



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

July 29, 2019

MEMORANDUM TO: Docket File 040-06659

THROUGH: Heather J. Gepford, PhD, CHP, Chief /RA/
Materials Licensing and Decommissioning Branch
Division of Nuclear Materials Safety

FROM: Martha R. Poston, Health Physicist /RA/
Materials Licensing and Decommissioning Branch
Division of Nuclear Materials Safety

SUBJECT: DOE Site Observation, Shirley Basin South, Carbon County, Wyoming

On July 10, 2019, staff from the U.S. Nuclear Regulatory Commission (NRC) Region IV office conducted an observational site visit at the Shirley Basin South Title II disposal site located in Carbon County, Wyoming. The purpose of the observational site visit was to observe the annual site surveillance activities being conducted at the site by the U. S. Department of Energy, and its contractor, Navarro Research and Engineering, Inc. The annual site surveillance activities included performance the of annual site inspection, identification of needed maintenance or repairs and assessment of condition of the disposal cell and diversion channels to identify potential issues. Enclosed to this memorandum is the NRC's observation trip report for the site.

The inspector concluded that the DOE and contractor representatives continued to maintain the site in accordance with the Long-Term Surveillance Plan (LTSP) for the Shirley Basin South (UMTRCA Title II) Disposal Site dated May 12, 2005 [ML051370527]. No significant regulatory issues or safety concerns were identified during the site visit.

Docket: 040-06659
License: SUA-551

Enclosure: NRC Observational Site Visit Report

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**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Docket: 040-06659
License: SUA-551
Report No.: 040-06659/2019-001
Licensee: U.S. Department of Energy
Facility: DOE Shirley Basin South Disposal Site
Location: Carbon County, Wyoming
Date: July 10, 2019
Inspector: Martha R. Poston, Health Physicist
Materials Licensing and Decommissioning Branch
Division of Nuclear Materials Safety
Approved by: Heather J. Gepford, PhD, CHP, Chief
Materials Licensing and Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure

NRC Observational Site Visit Report

1 Background

The Shirley Basin South Disposal Site is the location of a former uranium ore processing facility in Carbon County, Wyoming. The site is located approximately 60 miles south of Casper and 35 miles north of Medicine Bow. Petrotomics Company operated the mill from 1962 to 1985.

The site is classified as a Title II site under the Uranium Mill Tailings Radiation Control Act (UMTRCA) as promulgated by the U.S. Environmental Protection Agency in Title 40 *Code of Federal Regulations* (CFR), Part 192 (40 CFR 192). Under UMTRCA, the DOE is the licensee and is responsible for custody and long-term care of the site.

2 Site Status

The site consists of a two-tiered disposal cell located within a fenced boundary. The tiers of the cell are separated by a rip-rap covered slope. The tops of each tier were seeded with native grasses. A surface water diversion system, consisting of contoured surfaces, draining and collection channels is designed to divert rainwater away from the disposal cell. The disposal cell cover system was constructed with layers as follows: low-permeability clay radon barrier, sandy overburden protection layer and vegetated top soil. The site currently has 26 perimeter signs, 1 granite site markers, 26 boundary monuments, and a locked access gate on the fence. The fence is a four strand, barbed wire fence. DOE had one leasing agreement in place for the site. A local area rancher is authorized to graze cattle on the site. The rancher is also allowed to mow the acreage for hay and to use the water well onsite for his stock.

Petrotomics Company requested and received NRC approval for alternative concentration limits (ACLs) for nine constituents prior to transfer of the site to DOE and license termination [ML051670259]. The DOE samples for additional contaminants on an annual basis, as those parameters are useful indicators of contaminant migration. The site groundwater monitoring network consists of 14 wells; 6 of these 14 wells are down gradient of the cell.

Title 10 CFR 40.27 (c) states that the DOE shall implement the long-term surveillance plan (LTSP) and care for the disposal site in accordance with the provision of the LTSP. The LTSP is used by DOE and its contractor during its annual inspection. The Shirley Basin South LTSP requires annual groundwater sampling to assess cell performance. The sampling was conducted on July 9, 2019. Groundwater sampling activities were not reviewed during this observational site visit.

3 Site Observations and Findings

The DOE contractors used an inspection checklist to conduct the annual inspection. The checklist included requirements to inspect the entrance signs, gates, perimeter signs, perimeter fence, site markers, survey monuments, boundary monuments, erosion control markers, disposal cell top and side slopes, diversion channels, outflow channel and outflow channel under the LTSP. The checklist also included areas outside the LTSP requirements such as assessing the condition of monitoring wells and outlying

areas, and observation of the status of vegetation. Due to the presence of cattle onsite the leasing rancher has installed an electric wire fence onsite.

Prior to the start of the inspection, the DOE contractor conducted a safety briefing of the hazards to be aware of at the site, the pre-job briefing discussing the activities to be conducted, and a review of the inspection checklist to divide items between the teams. During the inspection, the DOE contractors observed that the fences were intact, site and survey markers and monument were in place, and the gate was intact and functional. Most perimeter signs showed slight signs of fading and one perimeter sign (P3) was completely illegible; the contractor indicated that the P3 sign would be marked as needing replacement. It was noted that the sign on the gate was also faded, but the contractor was aware of this due to groundwater sampling the previous day and had brought a sign to replace the faded one at the gate. The disposal cell appeared to be in good shape; the NRC inspector did not observe any issues associated with the cell and the native grasses ground cover is well established. The containment dam and diversion channels did not show any signs of erosion or settlement, although there was a small amount of water at the bottom of the containment dam due to rain the previous day. The DOE representative and DOE contractors did not identify any significant problems during the annual inspection that required immediate contingency actions.

The NRC inspector measured the ambient gamma exposure rates using a hand-held Ludlum Model 19 survey meter (Serial number 32888, calibration due date 7/12/18). With a background of 18 microrentgen per hour ($\mu\text{R/hr}$) measurements ranged from background to 70 $\mu\text{R/hr}$. The survey results indicated that the majority of the site property was at or near background levels.

4 Conclusions

The inspector concluded the DOE and contractor were maintaining the site in accordance with license requirements. The NRC staff did not identify any significant safety issues during the site tour.

5 Persons Contacted

B. Tsosie, Site Manager, DOE Office of Legacy Management
D. Johnson, Lead Inspector, Navarro Research and Engineering, Inc.
S. Hall, Inspector, Navarro Research and Engineering, Inc.
J. Price, Inspector, Navarro Research and Engineering, Inc.

DOE SITE OBSERVATION, SHIRLEY BASIN SOUTH, CARBON COUNTY, WYOMING –
DATED JULY 29, 2019

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