

## 7.0 Split Rock, Wyoming, Disposal Site

### 7.1 Compliance Summary

The Split Rock, Wyoming, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II Disposal Site was inspected on August 20–21, 2024. This was the first annual inspection for this site. Inspectors identified minor fence maintenance needs but found no cause for a follow-up inspection.

The site-specific *Long-Term Surveillance Plan for the Split Rock, Wyoming, UMTRCA Title II Disposal Site, Jeffrey City, Wyoming* (DOE 2023) (LTSP) requires annual sampling of groundwater and surface water. The most recent sampling event occurred on August 5–6, 2024. Analytical data from this sampling event were unavailable for this report and will be documented in the 2025 Annual Site Inspection and Monitoring Report for UMTRCA Title II Disposal Sites.

### 7.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the site-specific LTSP (DOE 2023) in accordance with procedures established to comply with the requirements of the U.S. Nuclear Regulatory Commission (NRC) general license at Title 10 *Code of Federal Regulations* Section 40.28 (10 CFR 40.28). Table 7-1 lists these requirements.

*Table 7-1. License Requirements for the Split Rock, Wyoming, Disposal Site*

Requirement	LTSP	This Report	10 CFR 40.28
Annual Inspection and Report	Sections 3.3 and 3.4	Section 7.4	(b)(3)
Follow-Up Inspections	Section 3.5	Section 7.5	(b)(4)
Routine Maintenance and Emergency Measures	Section 3.6	Section 7.6	(b)(5)
Environmental Monitoring	Section 3.7	Section 7.7	(b)(3)

### 7.3 Institutional Controls

The 5431-acre site, of which 1049 acres is privately owned, is identified by the property boundary shown in Figure 7-1. The site is owned both privately and by the United States and was accepted under the NRC general license in 2023. The U.S. Department of Energy is the licensee and, in accordance with the requirements for UMTRCA Title II sites, the Office of Legacy Management (LM) is responsible for the custody and long-term care of the site.

Institutional controls (ICs) at the site include federal ownership of the property, administrative controls, and groundwater use restrictions to prevent direct human exposure to site-derived contaminants. ICs are in place to ensure long-term protectiveness at the site. IC monitoring will be performed during the annual inspection. Inspectors will check the site for unauthorized entry, surrounding land use, and disturbance of site features. Every 5 years, beginning in 2025, records in the Wyoming State Engineer’s Office will be reviewed to determine if there were significant changes in water demand near the site and confirm that no new drinking wells have been established.

## 7.4 Inspection Results

The site, approximately 97 miles southwest of Casper, Wyoming, and 67 miles northwest of Rawlins was inspected on August 20–21, 2024. The inspection was conducted by T. Santonastaso and M. Guziak of the Legacy Management Support contractor. N. Keller and C. Boger (LM) attended the inspection. The purposes of the inspection were to confirm the integrity of visible features at the site, identify changes in conditions that might affect conformance with the LTSP, and evaluate whether maintenance or follow-up inspection and monitoring are needed.

### 7.4.1 Site Surveillance Features

Figure 7-1 shows the locations of site features, including site surveillance features and inspection areas, in black and gray font. Some site features that are present but not required to be inspected are shown in italic font. New observations identified during the 2024 annual inspection are shown in red. Inspection results and recommended maintenance activities associated with site surveillance features are described in the following subsections. Photographs to support specific observations are noted in the text and in Figure 7-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 7.9.

#### 7.4.1.1 Site Access and Entrance Gate

Access to the site is directly from Fremont County Ore Road. The main entrance gate is a tubular steel double swing gate in the disposal cell fence that provides access to the northern portion of the disposal cell. This gate, in the west portion of the disposal cell area fence, was secured by a lock and chain (PL-1). An access point south of the site entrance on Ore Road along the perimeter fence, previously secured by a locked cable, was replaced with two 10-foot tubular steel double swing gates in August 2024. No other maintenance needs were identified.

#### 7.4.1.2 Perimeter Fence and Signs

A barbed-wire stock fence and granite outcrops enclose the site disposal cell and reclaimed evaporation pond and restrict access from livestock. The grazing licenses granted by LM to local ranchers allow livestock grazing outside of the disposal cell area in exchange for perimeter and stock fence maintenance. Fences around the disposal cell area were inspected to ensure that they were intact. During the inspection, it was noted that there were several small segments of fencing interior to the disposal cell fence that may have been used in the past to restrict livestock access to the disposal cell via the granite outcrops on the stock fence line on the south side of the disposal area. These are noted in Figure 7-1 as “small segments of fence” (PL-2). However, no evidence of cattle grazing on the disposal cell area was observed. Before transition of the site, there were plans to repair 10% of the fence every year starting in 2024. The fence along Ore Road was identified as an immediate need for repair to keep livestock off the disposal cell and the reclaimed evaporation pond, and would satisfy the 10% fence repair requirement in 2024. The repair was completed in August 2024 (PL-3). Additionally, LM will work with the grazing licensees to ensure that the stock fence is maintained according to the grazing agreement. No other maintenance needs were identified.

The entrance sign, identified in Figure 7-1, is on the main site access road near the site marker (PL-4). Before transition, 40 additional steel signposts were placed around the perimeter of the site and the tailings impoundment at locations where access to the site is most likely to occur. Before the inspection, no signs had been installed on the posts. Signs were installed during the inspection at the most likely access points, including along Ore Road and adjacent to Highway 287, and one was added to the disposal cell area fence (PL-5).

Perimeter warning sign installation will continue during the next annual site inspection. Several of the sign locations may eventually be abandoned or relocated due to practicality, such as along the riverbank where vegetation is taller than the signposts and access would be difficult. No other maintenance needs were identified.

#### ***7.4.1.3 Site Marker***

The site has one granite site marker near the main entrance gate (PL-6). No maintenance needs were identified.

#### ***7.4.1.4 Boundary Monuments***

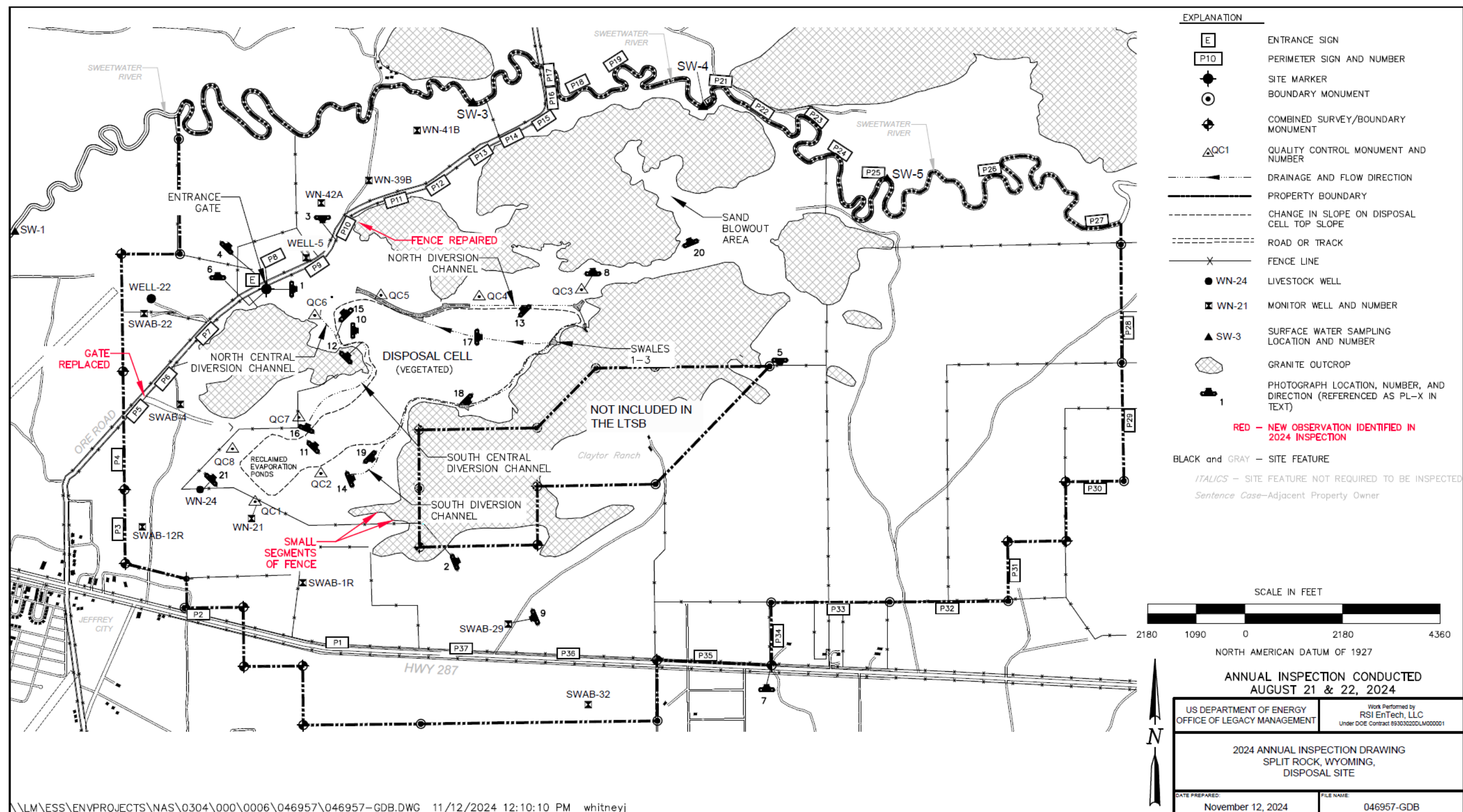
There are 37 boundary monuments delineating the site boundary (PL-7). No maintenance needs were identified.

#### ***7.4.1.5 Aerial Survey Quality Control Monuments***

In August 2024, eight permanent quality control monuments were installed at the site in preparation for a September 2024 baseline aerial survey of the disposal cell (PL-8). The quality control monument locations are shown in Figure 7-1. No maintenance needs were identified.

#### ***7.4.1.6 Monitoring Wells***

The site's groundwater monitoring network consists of 12 monitoring wells (Figure 7-1; DOE 2023) and one livestock well (WN-24) that were previously used in Western Nuclear Inc.'s (WNI) licensed monitoring program. Stock watering well, well-22, is within the property boundary but is not being used for monitoring. The groundwater use restriction for stock watering well, well-22, allows for livestock use only. Stock watering well, well-22, was not being used at the time of inspection. The monitoring well network wellhead protectors were undamaged and locked (PL-9). No maintenance needs were identified.



Abbreviation: LTSB = long-term surveillance boundary

Figure 7-1. 2024 Annual Inspection Drawing for the Split Rock, Wyoming, Disposal Site



## **7.4.2 Inspection Areas**

In accordance with the LTSP, the site is divided into four inspection areas to ensure a thorough and efficient inspection. The inspection areas are (1) the tailings impoundment on the top slope and side slopes; (2) the tailings impoundment drainage, diversion channels, toe drains, and apron; (3) the site perimeter and balance of site; and (4) the outlying area. Inspectors examined site surveillance features within each area and looked for evidence of erosion, settling, slumping, or other modifying processes that might affect the site's conformance with LTSP requirements.

### ***7.4.2.1 Tailings Impoundment Top Slope and Side Slopes***

The tailings impoundment, completed in 1996, occupies 265 acres and protrudes between granite outcrops. The outcrops split the tailings impoundment into two lobes in the northwest valley (NWV) (PL-10) and the southwest valley (SWV) (PL-11). The cover in the NWV consists of a rock layer overlain by a revegetated soil and rock mulch matrix, whereas the remaining cover consists of only a rock layer for erosion protection. There were no signs of erosion, settlement, or other modifying processes on the tailings impoundment cover that might affect its integrity.

Since construction of the final reclamation cover and before the site transitioned to LM, shrubs and grasses had established on the tailings impoundment and side slopes (PL-12) (DOE 2010). No negative performance impacts of established vegetation on the disposal cell have been identified (DOE 2023). No maintenance needs were identified.

### ***7.4.2.2 Tailings Impoundment Drainage and Diversion Channels, Toe Drains, and Apron***

The site stormwater diversion system was designed to control surface water flows from impacting the disposal area by conveying surface water away from the reclaimed tailings impoundment. The site stormwater diversion system consists of four diversion ditches: the North Diversion Channel (PL-13), South Diversion Channel (PL-14), North Central Diversion Channel (PL-15), and South Central Diversion Channel (PL-16). In addition, three riprap-lined swales are constructed on top of the reclaimed tailings impoundment to direct flood flows into the North Diversion Channel (PL-17). Riprapped erosion aprons and scour trenches were constructed at the outlets of all the diversion ditches to prevent headcutting and long-term erosion.

The site stormwater diversion system was designed to accommodate runoff from probable maximum precipitation water volumes. The North Central and South Central Diversion Channels protect the impoundment and drain water that flows off the impoundment cover. The North Diversion Channel intercepts flows from the higher terrain north and east of the tailings impoundment and conveys them to the west. The South Diversion Channel intercepts flows from the higher terrain south of the tailings impoundment and conveys them to the southwest. No maintenance needs were identified.

Since construction and before the site transitioned to LM, deep-rooted vegetation has established in the stormwater diversion system (DOE 2023). Inspectors noted volunteer growth of deep-rooted species within the stormwater diversion system; however, no negative performance impacts have been identified from their presence (PL-18). No maintenance needs were identified.

### **7.4.2.3 Site Perimeter and Balance of Site**

Before site transition to LM, erosion was repaired on the south side slope of the granite outcrop that has deposited sediment in the South Diversion Channel (PL-19). Further repair of the erosion is not anticipated because potential erosion in that portion of the site is not expected to significantly impact the function of the channel. No maintenance needs were identified.

Private land surrounds and is present within the site boundary. The balance of the site includes granite outcrops, riparian areas along the Sweetwater River, a former borrow area, revegetated slopes and flats, and native rangelands. Inspectors looked for changes in development in the surrounding areas, which could be development or expansion of human habitation, erosion, road building, oil and gas development, or other changes in land use. No signs of intrusion or other activities were identified on these properties during the 2024 inspection that may affect site protectiveness. Vegetation is well-established with few exceptions. There is a sand blowout area (PL-20) in reclaimed areas between rock outcrops in the interior of the Split Rock site. In these areas, pretransition grass reseeding efforts have failed, and plant cover is very sparse. However, no adverse effects of vegetation establishment were identified. No maintenance needs were identified.

Use of livestock well WN-24 was established between WNI, the former site licensee, and the same rancher who is currently utilizing the site for grazing under an LM grazing license. There was no evidence before transition that the well had been affected by processing-related groundwater contamination. The grazing license allows the rancher to pump water for livestock watering purposes and to utilize the watering facility (PL-21). No maintenance needs were identified.

Flood irrigation practices are utilized for hay production in accordance with a license with a local rancher and were in place before site transition. As a result, between May and August, portions of the site northwest of Ore Road are flooded and inaccessible. The hay field had dried up and had no water present. The hay had been cut, baled, and removed from the hay fields before the 2024 inspection. No maintenance needs were identified.

### **7.4.2.4 Outlying Areas**

The surrounding land is primarily used for livestock grazing and recreation. The area beyond the site boundary for 0.25 mile was visually observed for changes in land use, developments, or other phenomena that might affect the long-term integrity of the site. No changes were identified.

## **7.5 Follow-Up Inspections**

LM will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition or (2) LM is notified by a citizen or outside agency that conditions at the site are substantially changed. No need for a follow-up inspection was identified during the inspection.

## 7.6 Routine Maintenance and Emergency Measures

In accordance with the LTSP (DOE 2023), routine site maintenance will be performed by LM as needed. Maintenance to the tailings impoundment fence is anticipated to occur annually. In 2024, the section of the disposal cell area fence along Ore Road was repaired and a gate was replaced. No other maintenance needs are identified.

Emergency measures are corrective actions that LM will take in response to unusual damage or disruption that threatens or compromises site health and safety, security, integrity, or compliance with 40 CFR 192. No emergency measures were identified.

## 7.7 Environmental Monitoring

In accordance with the LTSP (DOE 2023), groundwater and surface water monitoring are required at the site to ensure that (1) site-related contamination does not adversely impact groundwater or surface water use outside of the long-term surveillance boundary (LTSB) and (2) the disposal cell performs as expected. The long-term monitoring program will also be used to confirm during inspections that no unexpected changes in site conditions occur (including changes in the behavior of the legacy plume), downward contaminant trends continue, and the protectiveness at the point of exposure (POE) is maintained under long-term management.

The long-term monitoring network at the site includes 12 monitoring wells and four surface water monitoring locations along the Sweetwater River. These locations, shown in Figure 7-2 and described in Table 7-2, are divided into two flow regimes: the NWV flow regime and the SWV flow regime. General groundwater flow directions are provided in the LTSP (DOE 2023). The river coincides with the northern boundary of the site and represents the most likely POE for site-related contamination. Alternate concentration limits (ACLs) will be used under long-term management for comparison to measure results as a possible indication of cell performance and compliance with protective standards applicable at the POE.

The NWV monitoring program consists of four groundwater wells between the disposal cell and the Sweetwater River. It also includes four surface water monitoring points along the river: one upstream of the site, two points on the northern LTSB to monitor contaminant levels of discharge from the NWV groundwater contaminant plume, and a downstream sampling location. The SWV groundwater monitoring network consists of eight groundwater wells between the disposal cell and the two potential points of exposure: the Sweetwater River and groundwater supply wells near Jeffrey City.

Each flow regime has a designated point of compliance (POC) well, to which ACLs are applied (Figure 7-2; Table 7-2). POC wells Well-5 and WN-21 are the designated POCs for the NWV and SWV flow regimes, respectively.



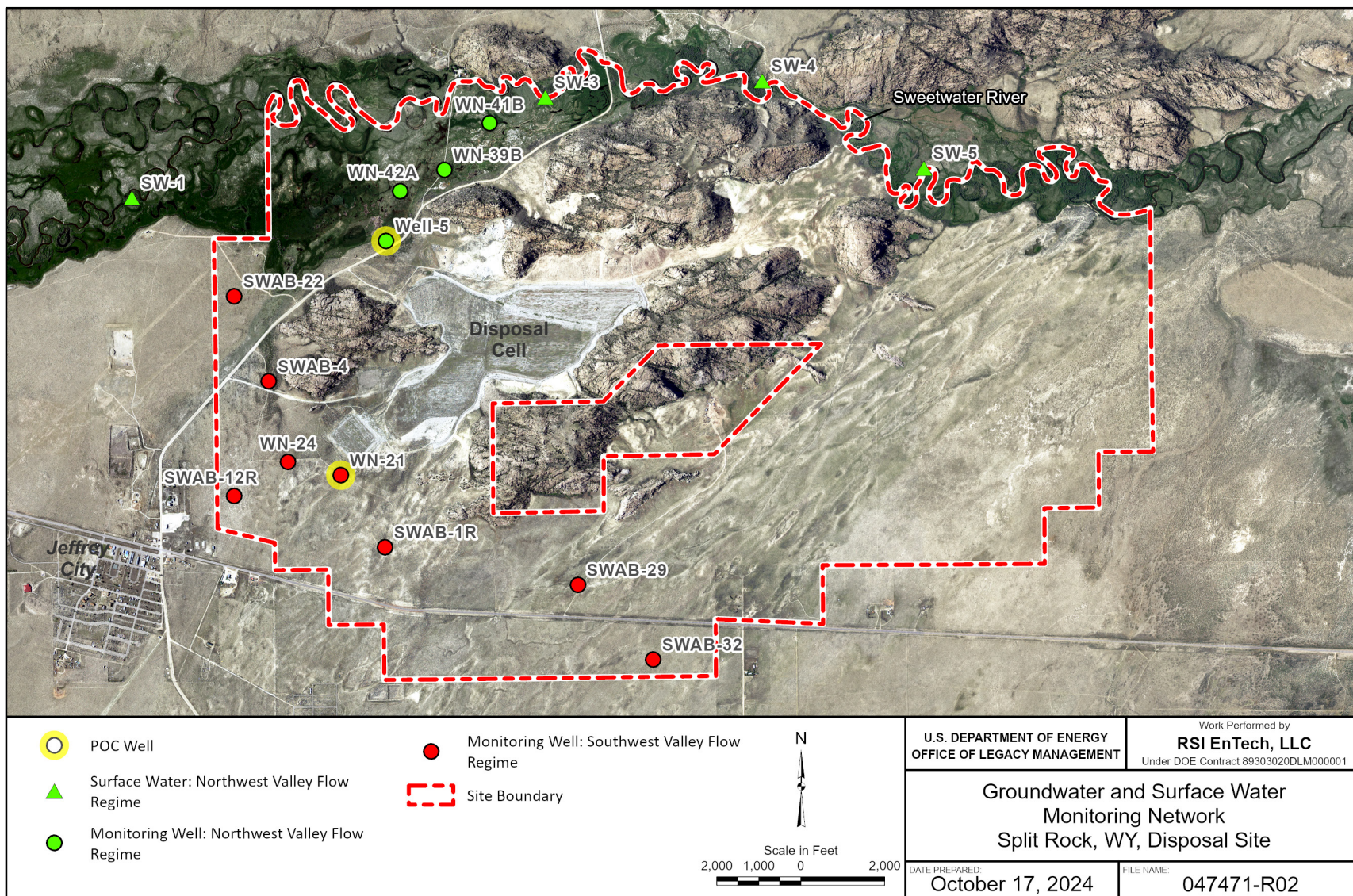


Figure 7-2. Groundwater and Surface Water Monitoring Network at Split Rock, Wyoming, Disposal Site

Table 7-2. Groundwater and Surface Water Monitoring Network at the Split Rock, Wyoming, Disposal Site

Monitoring Location	Description and Network Application
<b>NWV Flow Regime</b>	
Well-5	POC well.
WN-42A	Well where seepage from tailings meets the floodplain alluvial aquifer.
WN-39B	Downgradient of well WN-42A in the floodplain alluvial aquifer flow path.
WN41-B	Well location closest to the river; best available location remaining to indicate concentrations discharging to river.
SW-1	Historical upstream and background surface water location (offsite).
SW-3	Surface water POE location at predicted NWV plume discharge point.
SW-4	
SW-5	Historical downstream-most surface water location.
<b>SWV Flow Regime</b>	
WN-21	POC well.
SWAB-12R	Well at southwest corner of site, between site and Jeffrey City. Represents groundwater quality for groundwater flowing offsite in the Split Rock Formation regional aquifer.
SWAB-1R	Pretransition, this well had the highest uranium and nitrate concentrations; concentrations of uranium and nitrate both exceed standards.
SWAB-29	Downgradient-most location in the SWV flow regime; location intended to track plume movement.
SWAB-32	Well at southern border of site.
SWAB-4	SWV flow regime sentinel well.
WN-24	Well used for stock watering.
SWAB-22	SWV flow regime sentinel well.

**Notes:**

Table adapted from Table 7 of the LTSP (DOE 2023).

Table 8 of the LTSP describes the corresponding analytes and how the monitoring frequency will be evaluated periodically (annual to triennial evolution).

The first posttransition annual sampling event occurred on August 5–6, 2024. In addition to field measurements, samples were collected at each of the 16 locations shown in Figure 7-2 and analyzed for the four constituents of concern (COCs) identified for long-term monitoring in the LTSP: nitrate (as nitrogen [N]), selenium, sulfate, and uranium (DOE 2023).<sup>1</sup> These COCs were selected based on LM’s evaluation of historical data presented in Appendix E of the LTSP (DOE 2023). Because chemical data from the August 2024 sampling event had not been validated at the time this report was prepared, the analytical results will be documented in the 2025 annual inspection report.

In accordance with Section 3.7.1 of the LTSP, the next (2025) annual report will provide (1) a map with groundwater elevation data and associated hydrographs and (2) concentration versus time graphs for the four COCs at all groundwater and surface water monitoring locations.

<sup>1</sup> ACLs were initially established for ammonia, manganese, molybdenum, radium-226, and radium-228 (see Table 3 of the LTSP), but these analytes were not retained as indicator constituents in the long-term monitoring program (DOE 2023).



Analytical results will be compared with the ACLs and State of Wyoming water quality standards listed in Table 7-3.

*Table 7-3. ACLs and Groundwater and Surface Water Protection Standards for Long-Term Monitoring at the Split Rock, Wyoming, Disposal Site*

Analyte	ACLs (mg/L)		State of Wyoming Groundwater Standard (mg/L)		Surface Water Standard (mg/L) <sup>c</sup>
	NWV POC Well-5	SWV POC WN-21	Domestic Use <sup>a</sup>	Livestock Use <sup>b</sup>	
Nitrate	317	500	10	NA	10
Selenium	0.3	0.05	0.05	0.05	0.005
Sulfate	NA	NA	250	3000	NA
Uranium	4.8	3.4	NA	NA	0.03

Source: Table 9 of the LTSP (DOE 2023)

**Notes:**

<sup>a</sup> Standards are Wyoming Class I Groundwater Protection Standards for domestic use and applicable at the POE.

<sup>b</sup> Standards are Wyoming Class III Groundwater Protection Standards for livestock use and applicable at the POE.

<sup>c</sup> Standards are Human Health Values for Fish and Drinking Water that are applicable to Wyoming Class 2AB surface waters. This designation applies to the portion of the Sweetwater River that defines the site's northern boundary (and POE). Compliance with the chronic selenium standard is required.

**Abbreviations:**

mg/L = milligrams per liter

NA = not applicable (shaded cells)

According to the LTSP, ACLs, established by WNI and approved by NRC before site transition to LM, apply only “during operations and prior to the end of closure” (10 CFR 40, Appendix A, Criterion 5). Therefore, they are not considered enforceable groundwater protection standards under LM long-term management. These ACLs will be used for comparison to measured results as a possible indication of cell performance and compliance with protection standards applicable at the POE (DOE 2023). Wyoming groundwater and surface water protection standards are enforceable at the POE.

The Sweetwater River is the predicted discharge point of site-related contamination, and Wyoming Class 2AB standards are applicable. Wyoming Class III agricultural Groundwater Protection Standards for livestock use are applicable at the livestock well WN-24. Wyoming Class I domestic use groundwater protection standards are applicable at the LTSP.

### 7.7.1 Pretransition Groundwater and Surface Water Conditions

Sections 2.5.3 through 2.5.6, Section 3.7, and Appendix E (in particular) of the LTSP provide detailed site characterization information regarding groundwater and surface water conditions at and surrounding the site (DOE 2023). These characterizations were based on WNI's initial *Site Ground Water Characterization and Evaluation* (SMI 1999) but expanded to include an updated evaluation of hydrogeological conditions and analysis of water level and media-specific analytical data through 2020. As a placeholder for LM's first presentation of posttransition sampling data (scheduled for 2025), a brief summary of key findings is provided below.

Site-related contamination exiting the NWV flow regime impacts the floodplain alluvial aquifer, which is not used as a source of drinking water. This contamination has reached and continues to discharge into the Sweetwater River, but measured river concentrations remain below applicable surface water protection standards. The Sweetwater River is classified as a source for drinking water (i.e., a Wyoming Class 2AB surface water).

The Split Rock Formation regional aquifer receives site-related contamination exiting the SWV flow regime. This aquifer is used as a source of drinking water by Jeffrey City in an area upgradient of the Split Rock site that is unaffected by site-related contamination. Continued extraction of groundwater from this upgradient unaffected offsite area is not likely to draw contamination from the site (DOE 2023).

## 7.8 References

*Note: Previous compliance reports and other key site-related documents are available on the LM public website at:*

[https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Split\\_Rock](https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Split_Rock).

10 CFR 40. U.S. Nuclear Regulatory Commission, “Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content,” *Code of Federal Regulations*.

10 CFR 40.28. U.S. Nuclear Regulatory Commission, “General License for Custody and Long-Term Care of Uranium or Thorium Byproduct Materials Disposal Sites,” *Code of Federal Regulations*.

40 CFR 192. U.S. Environmental Protection Agency, “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings,” *Code of Federal Regulations*.

DOE (U.S. Department of Energy), 2010. *Baseline Soil and Characterization of the Split Rock, Wyoming, Disposal Site*, LMS/SPR/S06927, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2023. *Long-Term Surveillance Plan for the Split Rock, Wyoming, UMTRCA Title II Disposal Site, Jeffrey City, Wyoming*, LMS/SPR/S02613-0.0, Office of Legacy Management, August.

SMI (Shepherd Miller Inc.), 1999. *Site Ground Water Characterization and Evaluation*, prepared for Western Nuclear Inc., Split Rock Project, Jeffrey City, Wyoming, December.

## 7.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	90	Entrance Gate Secured by Lock and Chain
PL-2	67	Site Fence Between Granite Outcrop to Keep Livestock off Engineered Structures
PL-3	180	Repaired Fence Along Ore Road
PL-4	45	Entrance Sign
PL-5	180	Perimeter Sign on the North Side of the Stock Fence
PL-6	0	Site Marker near Entrance Gate
PL-7	—	Boundary Monument BM-17
PL-8	—	Quality Control Monument QC-3
PL-9	247	Monitoring Well SWAB-29
PL-10	90	Northwest Valley Lobe of Disposal Cell
PL-11	45	Southwest Valley Lobe of Disposal Cell
PL-12	45	Vegetation on Side Slope of Disposal Cell
PL-13	270	North Diversion Channel
PL-14	67	South Diversion Channel
PL-15	90	North Central Diversion Channel
PL-16	22	South Central Diversion Channel
PL-17	315	Swale Inlet Channel on Disposal Cell
PL-18	135	Deciduous Tree in South Diversion Channel
PL-19	135	Erosion Repair Area Completed by WNI
PL-20	337	Sand Blowout in Reclamation Area
PL-21	45	Livestock Well WN-24

**Note:**

— = Photograph taken vertically from above.



*PL-1. Entrance Gate Secured by Lock and Chain*



*PL-2. Site Fence Between Granite Outcrop to Keep Livestock off Engineered Structures*





*PL-3. Repaired Fence Along Ore Road*



*PL-4. Entrance Sign*





*PL-5. Perimeter Sign on the North Side of the Stock Fence*

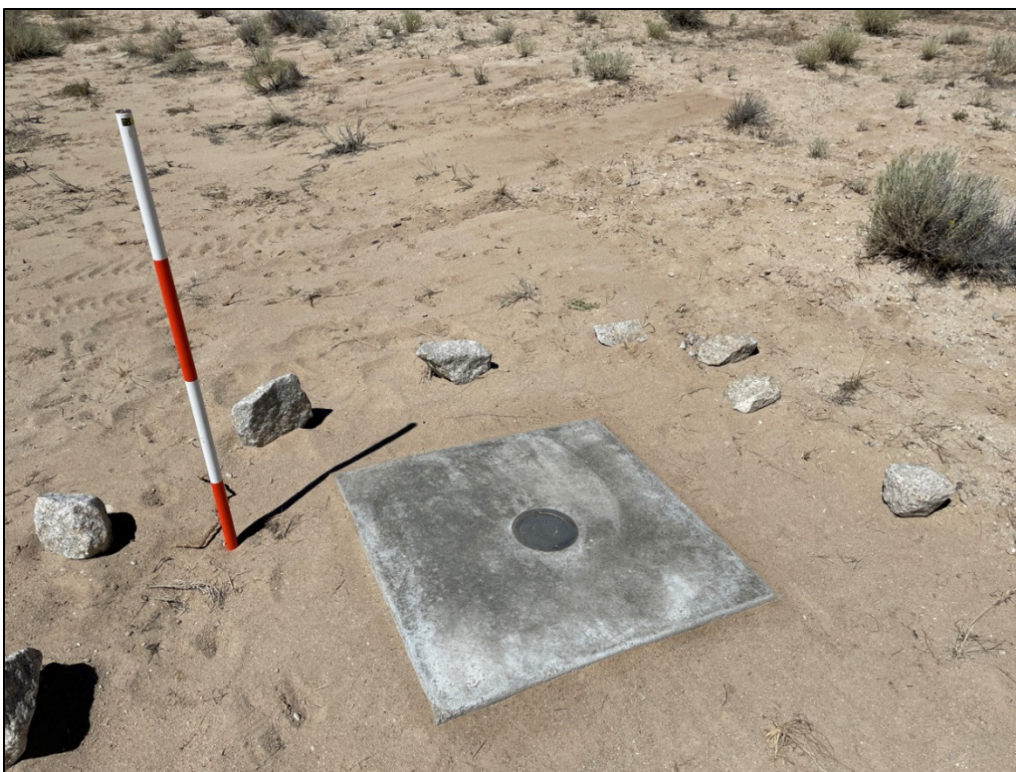


*PL-6. Site Marker near Entrance Gate*





*PL-7. Boundary Monument BM-17*



*PL-8. Quality Control Monument QC-3*





*PL-9. Monitoring Well SWAB-29*



*PL-10. Northwest Valley Lobe of Disposal Cell*





*PL-11. Southwest Valley Lobe of Disposal Cell*



*PL-12. Vegetation on Side Slope of Disposal Cell*





*PL-13. North Diversion Channel*



*PL-14. South Diversion Channel*





*PL-15. North Central Diversion Channel*



*PL-16. South Central Diversion Channel*





*PL-17. Swale Inlet Channel on Disposal Cell*



*PL-18. Deciduous Tree in South Diversion Channel*





*PL-19. Erosion Repair Area Completed by WNI*



*PL-20. Sand Blowout in Reclamation Area*



*PL-21. Livestock Well WN-24*