

4.0 Durango, Colorado, Disposal Site

4.1 Compliance Summary

The Durango, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on May 28, 2008. The disposal cell and all associated surface water diversion and drainage structures were in good condition and functioning as designed. The water level in the disposal cell has dropped which satisfies criteria for permanent closure of the transient drainage water collection and treatment system. However, DOE is evaluating an increase in the downgradient uranium concentration before decommissioning the treatment system. Vandalism, primarily theft and damage to signs, continues at the site. The bases of perimeter signs P41 and P44 have been undercut by erosion but remain stable. Infestations of noxious weeds and deep-rooted plants on the disposal cell continue to be monitored and controlled with herbicide. No other maintenance needs or cause for a follow-up or contingency inspection were identified.

4.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Durango 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 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 (NRC) 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 May 28, 2008. 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, and the original entrance gate closer to the cell, were in good condition.

- 4A The entrance sign, which had been vandalized by buckshot and no longer legible (PL–1), was replaced. Numerous other perimeter signs have bullet holes but remain legible. Perimeter signs P1 and P82 were missing and have been replaced. Perimeter sign P2 has been stolen a number of times and is no longer being replaced as adjacent signs are within sight. The site remains well delineated by the 81 other perimeter signs. The bases of perimeter signs P41 and P44 (PL–2) are being undercut by erosion but currently remain stable.

Trespassing 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 Monuments, 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 is superficially pocked from gunfire but remains 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. Several years ago one of the reference monuments for boundary monument BM–4 was bent to the ground, and the cap has been removed, but BM–4 itself is intact. Prior to the 2004 inspection, boundary monument BM–6 was destroyed when a pipeline was constructed 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 but can be found.

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 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.

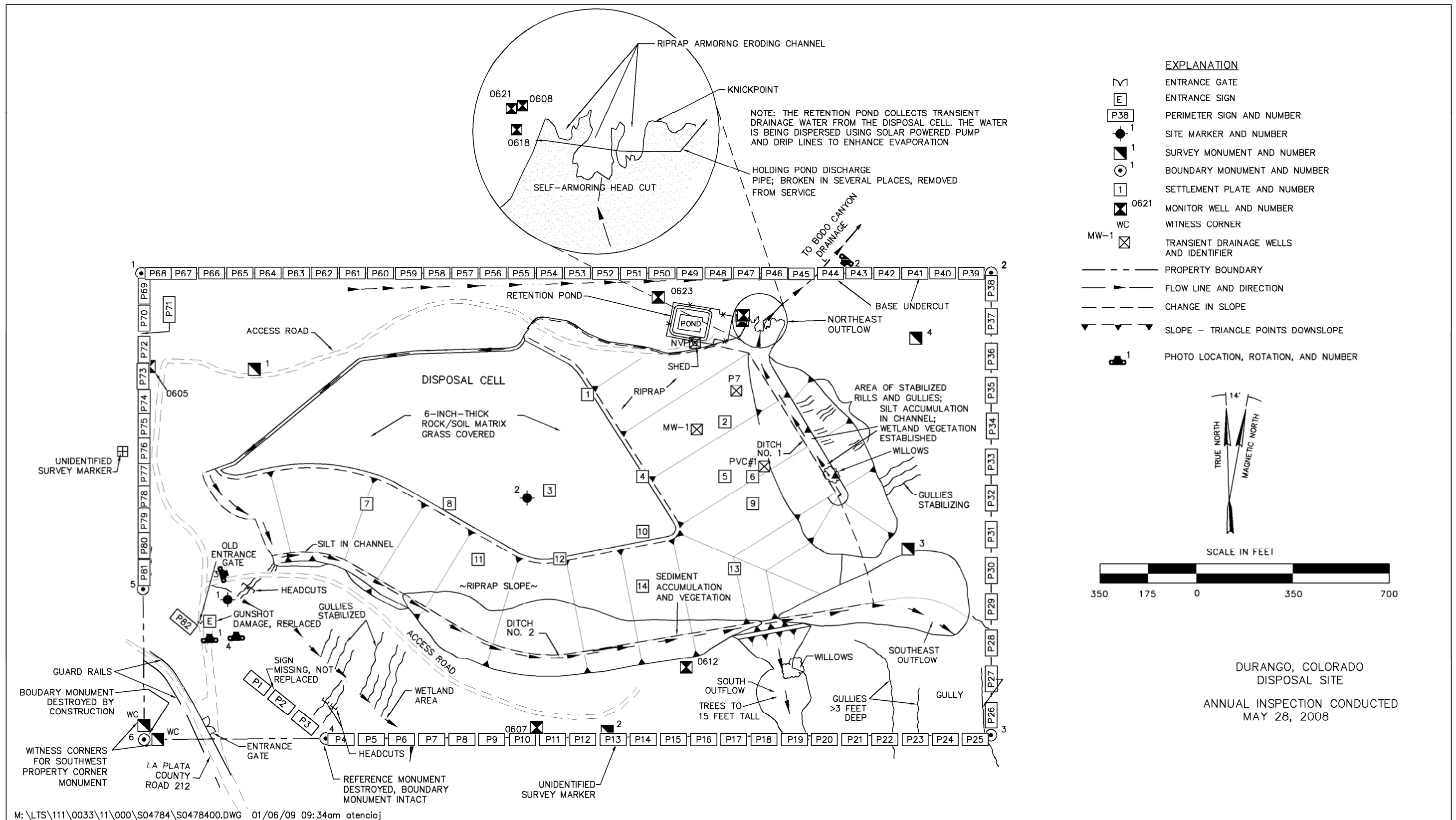


Figure 4-1. 2008 Annual Compliance Drawing for the Durango Disposal Site

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

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

In accordance with the LTSP, deep-rooted woody plants must be removed from the disposal cell when its shoot height equals or exceeds 3.5 feet (1.1 meters) from the base of the plant; this height criterion is based on an assumed root-to-shoot ratio of 1 to 1. 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 with herbicide on the disposal cell cover. One deep-rooted woody plant, gray rabbitbrush, was found on the cell top in 2008 and was treated with herbicide.

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 2008. Burrow holes will continue to be monitored but do not appear to degrade isolation or disposal cell integrity.

Side Slopes of Disposal Cell—The riprap-covered side slopes of the disposal cell are in good condition. There was no evidence of subsidence, rock deterioration, and slope failure.

4B Deep-rooted woody shrubs and trees were treated with herbicide in 2006, and woody species observed on the cell in 2008 were all shorter than the 3.5-foot criterion (PL-3). Three noxious weed species—musk thistle, Canada thistle, and bull thistle—continue to populate the side slopes. These plants have been treated with herbicide since 2002 by a commercial applicator, and their populations have decreased significantly. They were most recently treated in June and September 2008.

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 have allowed wetland vegetation, including willows, to take root in areas where moist sediments have accumulated. In other places, trees as tall as 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.

Treatment Cells and Retention Pond—The retention pond northeast of the disposal cell collects pore water that drains from the wet tailings that were encapsulated within the disposal cell (i.e., transient drainage). A solar-powered water management system installed in 2007 distributes water collected in the retention pond through drip lines and onto the lined pond side slopes to enhance evaporation. A security fence surrounds the treatment cells and retention pond,

and there is an equipment shed containing instrumentation to measure the transient drainage flow from the collection gallery. Both of these features were secure and in good condition at the time of the inspection.

Although there is a Colorado Pollutant Discharge Elimination System (CPDES) permit for discharge from the pond, no discharge from the retention pond occurred during 2008. Monthly discharge reports were submitted to the State of Colorado in accordance with the CPDES permit requirements.

In June 2006, the criteria for permanent closure of the toe drain and the water collection and treatment system, as described in the LTSP were met. Because the pore water level in the disposal cell has dropped, water is no longer being withdrawn and treated. In 2007, increasing uranium concentrations were reported in well 0618, located downgradient of the system's retention pond. An evaluation is being performed to determine the significance, if any, of this increased uranium concentration. After this evaluation, DOE will consult with NRC to determine if the collection and treatment system should be permanent closed.

Site Boundary—The site is not fenced. Missing and damaged perimeter signs indicate continued trespassing and vandalism. However, before the guardrail and gate along County Road 212 were installed in 2000, the public used the area between the county road and the original entrance gate quite heavily. Since the installation of the guardrail, use of this area has been minimal except for the destruction and theft of perimeter signs.

Historical rill and gully erosion has occurred at various locations on site, but most are in the process of stabilizing, and none are currently threatening the performance of the disposal cell or its associated surface water diversion structures. The establishment of vegetation and exposure of resistant bedrock in the gullies are effectively preventing further erosion in most of the gullies (PL-4). DOE will continue to monitor the site for active erosion.

4C Numerous areas along the site boundary are infested with state-listed noxious weeds. These areas were treated with herbicide in June and September 2008.

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. Primary land uses surrounding the site are wildlife habitat and recreation. The U.S. Bureau of Reclamation continues construction of the Animas-La Plata Project, a surface water diversion system. The DOE disposal site is immediately adjacent to the northern Ridges Basin Reservoir 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 2008.

4.3.3 Routine Maintenance and Repairs

In 2008, the entrance sign and perimeter signs P1 and P82 were replaced. Noxious weeds were treated with herbicide.

4.3.4 Groundwater Monitoring

- 4D 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 and 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 (POC) wells (MW–0607, MW–0612, and MW–0621). Three wells are completed in the alluvium, one upgradient (MW–0623) and one downgradient (MW–0608) of 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 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 (MCLs) established by the U.S. Environmental Protection Agency (EPA) in Table 1 to Subpart A of 40 CFR 192 (Table 4–3). Time-concentration plots for uranium, selenium, and molybdenum monitoring results are included as Figures 4–2, 4–3, and 4–4, respectively.

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

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

MCL = maximum concentration limit
mg/L = milligrams/liter

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

Uranium concentrations increased in monitor wells MW-0618 and MW-0623, and selenium increased in well MW-0623. Analytical results from all other locations are on trend with previous results.

In 2008, the most significant groundwater monitoring result reported was the uranium concentration in well MW-0618, where concentrations in the last two sampling events have exceeded the MCL. The uranium concentration of 0.05 mg/L reported in 2008 from this well is consistent with the 2007 value, and shows an increasing trend from the 2005 data. However, with only six data points available, trend analysis for this well is inconclusive for this constituent, and additional monitoring is needed. As mentioned previously, an evaluation of the uranium concentrations in this well is being performed in conjunction with the treatment system closure. All other concentrations of uranium, along with all concentrations of both selenium and molybdenum, remain on trend and well below their respective MCLs.

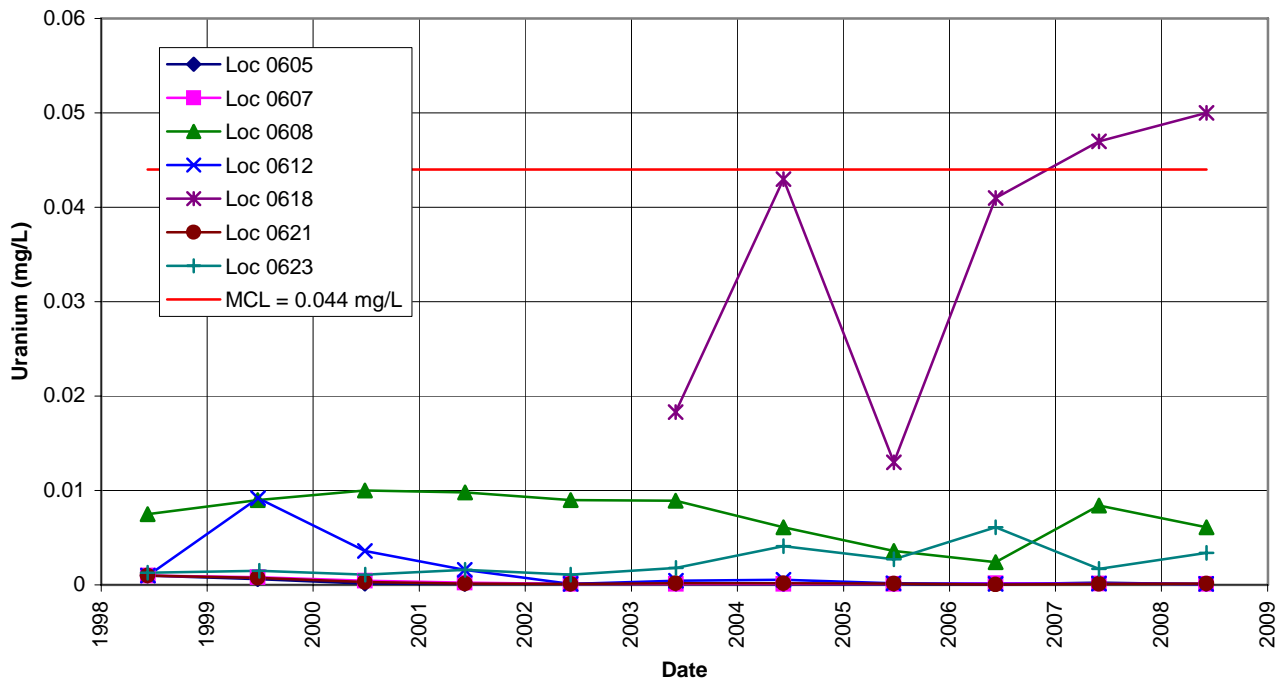


Figure 4-2. Time-Concentration Plot of Uranium in Groundwater at the Durango Disposal Site



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

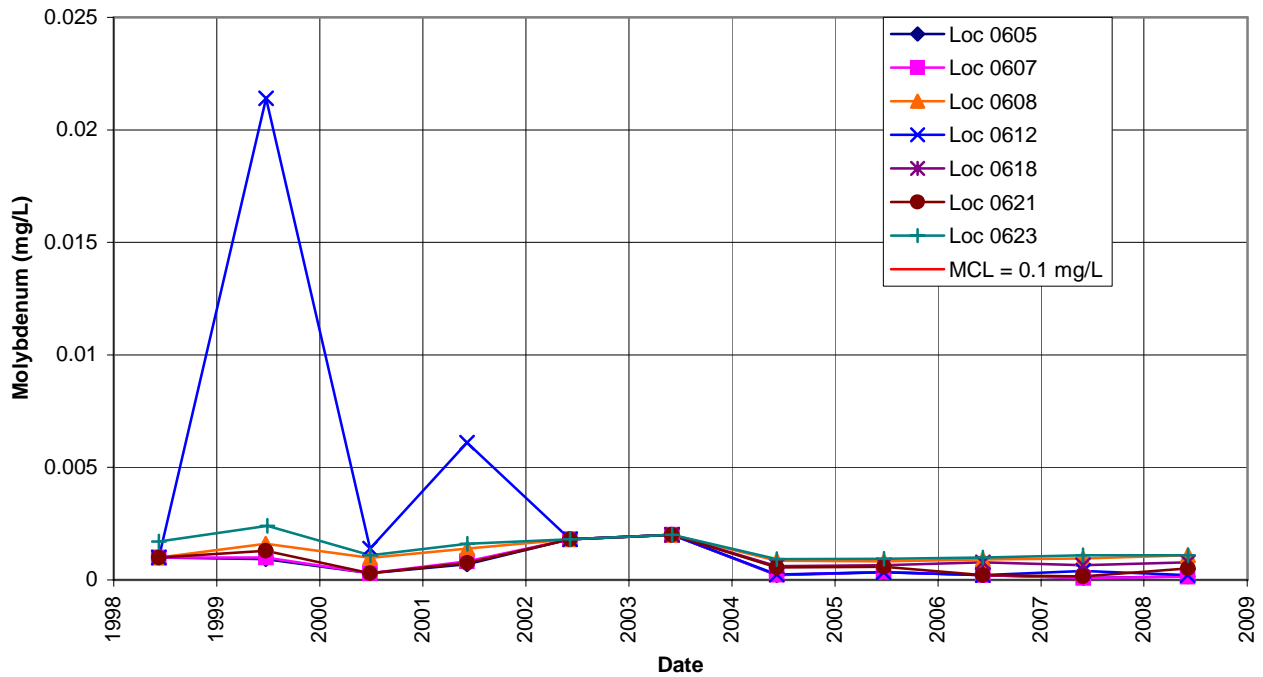


Figure 4-4. Time-Concentration Plot of Molybdenum in Groundwater at the Durango Disposal Site

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 2008.

4.3.6 Photographs

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

Photograph Location Number	Azimuth	Description
PL-1	0	Entrance sign prior to replacement.
PL-2	220	Undercutting at perimeter sign P44.
PL-3	75	South side slope of cell; note absence of woody vegetation.
PL-4	0	Headcuts of gullies below southwest corner of disposal cell.



DUR 5/2008. PL-1. Entrance sign prior to replacement.



DUR 5/2008. PL-2. Undercutting at perimeter sign P44.



DUR 5/2008. PL-3. South side slope of cell; note absence of woody vegetation.



DUR 5/2008. PL-4. Headcuts of gullies below southwest corner of disposal cell.