time of the observational site visit, the property was enclosed by a chain-link security fence and two locked entrance gates. Other institutional controls in place at the site include 11 boundary monuments, three survey monuments, two granite site markers, and 17 perimeter warning signs. During the inspection, one perimeter sign was missing, and was replaced prior to leaving the site. 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 DOE inspectors observed the four LTSP monitoring wells and 14 additional groundwater monitoring wells. The wells were secure at the time of the inspection and the visible portions of the wells were in good condition.

Rills and gullies are present on the western side of the property but do not encroach on the disposal cell structures and are not affecting any site surveillance features. Rills and gullies are also present along the escarpment located northeast of the disposal cell. Maximum gully depth in this area is approximately 5 feet. The rill and gully erosion could eventually damage perimeter signs and boundary monuments, and the DOE continues to monitor the area.

The NRC inspector measured the ambient gamma exposure rates using a Ludlum Model 19 microRoentgen meter calibrated to radium-226 (NRC No. 015546, calibration due date of 08/17/17). The background exposure rates ranged from 11-12 microRoentgen per hour (µR/hr). The exposure rates on top of the disposal cell ranged from 11-13 µR/hr. The exposure rates around the disposal cell ranged from 11-13 µR/hr. All exposure rates were approximately the same as background levels.

4 Conclusions

The NRC inspector concluded that the DOE inspectors conducted the site inspection in accordance with the requirements specified in the LTSP dated July 1998. 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 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.

6 Persons Contacted

D. Johnson, Title II Manager, Navarro Research and Engineering, Inc.
C. Grossman, Project Manager, NRC
J. Linard, Site Manager, DOE
J. Price, Site Lead, Navarro Research and Engineering, Inc.
E. Tyrrell, Site Lead, Navarro Research and Engineering, Inc.
H. Mickelson, State of Utah

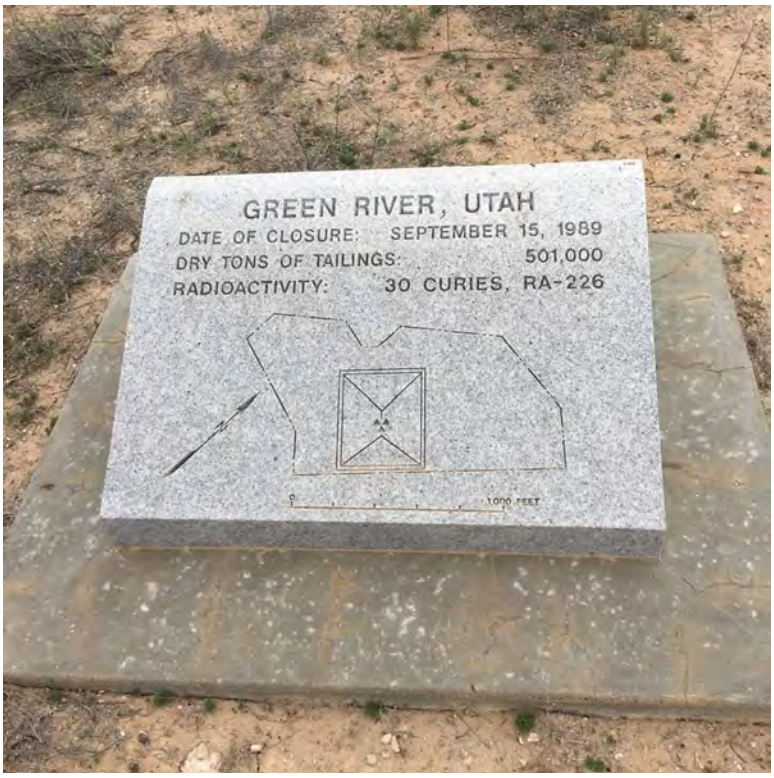

Figure 1: Green River disposal site marker

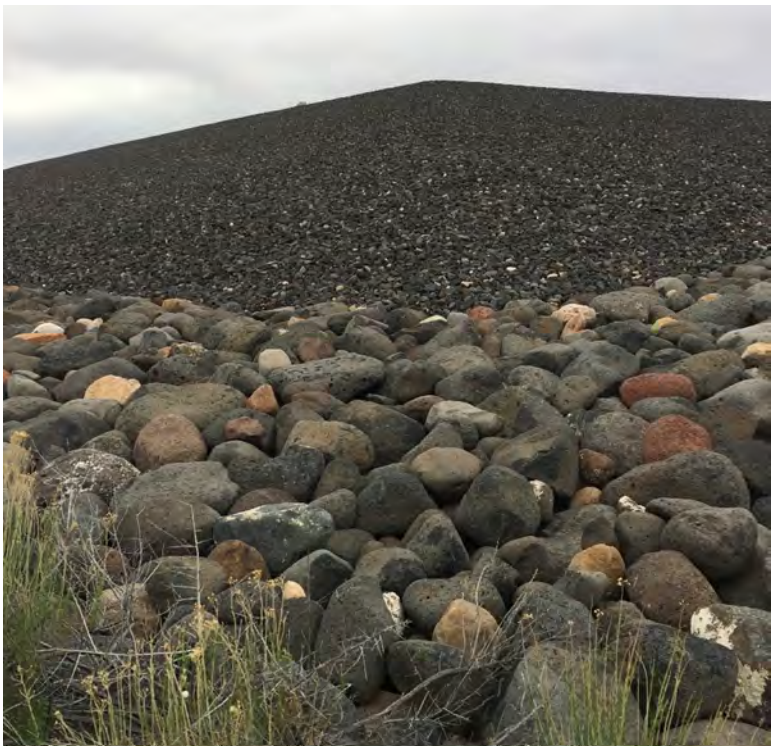

Figure 2: Green River disposal site side slope with rip-rap

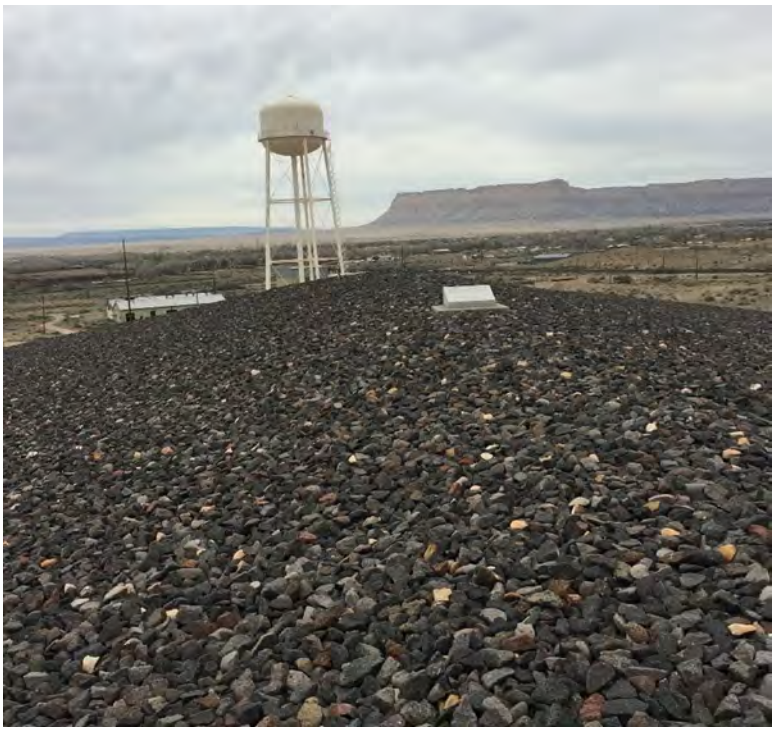

Figure 3: Green River disposal site top of cell with site marker

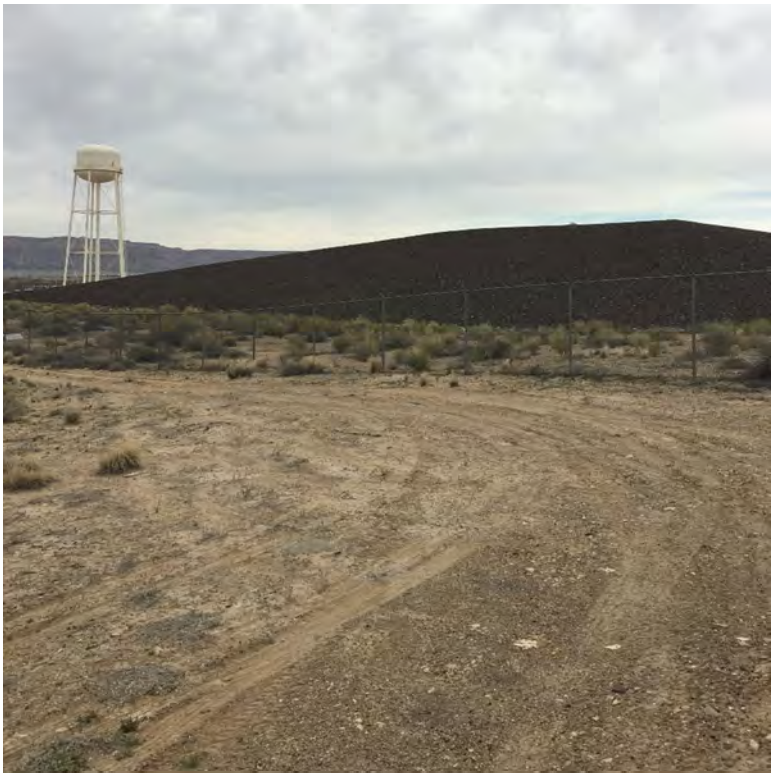

Figure 4: Green River disposal site looking northeast