



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

September 22, 2019

MEMORANDUM TO: Docket File 040-09090

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

FROM: Robert J. Evans, PhD, CHP, PE, Senior Health Physicist /RA/  
Materials Licensing and Decommissioning Branch  
Division of Nuclear Materials Safety  
Region IV

SUBJECT: OBSERVATIONAL SITE VISIT AT MAYBELL WEST DISPOSAL SITE

On September 4, 2019, the U.S. Nuclear Regulatory Commission (NRC) conducted an observational site visit at the U.S. Department of Energy's (DOE) Maybell West disposal site in Moffat County, Colorado. This observational site visit was conducted in accordance with NRC guidance dated September 7, 2012. The purpose of the observational site visit was to observe DOE's routine, annual inspection of the facility, and to observe the physical condition of the site. Enclosed to this memorandum is the NRC's observational site visit report.

In summary, the DOE representatives conducted the annual inspection in accordance with the guidance provided in the Long-Term Surveillance Plan dated February 2010 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML100550721). The two disposal cells at the site appeared to be in excellent condition, with the exception of minor depressions in limited areas on both cells. No significant regulatory issues or safety concerns was identified during the site visit.

Docket No.: 040-09090  
License No.: General License Pursuant to 10 CFR 40.28

Enclosure: NRC Observational Site Visit Report

cc: J. Nguyen, DOE Site Manager  
G. Grice, CDPHE, State of Colorado

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

Docket No.: 040-09090

License No.: General License Pursuant to 10 CFR 40.28

Report No.: 040-09090/2019-001

Licensee: U.S. Department of Energy

Facility: Maybell West Disposal Site

Location: Moffat County, Colorado

Date: September 4, 2019

Inspector: Robert J. Evans, PhD, CHP, PE, Senior Health Physicist  
Materials Licensing and Decommissioning Branch  
Division of Nuclear Materials Safety  
Region IV

Approved by: Heather J. Gepford, PhD, CHP, Chief  
Materials Licensing and Decommissioning Branch  
Division of Nuclear Materials Safety  
Region IV

Attachment: Photographs Taken at the Maybell West Disposal Site

Enclosure

## **NRC Observational Site Visit Report**

### **1 Background**

From 1975-1982, Umetco Minerals Corporation conducted heap leach operations at the Maybell West site. During operations, a sulfuric acid solution was applied to an ore pile in an effort to extract uranium from the ore. To support site operations, a series of holding ponds and an outdoor plant were constructed. After leaching operations were discontinued in 1982, liquid waste management continued until 1994. In 1991, the heap leach pile was regraded, and an interim cover was placed over the pile.

The Maybell West disposal cell was constructed to permanently dispose of waste material from the former heap leach pile. The Maybell West site was reclaimed between 1995-2005. Approximately 2 million tons of low-grade ore was stabilized and covered at the site. The cell contains approximately 96 curies of radium-226 activity. In addition to the main cell, an ancillary cell was constructed at the site. This smaller cell contains waste materials from the evaporation ponds as well as other contaminated site debris.

The Maybell West disposal site is located approximately 4 miles northeast of the town of Maybell, Colorado, and approximately 0.75 miles west of the Maybell disposal site. There are several open pit mines in the vicinity of the site. In particular, the Rob Pit is located immediately to the east of the site, and Johnson Pit is located southeast of the site.

The main disposal cell covers approximately 60 acres of the 180-acre site. The ancillary cell is approximately 4.5 acres in size. The crest of the main cell is approximately 75 feet above the surrounding terrain.

The main disposal cell cover is approximately 7 feet thick. The cover consists of a radon barrier, frost protection barrier, bedding material (to promote drainage of rainwater), and riprap cover. The disposal cell design included a clay liner beneath the heap leach pile which inhibited the discharge of contaminants to the subsurface area. The ancillary cell cover consists of a minimum of 5.5 feet of material. The ancillary cell cover includes a radon barrier, frost protection layer, and erosion protection layer.

The main cell has a center channel that routes surface rainwater towards the eastern tip of the cell. From the eastern tip, rainwater is routed by an interconnected drainage channel into Rob Pit. An energy dissipating structure (also called launch rock basin) was constructed at the intersection of the two channels to protect the disposal cell from long-term erosion of the downstream drainage channel. Rock-armored aprons were installed around the base of the main cell to promote drainage of rainwater away from the cell. Disturbed areas of soil around the main cell were regraded and seeded with native grasses.

The U.S. Department of Energy (DOE) submitted the Long-Term Surveillance Plan (LTSP) for the Maybell West disposal site to the NRC in February 2010, and the NRC approved the LTSP by letter, dated March 11, 2010 (ADAMS Accession No. ML100550721). Since 2010, the DOE has maintained institutional control of the site under Title II of the Uranium Mill Tailings Radiation Control Act and 10 CFR 40.28. In accordance with this regulation, the LTSP provides the instructions for institutional control of the site. These controls include deed restrictions, site markers, survey

monuments, boundary markers, gates, fences, and signs. The physical features of the site are inspected once per year by DOE staff.

## **2 Site Status**

Groundwater monitoring was performed intermittently from 1975-2005. These sample results indicated that site-related activities did not contaminate the groundwater. As a result, the DOE discontinued groundwater monitoring. The NRC-accepted LTSP currently does not require groundwater remediation or groundwater monitoring at the Maybell West disposal site.

The DOE conducted previous annual inspection of the Maybell West disposal site in August 2018 (ADAMS Accession Nos. ML18340A155 and ML18340A156). The inspection concluded that the main disposal cell, ancillary disposal cell, diversion channels, and drainage structures were in good condition and functioning as designed. Three small depressions were identified on top of the main disposal cell (discussed further in the next section). Several minor rills and gullies were identified in the northern and southwestern areas. The DOE inspectors noted fence line damage involving broken or loose fence strands. No deep-rooted vegetation was identified on the main disposal cell, but noxious weeds were treated with an herbicide. One damaged boundary monument was identified, and was scheduled to be repaired. No significant maintenance or contingency items were identified during the 2018 inspection.

In 2018, the DOE conducted a baseline aerial photogrammetry survey of the Maybell West site. This baseline survey will provide a means of measuring and monitoring site features, including the depressions, in the future. Multispectral imagery was also conducted to assess the vegetative cover. Six permanent quality control location monuments were installed at the site in 2018, to support this and future aerial surveys.

## **3 Site Observations and Findings**

To conduct the 2019 site inspection, the DOE and its contractors created an inspection checklist. The checklist included requirements for observation of the disposal cell, site perimeter, outlying areas, vegetation, and various site-specific features. The checklist included specific instructions to verify the integrity of the two diversion channels and the launch rock basin. The inspection staff included the DOE site manager and two contractors. The contractors had experience in project management, ecology, and geology. The DOE inspectors were accompanied by a representative from the State of Colorado.

The DOE inspectors checked the two disposal cells for evidence of erosion, settlement, slumping, displacement, and any other feature that would require maintenance or repair. The rock surfaces on the top and side slopes were found to be in excellent condition, with several minor exceptions (Figures 2 and 4). On the ancillary disposal cell, the DOE inspectors noted a row of small depressions along the northern edge of the cell, where the top cover connects with the northern side slope. This was the first time that the DOE inspectors had observed these minor depressions.

The DOE inspectors also observed the three depressions previously identified on the top of the main disposal cell. The largest depression was first observed in 2010, while the second depression was first observed in 2016. The smallest depression was first

observed in 2018. The DOE inspectors physically measured the sizes of the three depressions during the inspection. The largest depression measured 26-feet long, 8-feet wide, and 1-foot deep (Figure 3). The second depression measured 14-feet long, 6-feet wide, and 4-inches deep. The third and smallest depression measured 1-foot long, 1-foot wide, and 5-inches deep. The DOE planned to continue to monitor these depressions into the future and will use the information gained in the 2019 inspection for comparison to depression sizes in future inspections.

Some minor vegetation was observed on the disposal cells, but this vegetation did not appear to impact the cell covers. In addition, minor erosional features (rills) continued to be identified in the southwestern area of the site. These rills were similar in size and scope as noted during the 2018 inspection, and the rills did not threaten the integrity of the two disposal cells.

At the time of the observational site visit, the property was enclosed by a stock fence and locked gates. The DOE inspectors observed fence strand breaks, loose strands, and fence line erosion problems. These conditions were documented for future repair. Other institutional controls in place included boundary monuments, survey monuments, site marker (Figure 1), and perimeter warning signs. These institutional controls were found to be in good condition, with minor exceptions.

The site-specific checklist included instructions to observe the status of eight boundary monuments. Monuments BM-3 and BM-6 were difficult to locate in the field because they were constructed of capped rebar and not metal caps embedded in concrete. The DOE inspectors documented that they had trouble locating these monuments during the 2016 inspection (ADAMS Accession No. ML16327A459). The 2017 inspection (ADAMS Accession No. ML17346A764) indicated that BM-3 had been located but was bent and needed to be replaced. Neither the 2017 nor the 2018 inspection reports discussed the status of BM-6.

By letter dated March 19, 2018 (ADAMS Accession No. ML18031A324), the NRC asked the DOE to verify that it had visually located boundary monument BM-6 at the Maybell West disposal site during the 2017 annual inspection. (At the time of the 2019 inspection, DOE had not responded in writing to the NRC's request for information.) The NRC inspector asked the DOE representatives about boundary monument BM-6. The DOE's representatives stated that the monument had been visually located. As noted earlier, the monument was hard to locate in the field since it consisted only of rebar embedded in the ground with a cover cap.

#### **4 Conclusions**

The NRC inspector confirmed that the DOE conducted the annual inspection in accordance with the instructions provided in the LTSP and the associated site checklist. The disposal cell covers, and side slopes appeared to be in excellent condition, with the exception of the formation of small depressions on top of both cells. The DOE inspectors will continue to observe the depressions during future inspections to monitor for any increases in size. Minor erosion was identified around the disposal cells, but the erosion did not appear to be a threat to the disposal cells themselves. No significant safety issues were identified during the site visit.

## **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 inspector 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 end of the onsite visit.

## **6 Persons Contacted**

J. Cario, Site Lead, Navarro Research and Engineering, Inc.

J. Doebele, Environmental Protection Specialist, Colorado Department of Public Health and Environment

S. Hall, Site Lead, Navarro Research and Engineering, Inc.

J. Nguyen, Site Manager, DOE Office of Legacy Management



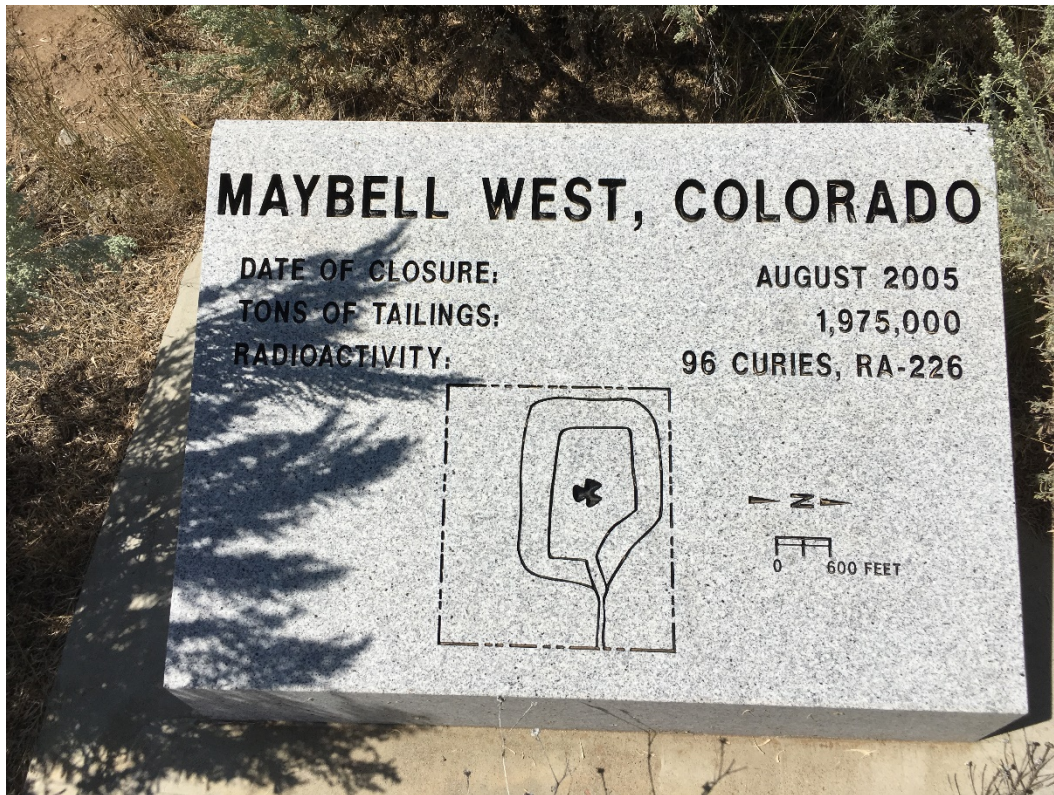


Figure 1: Maybell West disposal site marker at entrance to disposal cell



Figure 2: Top of disposal cell, looking east along Diversion Channel No. 1





Figure 3: Small depression on top of main disposal cell, looking southeast



Figure 4: Ancillary disposal cell as seen from top of main disposal cell, looking southeast



OBSERVATIONAL SITE VISIT AT MAYBELL WEST DISPOSAL SITE – DATED  
SEPTEMBER22, 2019

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