6.0 Grand Junction, Colorado, Disposal Site

6.1 Compliance Summary

The Grand Junction, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on November 28 and December 12, 2023. No major changes were observed on the disposal cell or in the associated drainage features. Inspectors identified minor maintenance needs that will be handled during upcoming site maintenance, but no cause for a follow-up inspection was identified.

A portion of the disposal cell remains open to receive low-activity radioactive materials from specified sources. The open disposal cell and its supporting structures and facilities are not included in the annual inspection. Ongoing disposal cell cover study areas, which include cover studies on top of the disposal cell and on lysimeter facilities adjacent to the north and west sides of the disposal cell, are not inspected. This annual inspection includes the closed portion of the disposal cell and the remaining portions of the disposal site.

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) conducts annual groundwater monitoring at the site as a best management practice. Two monitoring wells (0731 and 0732) are sampled to verify that groundwater in onsite paleochannels is not affected by potential seepage from the disposal cell. A third monitoring well (0733) is primarily used to measure water levels within the disposal cell. Groundwater monitoring of all three wells was completed on July 6, 2023.

6.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the closed portion of the disposal cell and the remaining portions of the site are specified in the site-specific Interim Long-Term Surveillance Plan (DOE 1998) (LTSP) 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 40.27 (10 CFR 40.27). Table 6-1 lists these requirements.

Table 6-1. Interim Requirements for the Grand Junction, Colorado, Disposal Site

Requirement	LTSP	This Report	10 CFR 40.27
Annual Inspection and Report	Sections 3.0 and 6.2	Section 6.4	(b)(3)
Follow-Up Inspections	Section 3.4	Section 6.5	(b)(4)
Maintenance and Repairs	Sections 2.7.3 and 4.0	Section 6.6	(b)(5)
Corrective Action	Section 5.0	Section 6.8	—
Groundwater Monitoring	Section 2.6	Section 6.7	(b)(2), (b)(3)

In December 2020, Congress passed legislation that extends the final disposal cell closure date from 2023 to 2031. Unless additional legislation is enacted by Congress further extending the final cell closure date, LM's operations to receive radioactive waste at the site are planned to cease in September 2031. Following final closure of the disposal cell, the Interim LTSP

(DOE 1998) for the site will be revised and finalized; with NRC acceptance of the final LTSP, the site will be subject to the NRC general license.

6.3 Institutional Controls

The 360-acre site, identified by the property boundary shown in Figure 6-1, is owned by the United States. Low-activity radioactive waste will be received until the disposal cell's legally mandated closure date or until it is filled to capacity, whichever comes first. Institutional controls (ICs) at the site include federal ownership of the property, administrative controls, and the following physical ICs that are inspected annually: the closed portion of the disposal cell and associated drainage features, access and entrance gates and signs, perimeter fence and signs, boundary monuments, and wellhead protectors.

6.4 Inspection Results

The site, 18 miles southeast of Grand Junction, Colorado, was inspected on November 28 and December 12, 2023. The inspection was conducted by J. Lobato, P. Wetherstein, and H. Petrie of the Legacy Management Support contractor. S. Woods (LM) and M. Cosby (Colorado Department of Public Health and Environment) also 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 Interim LTSP, and evaluate whether maintenance or a follow-up inspection and monitoring are needed.

6.4.1 Site Surveillance Features

Figure 6-1 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. Observations from previous inspections that are currently monitored are shown in blue, and new observations identified during the 2023 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 6-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 6.10.

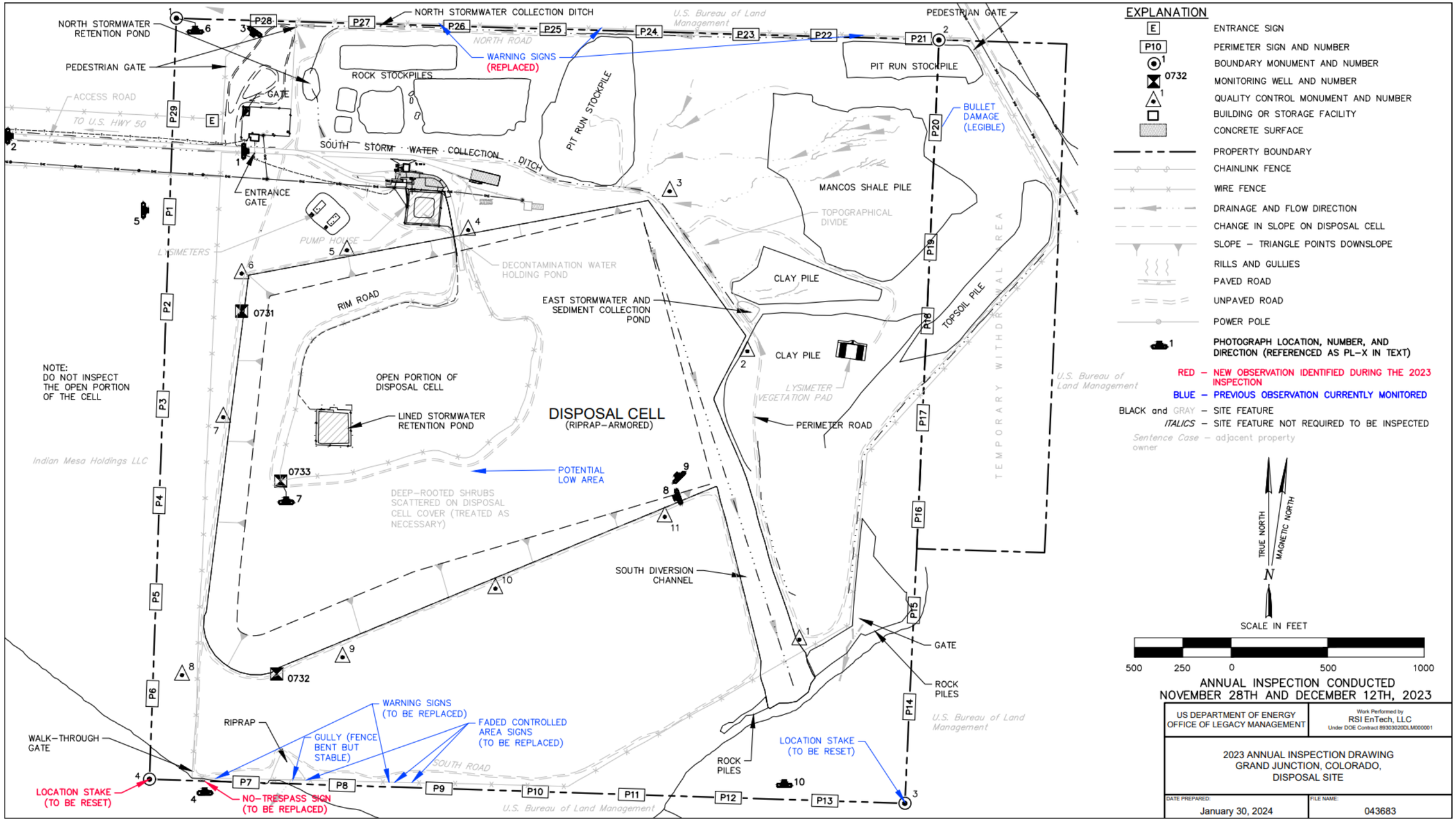


Figure 6-1. 2023 Annual Inspection Drawing for the Grand Junction, Colorado, Disposal Site

6.4.1.1 Access Road, Entrance Gates, and Entrance Signs

Access to the site is from U.S. Highway 50 by a right-of-way grant on federal land that is administered by the U.S. Bureau of Land Management (BLM). A steel double-swing gate along the highway right-of-way fence provides access to the BLM-administered right-of-way that leads to the site entrance gate. The access gate was secured at the time of the inspection (PL-1), and the lock was replaced during the inspection. Site access signs next to the gate were in good condition. No maintenance needs were identified.

Although it is not required by the Interim LTSP, LM maintains the site access road and associated right-of-way. The right-of-way is bounded by two barbed-wire fences that parallel the north and south sides of the site access road, with two stock gates included in each fence. Locks have been replaced on all access gates. No other maintenance needs were identified.

The solar-powered site entrance gate is secured by an electronic locking device that requires entry of a keypad code to open the gate. The entrance gate was functional at the time of the inspection (PL-2). Site entrance signs on and next to the entrance gate were in good condition.

The DOE contact number on the main entrance sign was updated with the new number. No maintenance needs were identified.

6.4.1.2 Perimeter Fence and Signs

A perimeter fence encloses the disposal cell features and operations areas (PL-3). It consists of a standard four-strand barbed-wire fence in some areas and a woven wire fence topped with barbed wire in others. The perimeter fence does not match the property boundary in several areas. The perimeter fence includes warning signs ("No-Trespassing" and "Controlled Area" signs) positioned at regular intervals. Multiple warning signs on the south perimeter fence are partially detached or illegible and (PL-4). The warning signs will be repaired or replaced before the next inspection.

There are 29 perimeter signs attached to steel posts set in concrete that are positioned at regular intervals along the property boundary (PL-5). Several perimeter signs along the south property boundary are faded or peeling but remain legible. Perimeter sign P20, replaced in 2021 because of bullet damage, has bullet damage again but remains legible. No other maintenance needs were identified.

6.4.1.3 Site Markers

Granite site markers similar to those at other UMTRCA sites will not be installed until final closure of the disposal cell in 2031.

6.4.1.4 Boundary Monuments

Four boundary monuments delineate the corners of the property boundary (PL-6). All were present and in good condition. The location stakes at boundary monuments BM-3 and BM-4 need to be reset. No other maintenance needs were identified.

6.4.1.5 Aerial Survey Quality Control Monuments

Eleven aerial survey quality control monuments were inspected. No maintenance needs were identified.

6.4.1.6 Monitoring Wells

The groundwater monitoring network consists of three monitoring wells: 0731, 0732, and 0733 (Figure 6-2) (well 0733 is shown in PL-7). All wellhead protectors were locked and undamaged. Root growth was observed in the well screens of monitoring wells 0731 and 0732 in 2021 (DOE 2022). The wells were redeveloped in 2022 (DOE 2023), and no root growth issues were observed during the 2023 sampling event. Weed spraying around each wellhead was completed in spring 2023 to keep out any deep-rooted plants. No other maintenance needs were identified.

6.4.2 Inspection Areas

In accordance with the Interim LTSP, the site is divided into four inspection areas to ensure a thorough and efficient inspection. The inspection areas are (1) the closed portion of the disposal cell, (2) diversion structures and drainage channels, (3) the area between the disposal cell and the property boundary or site perimeter fence, and (4) the outlying area. Inspectors examined specific site surveillance features within each area and looked for evidence of erosion, settling, slumping, or other modifying processes that might affect the integrity of the disposal cell and the site's conformance with the Interim LTSP requirements.

6.4.2.1 Closed Portion of the Disposal Cell

The closed portion of the disposal cell is armored with basalt riprap to control erosion (PL-8). The rock showed no significant weathering. During the 2022 inspection, inspectors noted an area, approximately 23 × 12 feet (ft), east of monitoring well 0733 that appears to be a low area. In 2023, inspectors noted no change to this area. Inspectors will continue to monitor this area. There was no evidence of erosion, settling, slumping, rock degradation, or other modifying processes that might affect the integrity of the disposal cell (PL-9).

Grasses and weeds were growing on most of the disposal cell cover (PL-9). Historically, deep-rooted shrubs on top of the disposal cell have been treated with herbicide. Although treatment is not required by the Interim LTSP, LM plans to continue controlling the deep-rooted shrubs as needed. No maintenance needs were identified.

Figure 6-2. Groundwater Monitoring Network for the Grand Junction, Colorado, Disposal Site

6.4.2.2 Diversion Structures and Drainage Channels

The south diversion channel is a large, riprap-armored structure that intercepts run-on water from offsite and onsite, as well as stormwater runoff from the disposal cell, and conveys the water into a natural drainage that flows away from the site to the southwest (PL-10). Grasses, weeds, and shrubs growing within the diversion channel are not expected to affect the channel's performance. The discharge area of the channel is armored with large-diameter basalt riprap. No maintenance needs were identified.

Other drainage features at the site include north and south stormwater collection ditches, the north stormwater retention pond, and the east stormwater and sediment collection pond. No maintenance needs were identified.

6.4.2.3 Area Between the Disposal Cell and the Site Boundary or Perimeter Fence

There are 11 discrete stockpiles of rock and soil between the disposal cell and the perimeter fence on the north and west sides of the site. Most of these materials eventually will be used to cover and close the open portion of the disposal cell. Vegetation and surface rocks generally protect the stockpiles from significant erosion.

Most of the flat areas between the disposal cell and the property boundary are vegetated with native shrubs, scant perennial grasses, and annual weeds. This area includes roads adjacent to the inside of the site perimeter fence, the disposal cell, the south diversion channel, the site stormwater collection ditches, and a few other locations. Localized erosion was reported in 2021 at two locations on the perimeter road adjacent to the east side of the south diversion channel (Figure 6-1). Those erosion areas were partially repaired in 2022, and repairs will continue with the ongoing maintenance of site stormwater collection ditches. In addition, general maintenance of other parts of the perimeter road are planned to coincide with the next receive and place estimated to be sometime in 2025. No other maintenance needs were identified.

6.4.2.4 Outlying Area

The 0.25-mile area beyond the site boundary was visually observed for erosion, changes in land use, or other phenomena that might affect the long-term integrity of the site. No such changes were identified. Most of the land surrounding the site is rangeland administered by BLM, and private property on the west side is used primarily for cattle grazing. No land-use changes were evident in those areas. Outside the site's eastern boundary is a 40-acre temporary withdrawal area that was issued by BLM to DOE for stockpiled materials. Some of the withdrawal area is included within the site perimeter fence and contains stockpiled materials. This area is not included in the Interim LTSP. No maintenance needs were identified.

6.5 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.

6.6 Maintenance and Repairs

Before the inspection, the following maintenance items were completed or partially completed:

- Replacement of warning signs along the north fence line
- Partial repairs to the two eroded areas adjacent to the east side of the perimeter road

Inspectors identified the following maintenance items that will be completed before the next inspection:

- Replacement or repair of warning signs on the south perimeter fence
- Reset of the location stake at boundary monuments BM-3 and BM-4
- Continued repairs on the areas adjacent to the perimeter road

No other maintenance needs were identified.

6.7 Groundwater Monitoring

In accordance with the Interim LTSP, LM conducts annual groundwater monitoring as a best management practice. Groundwater at the site qualifies for supplemental standards because it is designated as limited use with no numerical concentration limits for hazardous constituents identified at the site (DOE 1998). This designation applies when groundwater in the upper aquifer is not a current or potential source of drinking water. The disposal cell is underlain by 5 to 40 ft of alluvium. Beneath the alluvium is approximately 700 ft of Mancos Shale, which overlies the uppermost aquifer at the site, the Dakota Sandstone. Groundwater in the site area occurs in thin paleochannels within lower portions of alluvium deposits and in the confined Dakota Sandstone unit. Groundwater in the Dakota Sandstone is designated as limited use because total dissolved solids (TDS) concentrations exceed 10,000 milligrams per liter (mg/L). LM monitors groundwater from three monitoring wells adjacent to and in the disposal cell to determine if groundwater in onsite paleochannels is, or is not, affected by seepage (i.e., transient drainage) from the disposal cell (Table 6-2 and Figure 6-2). The most recent sampling event occurred on July 6, 2023.

Table 6-2. Groundwater Monitoring Network at the Grand Junction, Colorado, Disposal Site

Monitoring Well	Hydrologic Relationship
0731	Paleochannel, downgradient, edge of disposal cell, north side
0732	Paleochannel, downgradient, edge of disposal cell, south side
0733	Disposal cell, deepest location, center

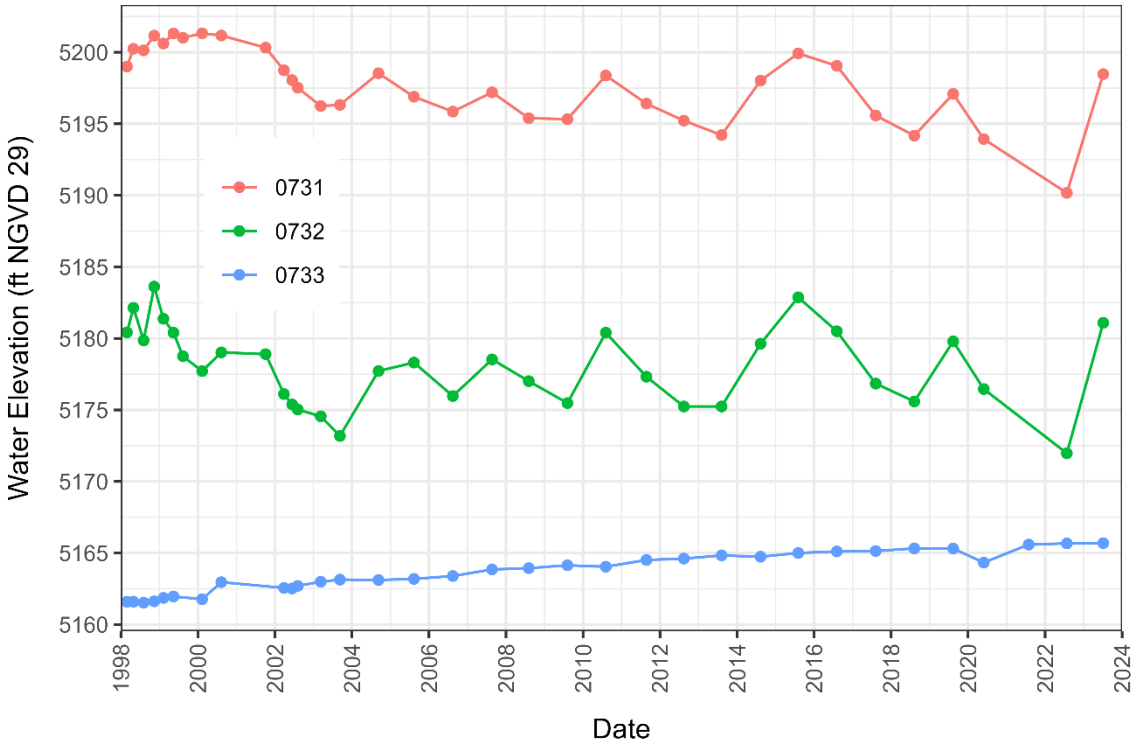
Monitoring wells 0731 and 0732 are screened within the alluvial paleochannels adjacent to the disposal cell and extend 5 to 7.5 ft into weathered Mancos Shale. These wells are in two separate paleochannel systems downgradient from the disposal cell (DOE 1998). Monitoring well 0733 is screened in the lower tailings within the disposal cell at an elevation that is below the paleochannel monitoring wells (Figure 6-2). Disposal cell construction was initiated by excavating Mancos Shale, which resulted in the base of the disposal cell being below the

weathered Mancos Shale horizon. Monitoring well 0733 is primarily used to measure water levels within the disposal cell. All groundwater monitoring results for the site are reported and published on the LM Geospatial Environmental Mapping System (GEMS) website (https://gems.lm.doe.gov/#site=GRJ).

6.7.1 Groundwater-Level Monitoring

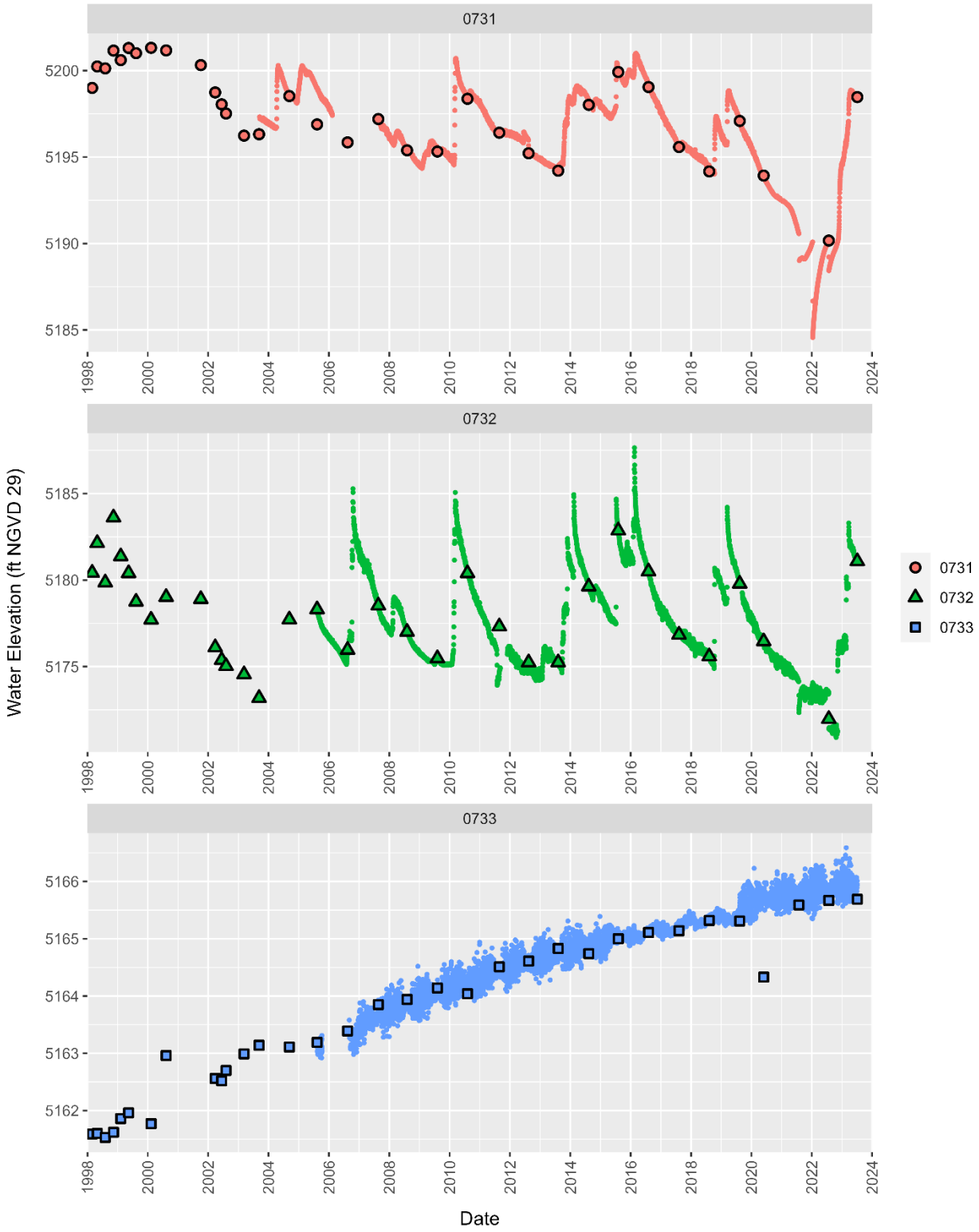
Static water-level measurements are obtained from each monitoring well before water quality samples are collected. These data are shown in Figure 6-3 for 1998–2023. The date for this and subsequent figures begins in 1998, coinciding with the issuance of the LTSP and installation of well 0733. As such, data from 1995 to 1997 for wells 0731 and 0732 are not shown. The timing of groundwater elevation fluctuations in wells 0731 and 0732 is similar (Figure 6-3), suggesting that the two paleochannel systems are influenced by the same upgradient recharge mechanisms. Water levels in disposal cell monitoring well 0733 have increased significantly (approximately 4 ft since 1998) but remain lower than water elevations in the two paleochannel monitoring wells (Figure 6-3).

Because the scale in Figure 6-3 spans approximately 40 ft, to provide greater resolution, Figure 6-4 plots the same data using unique scales to better show the magnitude of groundwater elevation fluctuations in each individual well. This figure also includes corresponding continuous water-level measurements obtained from pressure transducers installed in each of the wells in accordance with the LTSP (DOE 1998). Higher frequency water-level measurements from the pressure transducers enable better understanding of sources of recharge to the paleochannel systems and fluctuations in analyte concentrations.



Abbreviation: NGVD 29 = National Geodetic Vertical Datum of 1929

Figure 6-3. Manual Water-Level Measurements at the Grand Junction, Colorado, Disposal Site



Notes: The large symbols represent discrete water-level measurements from annual sampling events (shown in Figure 6-3). The small symbols are daily averages of corresponding transducer readings. The marked anomalous decline in water elevations shown for well 0731 datalogger data in early 2022 is likely due to a January 12, 2022, well redevelopment event.
Abbreviation: NGVD 29 = National Geodetic Vertical Datum of 1929

Figure 6-4. *Water Elevations from Discrete Measurements and Corresponding Transducer Readings*

6.7.2 Groundwater Quality Monitoring

In accordance with the LTSP, annual groundwater samples are analyzed for standard field parameters and the following indicator analytes: molybdenum, nitrate, polychlorinated biphenyls (PCBs), selenium, sulfate, TDS, uranium, and vanadium. The key indicator analytes are molybdenum, nitrate, selenium, and uranium. Results for these indicator parameters are compared to UMTRCA maximum concentration limits (MCLs) (40 CFR 192 Table 1 Subpart A), background concentrations from groundwater in alluvium, and background concentrations from groundwater in the Mancos Shale (Table 6-3). Background monitoring wells were installed, monitored, and abandoned before the disposal cell was constructed. Monitoring well concentration data are compared to the highest of the three values in Table 6-3 as a best management practice to determine if there is any potential seepage from the disposal cell. MCLs are listed for comparison evaluation only and not for compliance purposes.

Table 6-3. Maximum Concentration Limits and Maximum Background Concentrations for Groundwater in Alluvium and the Mancos Shale at the Grand Junction, Colorado, Disposal Site

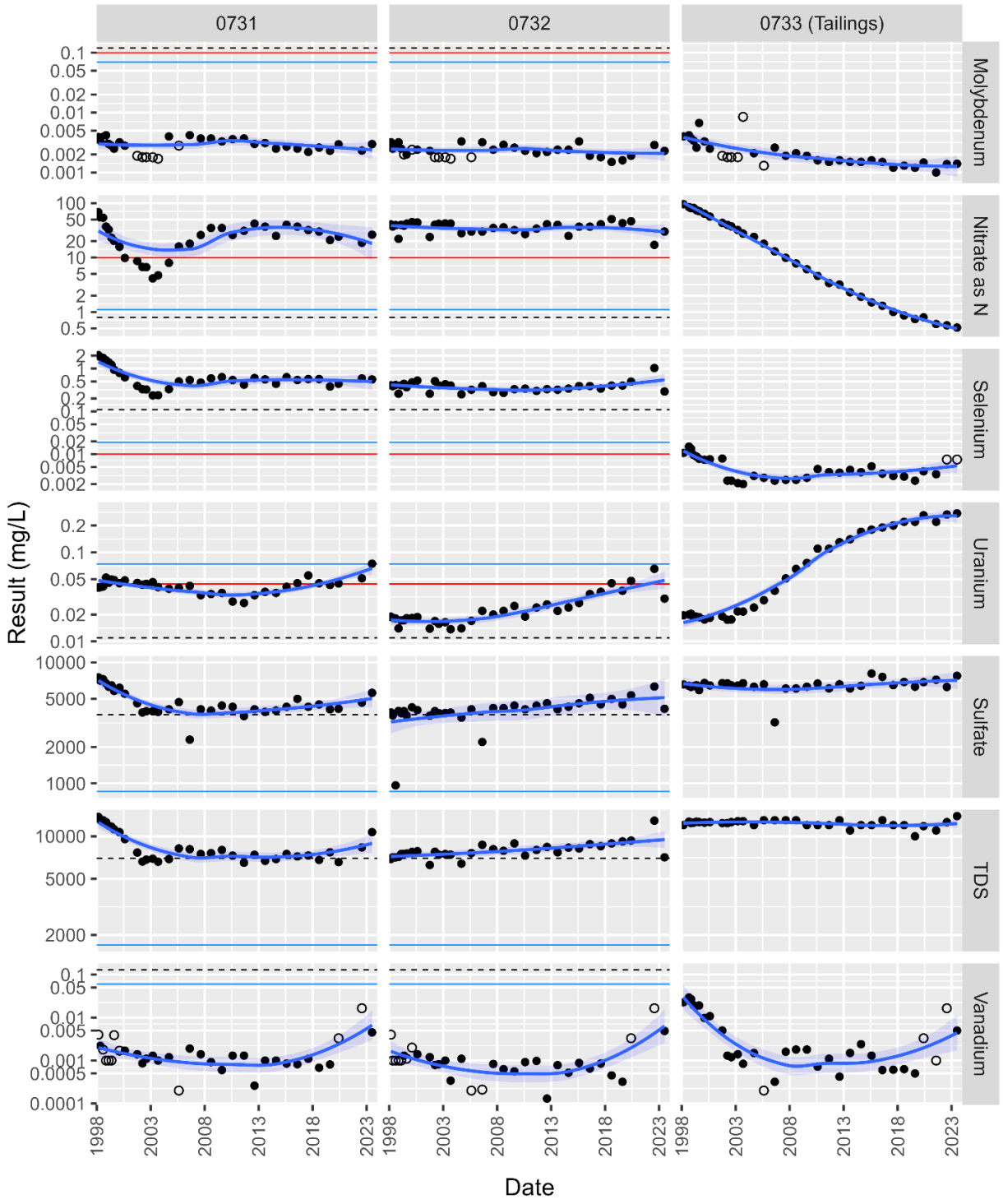
Constituent	MCL[a] (mg/L)	Maximum Concentration in Background Groundwater in Alluvium[b] (mg/L)	Maximum Concentration in Background Groundwater in the Mancos Shale[b] (mg/L)
Molybdenum	0.1	0.070	0.12
Nitrate (as nitrogen)	10	1.1	0.80
Selenium	0.01	0.019	0.11
Uranium	0.044	0.074	0.011
Sulfate	None	860	3700
TDS	None	1700	7000
Vanadium	None	0.060	0.13

Notes:

[a] MCLs as listed in 40 CFR 192 Table 1 Subpart A. U.S Environmental Protection Agency (EPA) secondary drinking water standards for sulfate and TDS are 250 and 500 mg/L, respectively. There are no EPA MCLs for vanadium.

[b] Maximum background concentrations listed for groundwater in alluvium and Mancos Shale are from Attachment 3 of DOE 1991, Table 3.34 and Table 3.37, respectively.

Figure 6-5 provides a matrix of time-concentration plots for each site monitoring well and analyte combination from 1998 to the present. Results for the key indicator analytes are shown first, followed by results for remaining analytes (sulfate, TDS, and vanadium). Data for the key indicator analytes are plotted relative to the MCLs and maximum background concentrations listed in Table 6-3. In accordance with LTSP requirements to evaluate analyte concentration trends in the monitoring wells (Section 2.6.2 of DOE 1998), Mann-Kendall trend analysis was conducted for all indicator analyte-well combinations to characterize the direction of concentration trends. Table 6-4 identifies analyte-well combinations with statistically significant increasing (or decreasing) trends based on the detailed Mann-Kendall trend test summary. The results referred to in the following discussion are presented to two significant figures.



● Detect ○ Nondetect

LOESS local regression line and 95% pointwise confidence interval

Limits or comparative maximum background concentrations from Table 6-3 (not appliable to tailings well 0733):

MCL

Maximum background concentration in alluvium

- - - Maximum background concentration in Mancos Shale

Note: Wells 0731 and 0732 were sampled in 2021, but the analytical results were rejected and deemed nonreportable (DOE 2022).

Abbreviations: LOESS = locally estimated scatterplot smoothing, N = nitrogen

Figure 6-5. Time-Concentration Plots of All Analytes in Groundwater (1998–2023)

Table 6-4. Mann-Kendall Trend Analysis Results for Indicator Parameters in Grand Junction, Colorado, Disposal Site Monitoring Wells, 1998–2023

Parameter[a]	Well	Number of Samples[b]	Number of Nondetects	Kendall's tau[c,d]	p-value[c,d]	Trend[c,d]
Key Indicator Analytes						
Molybdenum	0731	33	7	−0.16	0.21	No Trend
Molybdenum	0732	33	7	−0.13	0.29	No Trend
Molybdenum	0733	33	6	−0.55	<0.001	Decreasing
Nitrate as N	0731	33	0	−0.01	0.95	No Trend
Nitrate as N	0732	33	0	−0.06	0.65	No Trend
Nitrate as N	0733	33	0	−0.99	<0.001	Decreasing
Selenium	0731	33	0	−0.29	0.019	Decreasing
Selenium	0732	33	0	−0.06	0.61	No Trend
Selenium	0733	33	2	−0.29	0.018	Decreasing
Uranium	0731	33	0	−0.08	0.54	No Trend
Uranium	0732	33	0	0.60	<0.001	Increasing
Uranium	0733	33	0	0.82	<0.001	Increasing
Remaining Analytes[e]						
Sulfate	0731	33	0	−0.28	0.025	Decreasing
Sulfate	0732	33	0	0.57	<0.001	Increasing
Sulfate	0733	33	0	0.15	0.23	No Trend
TDS	0731	33	0	−0.42	0.001	Decreasing
TDS	0732	33	0	0.54	<0.001	Increasing
TDS	0733	33	0	−0.14	0.26	No Trend
Vanadium	0731	33	10	−0.06	0.63	No Trend
Vanadium	0732	33	11	−0.04	0.75	No Trend
Vanadium	0733	33	4	−0.48	<0.001	Decreasing

Notes:

[a] For all well-parameter combinations, the initial trend analysis date is February 27, 1998, and the final trend analysis date is July 6, 2023.

[b] Duplicate sample results were excluded from the trend analysis.

[c] Trend tests were performed using the "NADA: Nondetects and Data Analysis for Environmental Data" package in R, version 1.6-1.1 (Lee 2020). The NADA trend test is similar to the traditional Mann-Kendall trend test except that it accounts for the presence of nondetects at multiple detection limits.

[d] Trend analyses were conducted at the 0.05 significance level using a two-sided test. A calculated p-value of less than 0.05 indicates that a significant trend in the time series exists. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between −1 and +1.

[e] PCBs are not addressed in this summary because results for all wells have been below detection limits.

Abbreviation:

N = nitrogen

Key Indicator Analytes

Molybdenum concentrations in all three monitoring wells have been consistently below both the MCL of 0.1 mg/L and corresponding background concentrations (by at least one order of magnitude), with results ranging from 0.0010–0.0067 mg/L overall and from 0.0014–0.0030 mg/L in 2023. A statistically significant decreasing trend was identified for

well 0733, while concentrations in the two paleochannel wells have remained steady (no significant trend) since 1998 (Table 6-4).

With few exceptions, nitrate (as nitrogen) concentrations in paleochannel monitoring wells 0731 and 0732 have consistently exceeded the 10 mg/L MCL and corresponding background concentrations, generally ranging between about 20–40 mg/L (Figure 6-5). Exceptions apply to the 2000–2004 period, when nitrate concentrations in well 0731 decreased to as low as 4.6 mg/L, which is below the MCL. Results in 2023 were 26 mg/L and 30 mg/L, respectively. As noted in previous annual reports (e.g., DOE 2023), nitrate concentrations in disposal cell monitoring well 0733 have decreased significantly (Table 6-4), and this trend appears to be inversely correlated with the increasing trend in uranium concentrations (discussed below). Concentrations declined steadily from 96 mg/L in 1998 to 0.52 mg/L in 2023 (Figure 6-5). A possible explanation for this trend is increased reducing conditions (less oxygen) over time in this well, but this hypothesis has not been confirmed.

Selenium occurs naturally in the Mancos Shale deposits that underlie the disposal cell (DOE 1991), with concentrations ranging as high as 0.11 mg/L, exceeding the MCL of 0.01 mg/L (Table 6-3). Selenium concentrations in wells 0731 and 0732 have consistently exceeded background and the corresponding MCL of 0.01 mg/L, with most results ranging from 0.23 to 0.63 mg/L (Figure 6-5). The highest selenium concentrations have been measured in well 0731, where concentrations declined from 2.1 mg/L in 1998 to 0.30 mg/L in 2002, accounting for the statistically significant decreasing trend noted in Table 6-4. Concentrations in this well have remained fairly stable since then. No significant trend was found for selenium in well 0732, where concentrations have ranged from 0.24 to 1.0 mg/L. The most recent (2023) result in this well was 0.29 mg/L. The influence of the Mancos Shale is not evident in disposal cell monitoring well 0733 (screened in the lower tailings), where selenium concentrations have ranged from 0.0020 to 0.015 mg/L (Figure 6-5). The 2023 selenium result for well 0733 was below the detection limit (<0.0075 mg/L), equivalent to the 2022 result (DOE 2023).

Before 2023, uranium concentrations in well 0731 ranged from 0.027 to 0.055 mg/L, periodically exceeding the 0.044 mg/L MCL but consistently below the maximum concentration in background alluvial groundwater (0.074 mg/L) (Figure 6-5). The most recent (2023) result was 0.075 mg/L, a historical maximum essentially equaling the background value. Uranium concentrations in wells 0732 and 0733 continue to exhibit statistically significant increasing trends (Table 6-3). The maximum concentration in well 0732 (0.065 mg/L) was measured in 2022; the concentration declined in 2023 to 0.030 mg/L, which is below the MCL. The most recent (2023) uranium result for well 0733, 0.27 mg/L, is the historical maximum. Relatively high concentrations of uranium and other constituents are expected for a well screened in the disposal cell tailings. Concentrations of constituents of concern in well 0733 are not subject to compliance goals and are monitored solely for information gathering purposes.

Remaining Analytes

As there are no comparative concentration limits for the non-key indicator analytes, this discussion is limited to a brief summary of overall trends for sulfate, TDS, vanadium, and PCBs. Statistically significant trends in sulfate and TDS concentrations continue to be found for both paleochannel wells, with trends decreasing in well 0731 and increasing in well 0732 (Table 6-3). Sulfate concentrations in wells 0731 and 0732 have averaged between approximately

4000–5000 mg/L, while those in well 0733 have been slightly higher (6000–7000 mg/L). TDS concentrations are also highest in tailings well 0733 (generally 12,000–13,000 mg/L), relative to those in wells 0731 and 0732 (with most results ranging between 7000 and 9000 mg/L). The most recent TDS concentration in well 0733, 14,000 mg/L, is a historical maximum. Sulfate and TDS concentrations in wells 0731 and 0732 have been near or above the Mancos Shale background values of 3700 and 7000 mg/L, respectively. Sulfate and TDS concentrations in wells 0731 and 0732 have been much greater than the alluvial groundwater background values of 860 and 1700 mg/L, respectively (Figure 6-5).

Vanadium concentrations in paleochannel wells 0731 and 0732 have typically ranged from 0.0010 to 0.0020 mg/L, with about 30% of results below detection limits (Figure 6-5, Table 6-4). A statistically significant decreasing trend was found for vanadium in well 0733 (Table 6-4), stemming largely from the early sharp decrease in concentrations between 1998 and 2002, from 0.029 to 0.0012 mg/L. Since 2002, vanadium concentrations in this well have been generally stable, with most results ranging from 0.0010–0.0030 mg/L. In 2023, vanadium concentrations in wells 0731, 0732, and 0733 were 0.0045, 0.0049, and 0.0050 mg/L, respectively. Vanadium concentrations in wells 0731 and 0732 have been well below Mancos Shale and alluvial groundwater background values of 0.013 and 0.060 mg/L, respectively (Figure 6-5).

PCBs (Aroclors) continue to be monitored but have never been detected in site monitoring wells.

6.8 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192. No need for corrective action was identified. However, monitoring wells 0731 and 0732 are sampled as a best management practice to verify that groundwater in onsite paleochannels is not affected by potential seepage from the disposal cell. There are no set compliance standards for this best management practice monitoring, but NRC and state notification is required if any constituents have increasing trends above respective MCLs as specified in the Interim LTSP (DOE 1998). Based on the exceedance of background concentrations for nitrate, selenium, uranium, sulfate, and TDS from groundwater in the alluvium or the Mancos Shale, current data indicate that these two wells may be affected by disposal cell seepage. LM has initiated an alluvial aquifer characterization effort to further evaluate the data from wells 0731 and 0732 and follow the requirements of the Interim LTSP (DOE 1998) for past, current, and future constituent concentrations (including uranium).

6.9 References

10 CFR 40.27. U.S. Nuclear Regulatory Commission, “General License for Custody and Long-Term Care of Residual Radioactive Material 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*.

40 CFR 192 Table 1 Subpart A. U.S. Environmental Protection Agency, “Maximum Concentration of Constituents for Groundwater Protection,” *Code of Federal Regulations*.

DOE (U.S. Department of Energy), 1991. *Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Grand Junction, Colorado*, DOE/AL/050505.0000, UMTRA Project Team, September.

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6.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL–1	90	Site Access Gate and Signs
PL–2	90	Solar Entrance Gate and Signs
PL–3	215	West Perimeter Fence Line
PL–4	0	Faded Sign, South Perimeter Fence Line
PL–5	90	Perimeter Sign P1
PL–6	—	Boundary Monument BM-1
PL–7	—	Monitoring Well 0733
PL–8	250	Disposal Cell, South Side Slope
PL–9	315	Disposal Cell Top
PL–10	0	South Diversion Channel

Note:
— = Photograph taken vertically from above.

PL–1. Site Access Gate and Signs

PL–2. Solar Entrance Gate and Signs

PL–3. West Perimeter Fence Line

PL–4. Faded Sign, South Perimeter Fence Line

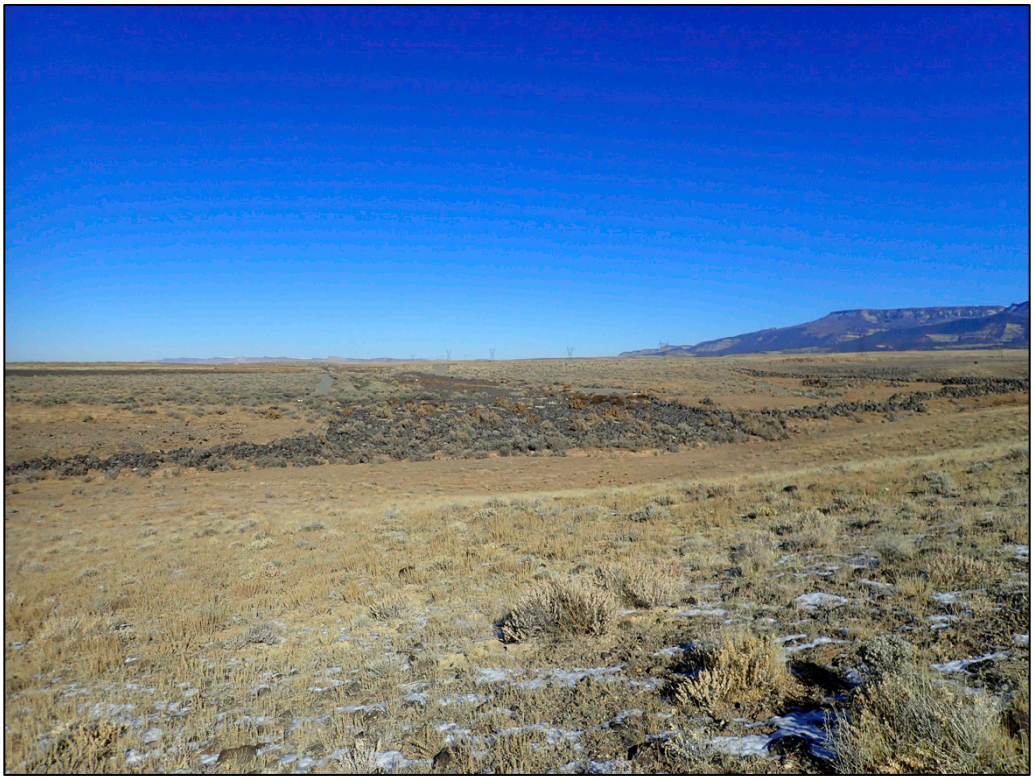
PL–5. Perimeter Sign P1

PL–6. Boundary Monument BM-1

PL–7. Monitoring Well 0733

PL–8. Disposal Cell, South Side Slope

PL–9. Disposal Cell Top



PL–10. South Diversion Channel