



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

November 29, 2012

MEMORANDUM TO: Docket File WM-00054

THROUGH: D. Blair Spitzberg, PhD, Chief */RA/*
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety
Region IV

FROM: Robert J. Evans, CHP, PE, Senior Health Physicist */RA/*
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SUBJECT: NRC OBSERVATIONAL SITE VISIT AT THE GRAND JUNCTION
DISPOSAL SITE

On November 14, 2012, an NRC Region IV inspector conducted an observational site visit at the U.S. Department of Energy's (DOE) Grand Junction Disposal Site in Mesa County, Colorado. This site visit was conducted in accordance with NRC guidance dated April 17, 2012 (ML120930240). The purpose of the site visit was to observe DOE's routine, annual visit to the facility. 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 Interim Long-Term Surveillance Plan dated April 1998. No significant regulatory issues or safety concerns were identified during the site visit.

Docket: WM-00054

Enclosure:
NRC Trip Report

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: WM-00054

Report: WM-00054/12-001

Licensee: U.S. Department of Energy

Facility: Grand Junction Disposal Site

Location: Mesa County, Colorado

Date: November 14, 2012

Inspector: Robert J. Evans, CHP, PE, Senior Health Physicist
Repository and Spent Fuel Safety Branch

Approved by: D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch

Attachment: Photographs Taken at the Grand Junction Disposal Site

Enclosure

NRC Trip Report

1 Background

Construction of the Grand Junction Disposal Site began in 1990. The site was previously known as the Cheney disposal cell. The cell was constructed to accept wastes from the Grand Junction Processing Site, historically known as the Climax uranium mill. The disposal site was also constructed to accept "vicinity property materials" from surrounding areas.

Vicinity properties were private and commercial properties that were previously constructed with mill-related contaminated materials and soils. The Climax mill released approximately 500,000 cubic yards of material for use as construction fill material from 1951-1966. Some vicinity property material was reclaimed and returned to the former Climax mill site for storage.

The bulk of the mill and vicinity property materials were transferred to the Grand Junction Disposal Site by 1994. An estimated 4.4 million cubic yards of contaminated materials were placed in the disposal cell. Additional cleanup and disposal of vicinity property material, under the Uranium Mill Tailings Remediation Action Project, continued until 1998. After 1998, vicinity property materials continued to be collected, but the material was collected with State agency oversight.

The 60-acre disposal cell is situated on a 360-acre site located 18 miles southeast of Grand Junction, Colorado. The nearest resident is located approximately 2 miles north of the site. Portions of the disposal cell cover were completed by 1994, but an area of the cell remains open. This site still accepts mill or tailings-related wastes for disposal, including vicinity property materials.

The Interim Long Term Surveillance Plan (LTSP) dated April 1998 offers two alternatives for cell closure. The cell will either remain open until 2023 or until the cell is filled to capacity. The open portion of the cell had a capacity of up to 250,000 cubic yards of additional material. This open area is 21 acres in size. The depth of the open area varies from 10 to 30 feet deep.

The disposal cell cover has been completed in some areas of the cell. The cover consists of a radon barrier, frost protection layer, bedding layer, and rip-rap for erosion protection. The cover is sloped to allow for runoff of precipitation, and rip-rap armored aprons are used to route precipitation away from the disposal cell.

2 Site Status

The site consists of a disposal cell located within a fenced boundary. Several structures remain onsite. These structures are used to support the disposal activities. The DOE controls site access by use of fences, warning signs, and locked gates.

Three monitoring wells are installed in the western portion of the disposal cell. Monitor Well 0731 is 33 feet deep and is located at the northwestern edge of the cell, while Monitor Well 0732 is 35 feet deep and is located at the southwestern edge. These two wells were installed in 1994 and are used to sample the groundwater in the alluvium.

Monitor Well 0733 is 74 feet deep and is located in the southwestern corner of the open area in the disposal cell. This well was installed in 1998 and is used to sample the groundwater below the tailings.

The DOE sampled these three wells on an annual basis. The most recent samples were collected in August 2012. The DOE sampled the water in the wells for uranium concentrations as well as several other chemical constituents. The sample results for 2012 indicate that the uranium concentrations in Wells 0731 and 0732 remain below the maximum concentration limit, but the uranium concentration in Well 0733 was above the maximum concentration limit.

The DOE trends the uranium concentrations in the three wells. Since about 2004, the uranium concentrations in Well 0733 have trended up from about 0.02 milligrams of uranium per liter of water (mg/L) in 2004 to 0.13 mg/L as of August 2012. The maximum concentration limit for uranium is 0.044 mg/L. These elevated measurements may be attributed to leaching of contamination from the open area of the disposal cell, or perhaps from the naturally radioactive shale located underneath the disposal cell. The DOE does not plan to implement corrective actions at this time because the groundwater is considered to be "limited use" water. The amount of naturally occurring total dissolved solids in the groundwater prevents this body of water from being used as a source of drinking water.

At the request of the NRC inspector, DOE shared some of its environmental monitoring and disposal records for 2012 with the inspector. Environmental monitoring consisted of measurement of ambient radon concentrations and gamma radiation levels in the vicinity of the disposal cell. The inspector reviewed these records to ensure that radioactive materials were not exiting the site from the open area.

The DOE sampled radon-222 at 11 various locations, including two background locations. The NRC inspector reviewed the radon effluent records for April-July 2012. The radon concentrations at the nine locations ranged from 0.3 to 1.0 picocuries per liter (pCi/L) with a background of 0.6 to 1.0 pCi/L. These sample results indicate that the radon-222 concentrations at the site boundaries were at background levels.

The NRC inspector also reviewed the results of DOE's gamma radiation monitoring. The inspector reviewed the sample results for the first half of 2012. The sample results ranged from 19.7 to 29.5 millirems per quarter with a background of 19.7 to 27.4 millirems per quarter. These sample results indicate that the ambient gamma radiation levels around the site boundaries were also at background levels.

The inspector reviewed the disposal records for 2012. During calendar year 2012, the Grand Junction Disposal Site received four shipments of waste material from four different disposal sites. The waste material included contaminated groundwater treatment media, pumps, piping, fencing, and general trash. The contaminated waste material is temporarily stored in a radioactive materials area prior to final disposal. The waste material is typically disposed about once per year. During 2012, the Grand Junction Disposal Site did not receive any shipments of vicinity property materials from the State of Colorado or any other entity.

The DOE installed a test cell adjacent to the disposal cell. The test cell is used to demonstrate inexpensive ways to transform existing low-permeability covers into evapo-

transpiration type covers in arid and semi-arid regions. For example, the test cell is used to study the impacts of deep-rooted vegetation on tailings covers. The results of the test will help DOE to decide whether to use herbicides to eliminate vegetation on existing disposal cell covers. Several more years of monitoring will be necessary before the results of the study can be used to improve DOE's long-term management practices.

The last annual DOE inspection of the Grand Junction Disposal Site was conducted in March 2011. In accordance with the Interim LTSP, the annual inspection requirement applies only to the closed and completed portion of the disposal cell. The DOE inspectors concluded that the disposal cell and associated surface water diversion and drainage structures were in good condition and functioning as designed. No follow-up or contingency inspections were required in response to the 2011 inspection findings.

3 Site Observations and Findings

The DOE inspectors are tasked to inspect the cell cover, diversion channels, site features, and outlying areas. The site-specific surveillance features include site access roads, entrance gates, fences, entrance and perimeter signs, boundary monuments, and monitoring wells. The granite site markers have not been installed. The markers will be installed after the disposal cell has been permanently closed.

To conduct the site inspection, DOE and its contractors created an inspection checklist. During the site tour, the DOE inspectors checked for evidence of erosion, settlement, slumping, displacement, and any other feature that required maintenance or repair. The rock surfaces on the cover, side slopes, and diversion channels were found to be in excellent condition.

During previous DOE inspections, small rills were discovered in the southwestern corner of the disposal cell side-slope. Since that time, the rills were repaired. During the 2012 inspection, no new rills were identified.

A new paved road had been installed between the highway and the site. The road was observed to be in excellent condition. The fences and gates were also in good condition. The outlying areas were used to stockpile cover materials for eventual closure of the open portion of the cell. These cover materials included shale, clay, rock, and topsoil. No significant erosion was identified in or around these stockpiled materials.

The Interim LTSP requires removal of deep-rooted shrubs on the cover of the cell. As noted earlier, DOE was studying the impacts of vegetation on cell covers. Until the study has been completed, DOE plans to continue removing deep-rooted vegetation from the cover area.

During the observational site visit, the NRC inspector measured the ambient gamma exposure rates using a Ludlum Model 19 microRoentgen meter calibrated to radium-226 (NRC No. 015525, calibration due date of 05/14/13). The background exposure rates ranged from 8-10 microRoentgens per hour ($\mu\text{R/hr}$). The exposure rates around the disposal cell ranged from 8-12 $\mu\text{R/hr}$. The exposure rates on top of the disposal cell ranged from 12-33 $\mu\text{R/hr}$. As expected, the highest measurements were observed near the boundary to the open portion of the disposal cell, an area where radioactive materials were present.

4 Conclusions

The NRC inspector concluded that the DOE inspectors conducted the site inspection in accordance with the Interim LTSP dated April 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.

The uranium concentration in Monitor Well 0733 continues to trend upward, and DOE continues to sample the well on an annual basis. As noted earlier, DOE does not plan to implement corrective actions at this time because the groundwater is not being used as a source of drinking water.

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

R. Bush, Site Manager, DOE

M. Cosby, Environmental Protection Specialist, Colorado Department of Public Health and Environment

S. Hall, Scientist, S. M. Stoller Corp.

R. Johnson, Scientist, S. M. Stoller Corp.

P. Wetherstein, Environmental Compliance, S. M. Stoller Corp.

S. Woods, Environmental Compliance, S. M. Stoller Corp.



Figure 1: Boundary between side slope (left) and top cover (right) on northern end of disposal cell



Figure 2: Southern edge of disposal cell (looking east)



Figure 3: Open portion of disposal cell with lined storm water retention pond



Figure 4: Cell cover study area located north of disposal cell