

13.0 Naturita, Colorado, Disposal Site

13.1 Compliance Summary

The Naturita, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on May 5, 2008. The site was in excellent condition and the disposal cell and all associated surface water diversion and drainage structures were functioning as designed. Minor erosion and rock debris identified along and on the access road will be addressed in 2009. The perimeter fence was repaired, noxious weeds were sprayed with herbicide, and pedestrian fence ladders were installed at three key locations as a safety precaution. No other maintenance needs or cause for a follow-up or contingency inspection were identified.

In accordance with the Long-Term Surveillance Plan (LTSP), DOE has monitored groundwater at the site as a best management practice to demonstrate the initial performance of the disposal cell. Based on the 2008 groundwater sampling results, which are consistent with historical measurements and corroborate previous conclusions regarding the efficacy of the groundwater monitoring program, DOE plans to recommend to the U.S. Nuclear Regulatory Commission (NRC) that groundwater monitoring be discontinued at the site because groundwater quality in the uppermost aquifer has not been impacted by the disposal cell.

13.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Naturita Disposal Site are specified in the *Long-Term Surveillance Plan for the Upper Burbank Disposal Cell, Uravan, Colorado* (DOE/AL/62350–250, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, July 1999) 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 13–1.

Table 13–1. License Requirements for the Naturita Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 3.1 and 6.2	Section 13.3.1
Follow-Up or Contingency Inspections	Section 3.4	Section 13.3.2
Routine Maintenance and Repairs	Section 4.0	Section 13.3.3
Groundwater Monitoring	Section 2.6.2	Section 13.3.4
Corrective Action	Section 5.0	Section 13.3.5

Institutional Controls—The 26.65-acre disposal site is owned by the United States of America and was accepted under the NRC general license (10 CFR 40.27) in 1999. 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. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no-trespassing signs placed along the property boundary, and a locked gate at the entrance to the site access road. Verification of these institutional controls is part of the annual inspection. Inspectors found no evidence that these institutional controls were ineffective or violated.

13.3 Compliance Review

13.3.1 Annual Inspection and Report

The site, located approximately 1 mile west-southwest of the former community of Uravan, Colorado, was inspected on May 5, 2008. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 13–1. Numbers in the left margin of this report refer to items summarized in the “Executive Summary” table.

13.3.1.1 Specific Site-Surveillance Features

Access Roads, Gates, Fence, and Signs—Access to the Naturita Disposal Site is from Montrose County Road EE22, which intersects State Highway 141 at Uravan, Colorado. Road EE22 approaches the site from the southeast and continues (off-site) along the northeast side of the disposal cell. The paved or graveled county road was in good condition.

The site entrance gate, located north of the disposal cell off of Road EE22, consists of a locked pair of tubular metal gates suspended from galvanized steel gateposts. The gates are in good condition. The road through the entrance gate provides access to monitor wells adjacent to the north and west sides of the cell. Two additional metal gates located along this access road were also secure and in good condition.

13A The access road, which was regraded after the 2005 inspection, was generally in good condition. However, a small hole has begun to erode along the west side of the road (PL–1). This eroded roadside area was identified in 2007 and will be repaired before the next inspection. In September 2005, fallen rocks were removed from the road, the road was regraded, and several loads of gravel were used to fill gullies. No significant erosion of these gullies was evident in 2008. However, boulders have fallen onto the road again (PL–2); these boulders will be removed from the access road before the next annual site inspection.

13B A barbed-wire stock fence encloses the site. Except for several small sections with broken or loose wire strands, the fence was in good condition. Broken strands were observed near perimeter signs P1 (PL–3) and P25. Two other fence sections have loose strands; the first located between perimeter signs P5 and P6, and the second south of perimeter sign P21. These broken and loose strands were repaired in September 2008.

13C In August 2008, as a safety precaution, pedestrian fence ladders were installed at three locations around the perimeter of the site near boundary monuments BM–9, BM–15, and BM–16 (PL–4). These structures will allow inspectors to safely cross barbed-wire fences to access the site.

The site has 25 perimeter signs and one entrance sign. Perimeter signs, mounted on steel posts, are set approximately 5 feet inside the perimeter fence. Perimeter sign P2 has bullet holes but remains legible. The other 24 perimeter signs and the entrance sign were in good condition.

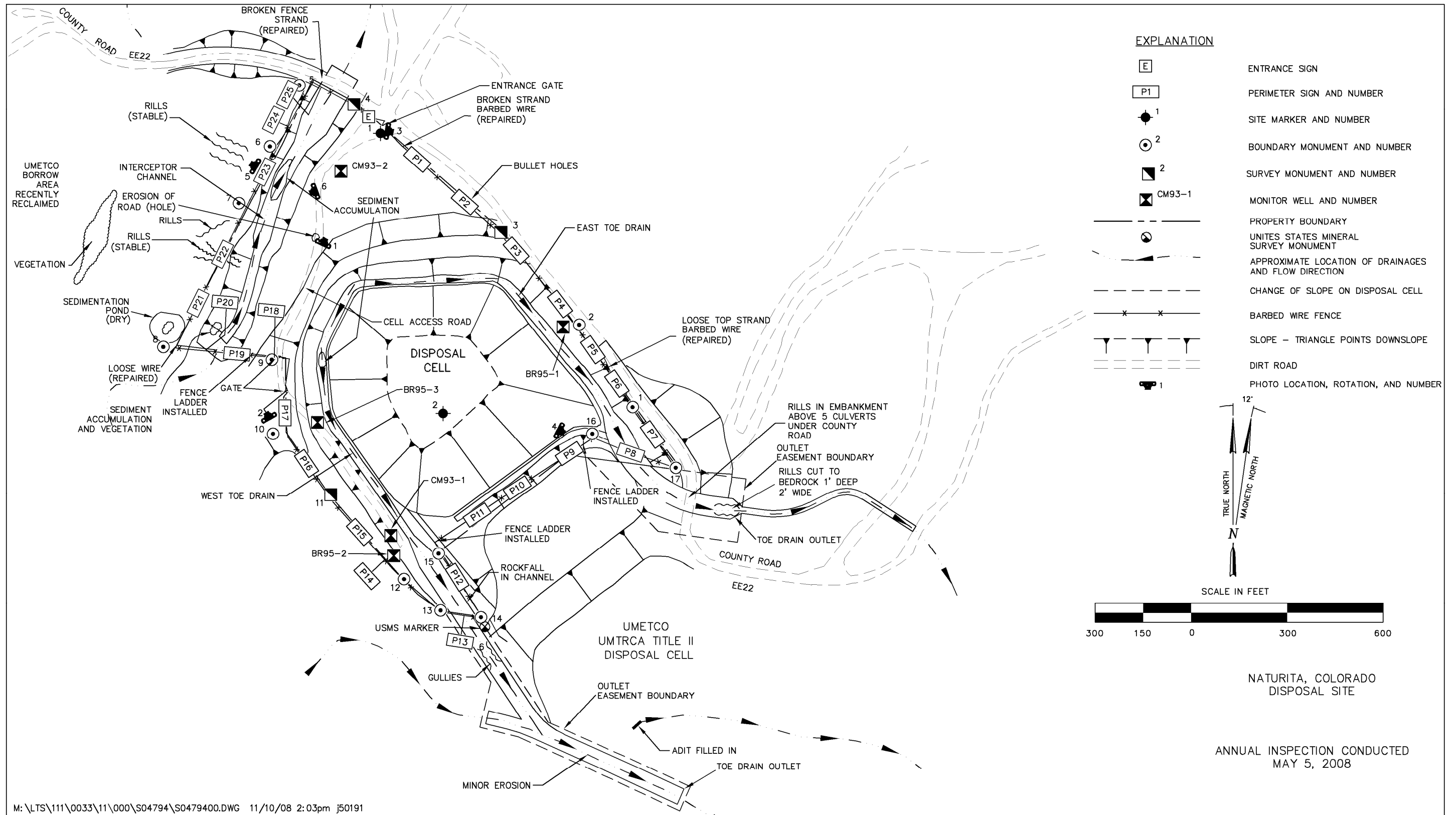


Figure 13-1. 2008 Annual Compliance Drawing for the Naturita Disposal Site

This page intentionally left blank

Site Markers and Monuments—The two granite site markers, SMK-1 and SMK-2, were undisturbed and in good condition. SMK-1 has a minor chip off the northeast corner of the concrete pad on which it is placed; the chip will be examined during the next inspection to determine if repairs are necessary.

The site property boundary has 17 corners, which are marked by either boundary monuments or survey monuments. Boundary monuments are designated BM-1 through BM-17. Three survey monuments, SM-3, SM-4, and SM-11, are used in lieu of boundary monuments BM-3, BM-4, and BM-11. Survey monuments were installed during site construction for survey control; boundary monuments were installed after completion of construction to delineate the final property boundary. Both types of monuments are located with the same precision. All boundary and survey monuments were undisturbed and in good condition.

Monitor Wells—The groundwater-monitoring network has five wells: BR95-1, BR95-2, BR95-3, CM93-1, and CM93-2. All monitor wells were secure and in good condition.

13.3.1.2 Transects

To ensure a thorough and efficient inspection, the site is divided into four transects: (1) the riprap-covered top slope and side slopes of the disposal cell, (2) the riprap-covered toe drains and toe drain outlets, (3) the riprap-covered interceptor channel, and (4) the outlying area.

Within each transect, inspectors examined specific site-surveillance features, such as monitor wells, survey and boundary monuments, signs, and site markers. Inspectors examined each transect for evidence of erosion, settling, slumping, or other disturbance that might affect the site's integrity or long-term performance.

A fifth transect identified in the LTSP consisted of the reclaimed areas surrounding the disposal cell. Vegetation cover in this area is well established, and a storm water discharge permit that addressed this area was terminated by the State of Colorado in November 2001. Therefore, this transect is no longer formally inspected.

Top Slope and Side Slopes of Disposal Cell—The disposal cell was completed in 1998. Rock riprap covers the 2-acre top of the disposal cell and the approximate 8 acres of side slopes. The rock is rounded and is larger on the side slopes than on the top. The rock-covered surfaces were in excellent condition and showed no signs of disturbance except for an irregular surface area on the southwest side of the top surface, where a standpipe was removed several years ago. The remaining portions of the top and side slopes of the disposal cell were in excellent condition. No evidence of subsidence, differential settlement, slumping, or other modifying process was noted, and no vegetation was evident on the cell.

Toe Drains and Toe Drain Outlets—Two riprap-armored toe drains collect water from the cell side slopes and divert it to the southeast.

The toe drain on the west and southwest sides of the cell exits through a channel quarried through the wall of the Burbank Pit and into Hieroglyphic Canyon and finally to the San Miguel River. Some sediment has accumulated in the upper end of the western toe drain, allowing scattered weeds and grasses to grow; however, the drain remains functional. Farther down this

drain, beyond the armored portion, water is beginning to erode softer bedrock. As noted in previous inspections, a knickpoint has formed at the intersection of shale and overlying sandstone units within the Salt Wash Member of the Morrison Formation. This erosion does not affect the performance of the toe drain but will continue to be monitored.

The east toe drain extends through the adjacent Umetco Minerals Corporation's (Umetco) Uravan UMTRCA Title II Disposal Site and crosses beneath County Road EE22 through five culverts. A boulder apparently rolled off the slope from County Road EE22 along the eastern side of the site into the drain near perimeter sign P4, but its presence does not degrade the drain function. However, this area will be monitored in future inspections for additional rock movement.

Rills are present in the road embankment over the culvert outlets but are not affecting the road surface at this time. Minor erosion of loose material has occurred in the drain outlet area, but the underlying sandstone bedrock limits further erosion. Water was observed in the drain at the time of the inspection.

Russian knapweed, a noxious weed, has been found in the past in the lower drainage area and on the land separating the drainage area from the adjacent Umetco UMTRCA Title II disposal cell.

- 13D This noxious weed was not found during the 2008 inspection, but was identified later in the season, and weed-control efforts were undertaken where necessary.

Interceptor Channel—A riprap-armored interceptor channel, upgradient and northwest of the disposal cell, diverts storm water and snowmelt run-on to the northeast across County Road EE22. Some erosion has occurred outside the property uphill from perimeter sign P23 (PL-5) and between perimeter signs P22 and P23, resulting in deposition of sediment in the channel. The rills appear to have eroded more since 2007, and vegetation has increased slightly in the accumulated sediment area inside the channel. Otherwise, the channel was in excellent condition, and the sediment and vegetation do not impair the function of the channel. A culvert was not installed where the channel crosses the road, so the road could be damaged in the event of heavy storm water flow. However, to date, storm water has not affected the road.

Three species of noxious weeds—halogeton, Russian knapweed, and tamarisk—have been found during previous inspections in and adjacent to the interceptor channel. This area, which had been treated with herbicide in both 2006 and 2007, was sprayed again later in the 2008 growing season.

Outlying Area—The site boundary and the area within 0.25 mile of the site boundary have been highly disturbed by mining, quarrying, and road building activities. Umetco has recently completed remedial activities on the main Uravan UMTRCA Title II disposal cell, located across County Road EE22 east of the Title I site. A separate Umetco UMTRCA Title II disposal cell abuts the Naturita disposal cell on the southeast cell boundary. The Uravan Site is in the process of being transferred to the DOE's Office of Legacy Management for long-term care.

Russian knapweed and tamarisk previously found in a sedimentation pond above the interceptor channel adjacent to the property boundary (near boundary monument BM-8) were sprayed with herbicide in 2006. One tamarisk plant was observed during the inspection, but no other live noxious weeds were present. Because this area provides a seed source to the site, it was monitored later in the 2008 season and sprayed again where necessary.

One outlying area that should be monitored in future inspections is the large Umetco borrow area northwest (and uphill of) the Naturita Disposal Site, which was recently reclaimed (PL-6). Sediment could erode from this freshly disturbed region onto the site if heavy rains occur before vegetation reestablishes.

13.3.2 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.

13.3.3 Routine Maintenance and Repairs

In 2008, the barbed-wire perimeter fence was repaired, and pedestrian fence ladders were installed at three key locations. Herbicide was applied where necessary to control noxious weeds. Several additional maintenance issues identified during the 2008 inspection will be addressed before the 2009 annual inspection. Minor erosion observed along the access road on the northwest side of the cell will be repaired. Also, boulders that have accumulated on the road south of that location (above the lower gate) will be removed.

13.3.4 Groundwater Monitoring

13E Groundwater Monitoring Strategy—In accordance with the LTSP (beginning in 2000), DOE has monitored groundwater at the site every 2 years as a best management practice to demonstrate the initial performance of the disposal cell; the last sampling event was in July 2008. The compliance strategy is to not exceed maximum concentration limits (MCLs) established in Table 1 to Subpart A of 40 CFR 192 or background levels in a point-of-compliance (POC) well (CM93-2) in the uppermost aquifer (Wingate Sandstone) downgradient from the disposal cell. The Wingate Sandstone lies approximately 600 feet beneath the disposal cell and is hydrologically isolated from the surface by unsaturated sandstone and relatively impermeable shale layers (aquitard) of the Salt Wash Member of the Morrison Formation and the Summerville Formation, respectively.

Groundwater monitoring is performed in three shallower monitor wells (BR95-1, BR95-2, and BR95-3; Figure 13-1), completed at the contact between the Salt Wash Member and the Summerville Formation, to provide early warning of possible migration of contaminants. If contamination suspected to be related to the disposal cell is observed at this horizon, DOE will sample two deeper wells (CM93-1 and CM93-2) screened in the uppermost aquifer (Wingate Formation). Indicator analytes are arsenic, molybdenum, and uranium. Monitor wells CM93-1 and CM93-2 in the uppermost aquifer (Wingate Sandstone) were last sampled in May 1997, and concentrations of all indicator analytes were at or near detection limits and, thus, well below the respective MCLs.

Groundwater Monitoring Results—Results of the most recent 2008 sampling event are consistent with those reported in previous years (1997, 1998, 2000, 2002, 2004, and 2006). Uranium concentrations continue to remain stable, ranging from 0.03 to 0.11 milligrams per liter (mg/L). Although concentrations in wells BR95–1 and BR95–2 exceed the MCL of 0.044 mg/L, comparable concentrations of uranium have been detected in samples collected from these wells since the beginning of the monitoring period and have not changed appreciably (see Figure 13–2 below). Concentrations of uranium in this range are not unexpected at the contact between the Salt Wash Member and the Summerville Formation because uranium mineralization is present in the Salt Wash Member. An indication of the intrinsic mineralization of this groundwater is the high level of uranium in seep water approximately 0.5 mile north-northwest of the disposal cell—2.0 mg/L in October 2000 and 2.59 mg/L in April 2001 (Umetco results for Seep 1). This seep is cross gradient from the disposal cell and represents natural discharge from the Salt Wash/Summerville contact. Therefore, the concentrations of uranium reported from wells BR95–1 and BR95–2 are considered to be naturally occurring (background) and not site-related.

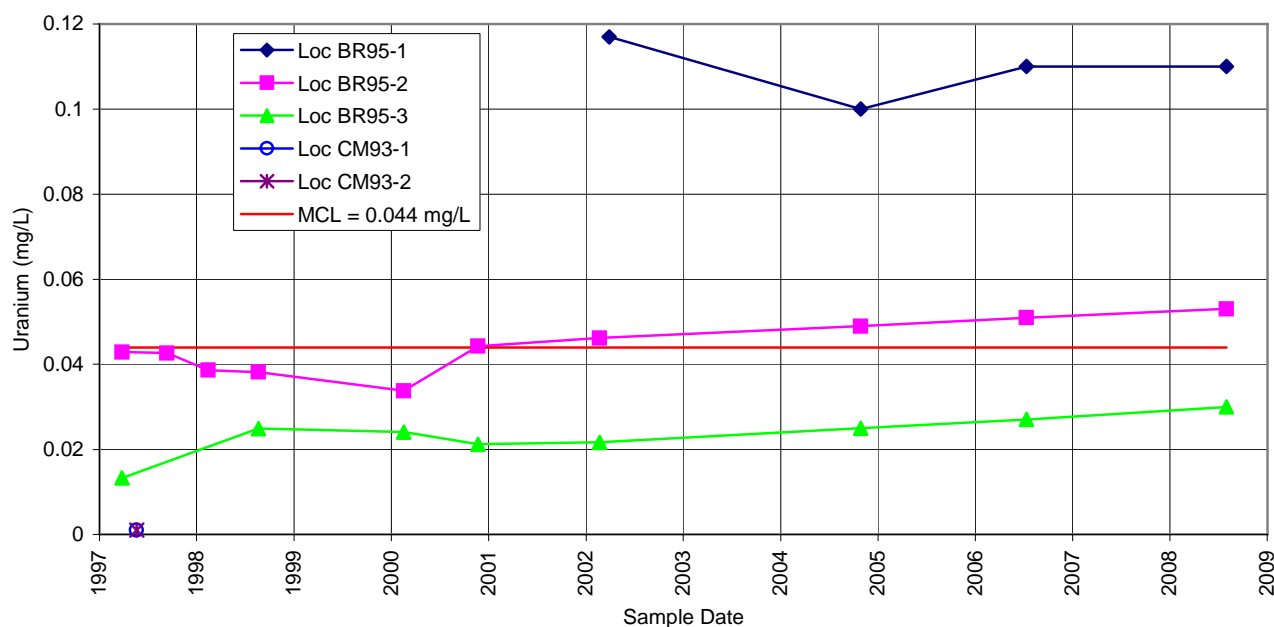


Figure 13–2. Time-Concentration Plots of Uranium in Groundwater at the Naturita Disposal Site

Concentrations of arsenic and molybdenum are still one to two orders of magnitude below corresponding MCLs, consistent with historical measurements. In 2008, concentrations of arsenic in groundwater in the three shallower monitor wells (BR95–1, BR95–2, and BR95–3) ranged from 0.0004 to 0.001 mg/L—well below the MCL of 0.05 mg/L. The greatest concentration of molybdenum in 2008 was 0.014 mg/L (BR95–3), approximately one order of magnitude less than the MCL of 0.1 mg/L.

Groundwater Monitoring Evaluation—Based on these results, and in keeping with the LTSP provision that allows for a reevaluation of the need for continued groundwater monitoring, DOE plans to recommend to NRC termination of the groundwater monitoring program at the Naturita Site. This recommendation is based on the following factors: (1) the uppermost aquifer is hydrologically isolated from the surface by an aquitard consisting of unsaturated sandstone and relatively impermeable shale layers; (2) historical monitoring has demonstrated that contamination does not occur within the uppermost aquifer; (3) naturally occurring uranium mineralization affects water quality within the surface formation on which the disposal cell is constructed; and (4) concentrations of indicator compounds have remained essentially static since the onset of sampling (arsenic and molybdenum concentrations remain one to two orders of magnitude less than respective MCLs), indicating no apparent influence from the disposal cell. Given these factors, continued sampling and analysis of the BR-series wells completed in this unit are expected to provide little useful data for evaluating cell performance.

13.3.5 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.

13.3.6 Photographs

Table 13–2. Photographs Taken at the Naturita Disposal Site

Photograph Location Number	Azimuth	Description of Photograph
PL–1	25	Hole eroded along west side of access road near top of hill that leads into cell.
PL–2	330	Rocks on access road between upper and lower gates.
PL–3	100	Broken strand of fence near perimeter sign P1.
PL–4	120	New pedestrian fence ladder installed near boundary monument BM–16.
PL–5	300	Rills west of upper interceptor channel up to 3 feet deep.
PL–6	250	Umetco reclamation area looking west-southwest from upper access road.



NAD 5/2008. PL-1. Hole eroded along west side of access road near top of hill that leads into cell.



NAD 5/2008. PL-2. Rocks on access road between upper and lower gates.



NAD 5/2008. PL-3. Broken strand of fence near perimeter sign P1.



NAD 8/2008. PL-4. New pedestrian fence ladder installed near boundary monument BM-16.



NAD 5/2008. PL-5. Rills west of upper interceptor channel up to 3 feet deep.



NAD 5/2008. PL-6. Umetco reclamation area looking west-southwest from upper access road.