

4.0 Durango, Colorado, Disposal Site

4.1 Compliance Summary

The Durango, Colorado, Disposal Site, inspected on August 14, 2007, is in good condition. In June 2006, the criteria for permanent closure of the transient drainage water collection and treatment system were met; however, an increased uranium concentration reported downgradient needs to be evaluated. In 2007, a solar-powered water management system was installed to distribute retention pond water to drip lines used to enhance evaporation. Infestations of noxious weeds continue to be monitored and controlled with herbicide. Vandalism, primarily theft and damage to signs, continues at the site. No other maintenance needs or cause for a follow-up or contingency inspection was identified.

4.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Durango, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site are specified in the *Long-Term Surveillance Plan [LTSP] for the Bodo Canyon Disposal Site, Durango, Colorado* (DOE/AL/62350-77, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, September 1996) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 4-1.

Table 4-1. License Requirements for the Durango, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 4.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 4.3.2
Routine Maintenance and Repairs	Section 8.0	Section 4.3.3
Groundwater Monitoring	Section 5.0	Section 4.3.4
Corrective Action	Section 5.0	Section 4.3.5

Institutional Controls—Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, warning/no trespassing signs (entrance and perimeter signs) placed along the property boundary and a locked gate at the entrance to the site. The 121-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1996. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site.

Inspectors found no evidence that these institutional controls were ineffective or violated.

4.3 Compliance Review

4.3.1 Annual Inspection and Report

The site, located southwest of Durango, Colorado, was inspected on August 14, 2007. Results of the inspection are described below. Features and photograph locations (PLs) discussed in this

report are shown on Figure 4–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

4.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gates, Entrance Sign, and Perimeter Signs—Access to the site is by La Plata County Road 212, which is a dedicated public right-of-way that crosses the southwest corner of DOE property. The entrance gate and guardrails along the county road, installed in 2000, and the original entrance gate closer to the cell were in good condition.

- 4A The entrance sign, which had been vandalized by buckshot to the extent that it was no longer legible (PL–1), was replaced. Numerous other perimeter signs have bullet holes but remain legible. Perimeter sign P2 has been stolen a number of times and is no longer being replaced. The site remains well delineated by the 81 other perimeter signs. The base of perimeter sign P44 is being undercut by erosion, but currently remains stable (PL–2).

Trespass and vandalism have been difficult to control at the site. Although DOE has implemented various engineered, institutional, and administrative controls at this site, including increased patrols by County Sheriff officers, vandalism continues to be an ongoing concern and maintenance issue. Impacts resulting from the construction of the nearby Animas-La Plata Project and increased recreational use in the area will continue to be monitored.

Site Markers, Survey and Boundary Monuments—All site markers, survey monuments, and boundary monuments are in excellent condition except for SMK–1, BM–3, BM–4, and BM–6. Site marker SMK–1 near the entrance gate was superficially pocked from gunfire but is legible. Boundary monument BM–3 and two of its reference monuments are situated in a small gully and threatened by erosion; however, the monuments are currently stable. One of the reference monuments for boundary monument BM–4 has been bent to the ground and the cap removed, but BM–4 itself is intact. Boundary monument BM–6 was destroyed prior to the 2004 inspection during construction of a pipeline near the site. A decision was made not to replace it because both of its witness corners are present and remain in good condition. The northern witness corner is becoming overgrown with oak brush. The brush will be cleared away in 2008.

Monitor Wells and Other Wells—Monitor wells were locked and in good condition. The cap on one of the disposal cell’s transient drainage collection system vent wells, PVC #1, is cracked but remains functional.

4.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into six areas referred to as transects: (1) the top of the disposal cell; (2) the side slopes of the disposal cell; (3) the drainage ditches; (4) the treatment cells and holding pond; (5) the site boundary; and (6) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

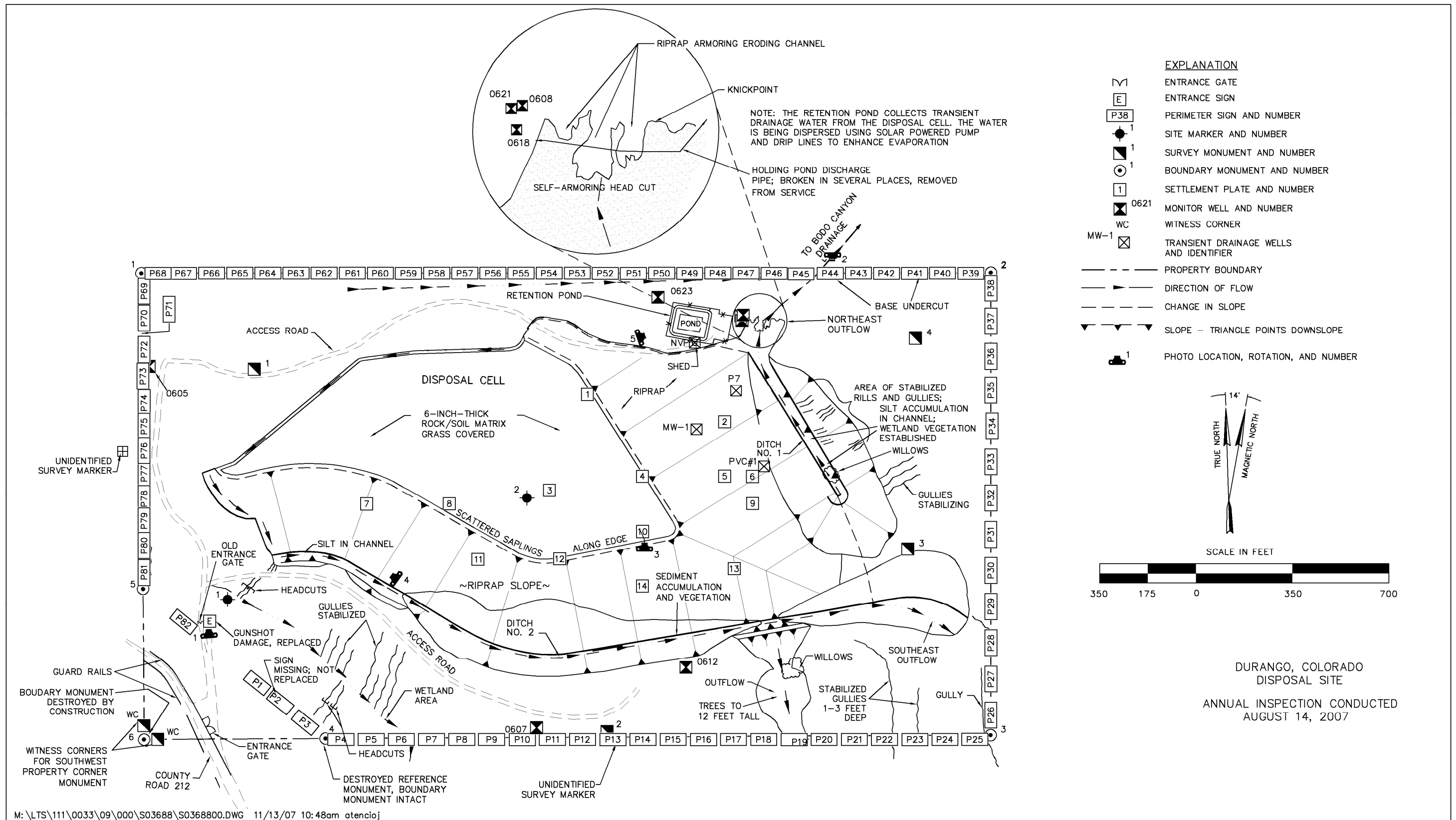


Figure 4-1. 2007 Annual Compliance Drawing for the Durango, Colorado, Disposal Site

Top of Disposal Cell—The top of the disposal cell is vegetated and in excellent condition. No evidence of settling, slumping, and erosion was observed.

Vegetation on the soil rock matrix cover remains healthy. Plant cover consists primarily of seeded grass species and several “volunteer” species, including deep-rooted woody shrubs.

Although the aboveground height of the dryland alfalfa found growing on the cell top will never exceed the 3.5-foot criterion listed in the LTSP for woody species, it is known to be a deep-rooted plant. This species is now being controlled on the disposal cell cover (PL-3). No deep-rooted woody species were found on the cell top in 2007. The noxious musk thistle and deep-rooted alfalfa plants were treated with herbicide in September 2007.

In the past, small rodents have dug burrows in the top of the disposal cell near site marker SMK-2. Inspectors noted that the burrows appeared to be abandoned in 2007. Burrow holes will continue to be monitored but do not appear to be a problem at this time.

Side Slopes of Disposal Cell—The riprap-covered side slopes of the disposal cell are in excellent condition and continue to prevent subsidence, rock deterioration, or slope failure.

- 4B The 2006 treatment of a variety of deep-rooted woody shrubs and trees was successful, and woody species observed on the cell in 2007 were all less than 1 foot high. Two noxious weed species—musk thistle and Canada thistle—continue to populate the side slopes. They were treated in June 2007 (PL-4) and again in September 2007.

Drainage Ditches—Rock-armored drainage ditches beneath the toe of the side slope on the northwest, south, and east sides of the disposal cell direct runoff into natural drainages that carry storm water away from the disposal site. Past erosion and sloughing in Ditch No. 1 has allowed wetland vegetation including willows to take root in areas of moist sediments. In other places, trees as tall as 10 and 15 feet grow in the drainage ditches. The sediment deposits and vegetation currently will not compromise the drainage ditches’ performance in the event of a large storm. Should colluvial deposits or excessive vegetation dam a drainage ditch so as to impound water, the deposits or vegetation will be removed.

The riprap-covered outflow of Ditch No. 1 was designed to erode back to a rock-filled trench and self-armor in the process. No significant erosion has occurred in Ditch No. 1 since it was last surveyed in 1999.

- 4C **Treatment Cells and Retention Pond**—The retention pond northeast of the disposal cell collects drainage water from the cell. Water retained in the retention pond is distributed by solar powered pumps and drip lines onto the lined pond sideslopes to enhance evaporation. This solar-powered water management system was installed in 2007 (PL-5).

Although there is a Colorado Pollutant Discharge Elimination System (CPDES) permit for discharge from the pond, no discharge from the retention pond occurred during 2007. Monthly discharge reports were submitted to the State of Colorado in accordance with the CPDES.

In June 2006, the criteria were met for permanent closure of the toe drain and the water collection and treatment system, as presented in the LTSP, and described in the 2006 compliance report. However, in 2007, an increased uranium concentration was reported in well 0618, located downgradient of the water collection and treatment system's retention pond. This increased uranium concentration will be evaluated to determine its significance. After this evaluation, a decision will be made regarding whether permanent closure of the collection and treatment system remains valid.

Site Boundary—The site is not fenced. Missing and damaged perimeter signs indicate continued trespassing and vandalism. However, the guardrail and entrance gate off of the county road, installed in 2000, have effectively prevented vehicular trespass and the associated damage that had occurred prior to their installation.

Historical rill and gully erosion on the south-facing slope along the southern boundary of the site is stable. Establishment of vegetation and exposure of resistant bedrock in the gullies are effectively preventing further erosion in most of the gullies. Headcuts in two gullies in the southwest portion noted in 2006 were revisited in 2007. These are active, but do not pose a threat to cell integrity at this time and will be inspected again in 2008. Additionally, the two gullies on the north-facing slope, just north of perimeter sign P3 along the southern boundary of the site, were checked during the 2007 inspection. It appears that the headcutting is stable. No potential threat to the cell is posed by these headcuts.

Migration of riprap down the steep hill below the south outflow of Ditch No. 2 has subsided and the area appears stable. The area below the southeast outflow of Ditch No. 2 has also stabilized in the bedrock.

4D Numerous areas along the site boundary are infested with state-listed noxious weeds. These areas were treated with herbicide in June 2007 and again in September 2007.

Outlying Area—The area beyond the site boundary for a distance of 0.25 mile was visually inspected for signs of erosion, development, or other disturbance that might impact the integrity of the site. The U.S. Bureau of Reclamation construction of the Animas-La Plata Project continues. The DOE disposal site is immediately adjacent to the northern Ridges Basin area boundary. Recreational use of the outlying area is expected to increase substantially upon completion of the reservoir project. Currently there is no concern regarding the outlying area.

4.3.2 Follow-up or Contingency Inspections

DOE 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) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2007.

4.3.3 Routine Maintenance and Repairs

In 2007, the entrance sign was replaced, and noxious weeds were treated with herbicide during spring and fall applications.

4.3.4 Groundwater Monitoring

- 4E In accordance with the LTSP, groundwater is monitored at the Durango site to verify the initial performance of the disposal cell. The monitoring network consists of seven wells (Table 4–2) (Figure 4–1). Four wells are completed in the uppermost aquifer (bedrock of the Cliff House Sandstone and the Menefee Formation), including one upgradient background well (MW–0605) and three downgradient point of compliance wells (MW–0607, MW–0612, and MW–0621). Three wells are completed in the alluvium: one upgradient (MW–0623) and one downgradient (MW–0608) from the disposal cell. The third alluvial well, monitor well MW–0618 (screened to the bottom of the alluvial aquifer), was installed adjacent to well MW–0608 (screened to 10 feet above the base of the alluvial aquifer) and added to the monitoring network in 2002, as a best management practice, because it intercepts the full saturated zone of the alluvial aquifer.

Table 4–2. Groundwater Monitoring Network at the Durango, Colorado, Disposal Site

Monitor Well	Well Compliance Type	Hydrologic Relationship
MW–0605	Background	Upgradient (uppermost aquifer)
MW–0607	Point of Compliance	Downgradient (uppermost aquifer)
MW–0612	Point of Compliance	Downgradient (uppermost aquifer)
MW–0621	Point of Compliance	Downgradient (uppermost aquifer)
MW–0623	Background	Upgradient (alluvial aquifer)
MW–0608		Downgradient (alluvial aquifer)
MW–0618		Downgradient (alluvial aquifer)

Groundwater samples are collected annually and analyzed for three indicator parameters: molybdenum, selenium, and uranium. The standards for the three indicator parameters are the respective maximum concentration limits (MCL) established by the U.S. Environmental Protection Agency in Table 1 to Subpart A of 40 CFR 192 (Table 4–3).

Table 4–3. Maximum Concentration Limits for Groundwater at the Durango, Colorado, Disposal Site

Constituent	MCL (mg/L)
Molybdenum	0.1
Selenium	0.01
Uranium	0.044

Key: MCL = maximum concentration limit

mg/L = milligrams/liter

Note: EPA MCLs as listed in 40 CFR 192 Table 1, Subpart A.

In 2007, uranium and selenium concentrations reported increases in monitor wells MW–0618 and MW–0608. Analytical results from all other locations are on trend with previous results. Time-concentration plots for uranium, selenium, and molybdenum are included as Figures 4–2, 4–3, and 4–4, respectively.

As shown in Figure 4–2, the highest uranium concentrations occur in monitor well MW–0618 where for the first time since sampling began in 2003 concentrations have exceeded the MCL. The uranium concentration of 0.047 mg/L reported in 2007 is consistent with 2004 and 2006 values, but is over twice the concentrations reported in 2003 and 2005. However, with only

5 data points available for this well, trend analysis is inconclusive for this constituent and additional monitoring is needed. The uranium concentration reported in 2007 from well MW-0608 also increased, although the results (0.0084 mg/L) from this well remain below the MCL and within the historical range. These wells are adjacent to each other and completed in the alluvium, although screened at different depths (see previous text). Point of compliance well MW-0621 is also adjacent to these wells; however, completion is within the underlying bedrock (i.e., the uppermost aquifer). Analytical results reported historically from well MW-0621 for uranium continue at or near detection limits.

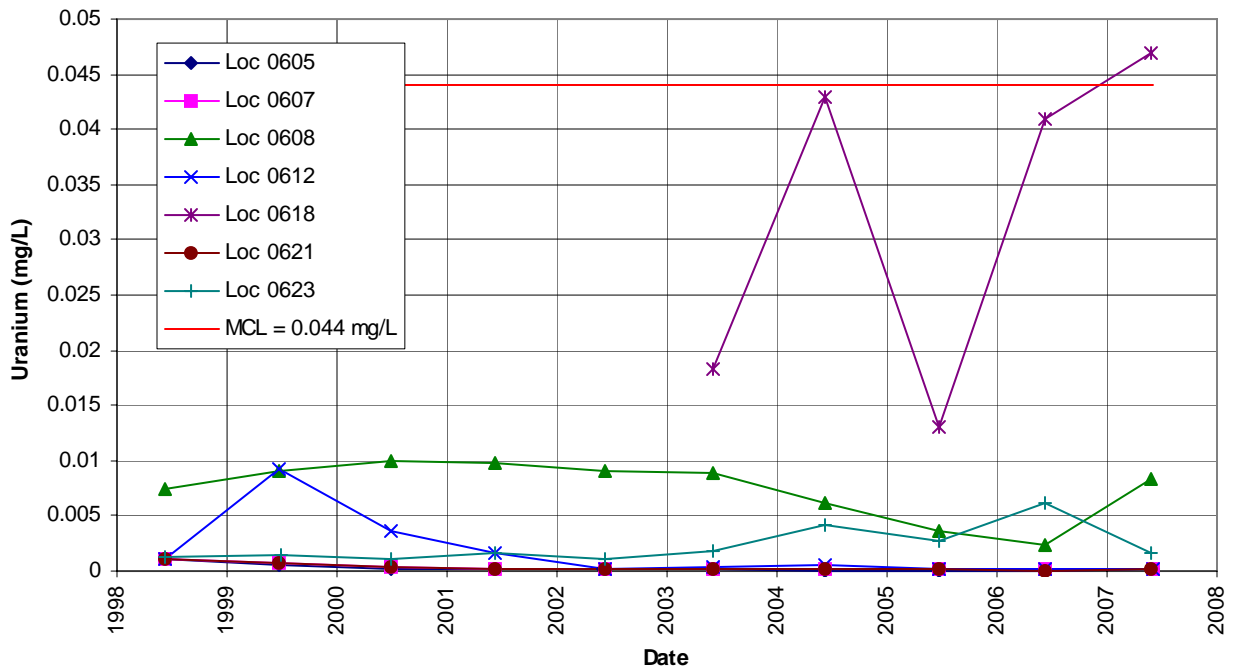


Figure 4-2. Time-Concentration Plot of Uranium in Groundwater at the Durango, Colorado, Disposal Site

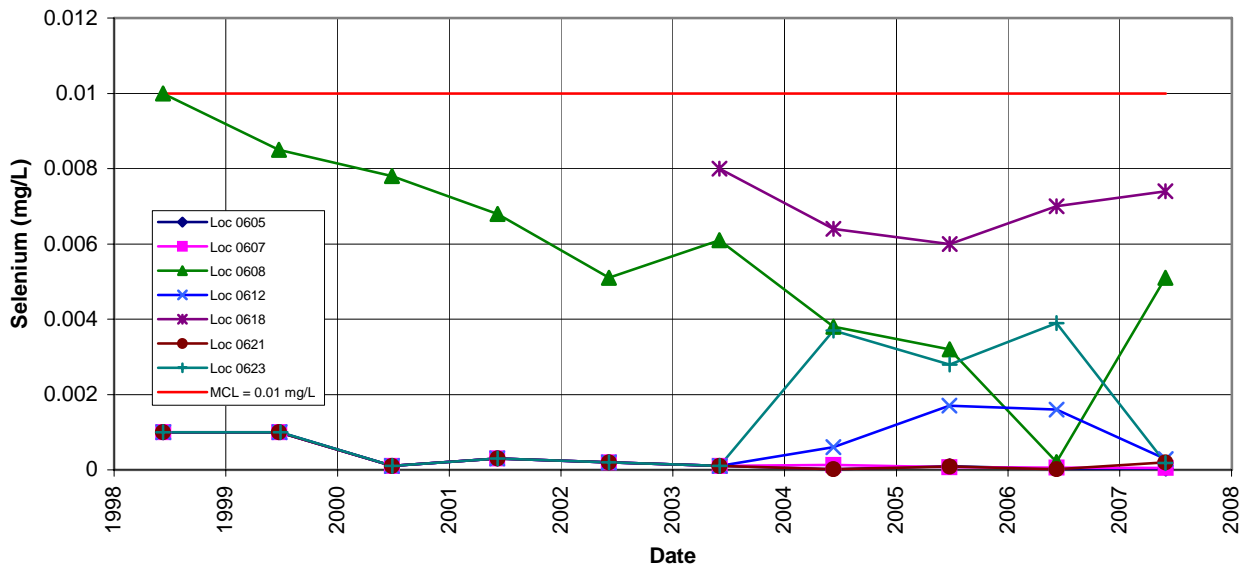


Figure 4-3. Time-Concentration Plot of Selenium in Groundwater at the Durango, Colorado, Disposal Site



Figure 4-4. Time-Concentration Plot of Molybdenum in Groundwater at the Durango, Colorado, Disposal Site

4.3.5 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 corrective action was required in 2007.

4.3.6 Photographs

Table 4-4. Photographs Taken at the Durango, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description
PL-1	355	Entrance sign in need of replacement.
PL-2	180	Undercutting and deposition at perimeter sign P44.
PL-3	360	Dead alfalfa plants on disposal cell top, sprayed with herbicide in September 2006.
PL-4	305	Dead Canada thistle on disposal cell side slope, sprayed with herbicide in June 2007.
PL-5	70	Retention pond; note drip lines along top and left banks.



DUR 8/07. PL-1. Entrance sign in need of replacement.



DUR 8/07. PL-2. Undercutting and deposition at perimeter sign P44.



DUR 8/07. PL-3. Dead alfalfa plants on disposal cell top, sprayed with herbicide in September 2006.



DUR 8/07. PL-4. Dead Canada thistle on disposal cell side slope, sprayed with herbicide in June 2007.



DUR 8/07. PL-5. Retention pond; note drip lines along top and left banks.

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