2.0 Burrell, Pennsylvania, Disposal Site

2.1 Compliance Summary

The Burrell, Pennsylvania, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site, inspected on October 19, 2010, was in excellent condition. The disposal cell and all associated drainage diversion structures were in good condition and functioning as designed. Deep-rooted plants continue to grow on the disposal cell in accordance with the revised long-term surveillance plan (LTSP) issued in April 2000.

A vegetation management plan was implemented in 2008 to control noxious and invasive plants. Coupled with lessons learned in vegetation management at the site, the plan's implementation has led to continuous and significant improvement of herbaceous cover. In-the-field discussions with site maintenance personnel during annual inspections continue to improve the efficiency and effectiveness of vegetation management activities.

Groundwater monitoring is required every 5 years at the Burrell site. DOE conducted the groundwater sampling in October 2009. Those results were not available in time to be included in the 2009 compliance report, so they are presented in this report. The 2009 samples continue to indicate there is no contamination being released and that the disposal cell is performing as designed.

No cause for a follow-up or contingency inspection was identified.

2.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Burrell Disposal Site are specified in the *Long-Term Surveillance Plan for the U.S. Department of Energy Burrell Vicinity Property, Blairsville, Pennsylvania* (GJO−2002−331−TAR, U.S. Department of Energy [DOE], revised April 2000) and in procedures established by DOE to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). Table 2–1 lists these requirements.

Table 2–1. License Requirements for the Burrell Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.3	Section 2.3.1
Follow-Up or Contingency Inspections	Section 3.5	Section 2.3.2
Routine Maintenance and Repairs	Section 3.6	Section 2.3.3
Groundwater Monitoring	Section 3.7	Section 2.3.4
Corrective Action	Section 3.6.3	Section 2.3.5

Institutional Controls—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 along the property boundary, and locked gates.

The 72-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 1994. 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.

2.3 Compliance Review

2.3.1 Annual Inspection and Report

The site, east of Blairsville, Pennsylvania, was inspected on October 19, 2010. The results of the inspection are described below. Figure 2–1 shows features and photograph locations (PLs) mentioned in this report. Numbers in the left margin of this report refer to items summarized in the "Executive Summary" table.

2.3.1.1 Specific Site-Surveillance Features

Site Access, Fence, Gates, and Signs—Access to the site is off Strangford Road on an access road that lies within a perpetual right-of-way through private property (Tract 201–E). The access road continues across DOE-leased land and crosses the Norfolk Southern railroad tracks to the entrance gate at the east end of the site. Authorized personnel who need access to the railroad tracks and to the several natural-gas wells nearby also use the road.

The chain-link security fence, replaced in 2007, remains in excellent condition, with the exception of a bent rail on the south fence (PL–1). The top rail was bent when a tree fell across it in the spring of 2010. The tree was safely removed from the fence shortly after being discovered. The top rail, although bent, remains serviceable. A vegetation-free corridor remains established along the fence line (PL–2). The entrance gate and four personnel gates were in good condition. Of the 17 perimeter signs mounted on the security fence, four have been damaged by bullet holes, but they remain serviceable.

Site Markers and Monuments—The site has nine markers (a site marker and eight erosion control markers). Site marker SMK–1 was in excellent condition. All eight erosion control markers were located during the inspection, and seven were in good condition. Erosion control marker E–7 remains damaged and is identified as a minor maintenance item for the site that will be addressed in 2011. Dense vegetation is once again growing around the erosion control markers. The dense vegetation will be targeted for removal in 2011 so that inspectors can safely access the markers.

The site has 10 monuments (three survey monuments and seven boundary monuments). All three survey monuments were in good condition. Of the seven boundary monuments, five were in good condition. Boundary monument BM–4 was missing, and boundary monument BM–5 was damaged. Both are considered to be minor maintenance items that will be addressed in 2011.

Monitoring wells—The site has four pairs of monitoring wells. Each pair consists of a shallow (alluvial) completion and a deeper (bedrock) completion. Monitoring wells were not inspected in 2010. They were last inspected by the water sampling crew in 2009. They will be inspected again when wells are sampled in 2014. All wells encountered during the 2010 site inspection were locked and secured.

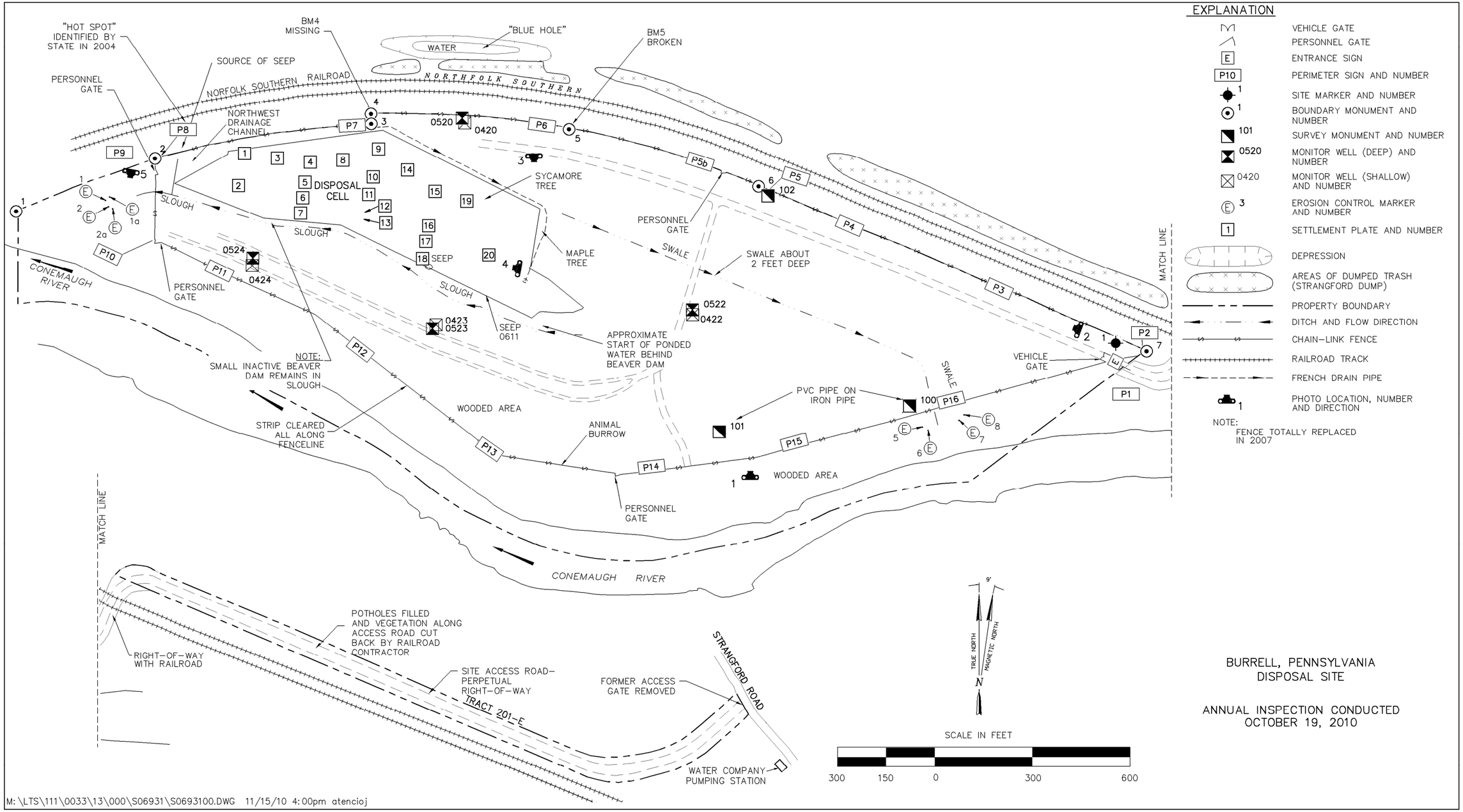

Figure 2–1. 2010 Annual Compliance Drawing for the Burrell Disposal Site

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2.3.1.2 Transects

To ensure a thorough and efficient inspection, inspectors divided the site into four areas called "transects": (1) the disposal cell, (2) the area between the disposal cell and site boundary, (3) the site perimeter, and (4) 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, and vegetation. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect the site's integrity or long-term performance.

Disposal Cell—The riprap-covered disposal cell was in excellent condition (PL–3). There were no indications of cell instability, such as slumping, bulging, or differential settlement. Rock quality was excellent; degradation of the limestone riprap was not evident.

Active control of vegetation on the cell cap has not been required since 2000 (according to the revised LTSP). Past studies at the Burrell Site concluded that deep-rooted plant growth on the cell puts the public and the environment at no greater risk of exposure to contaminants within the disposal cell. Vegetation growth on the cell might actually enhance cover performance through evapotranspiration. These studies further concluded that plant growth would not impede the proper functioning of the radon barrier. NRC concurred in the revised LTSP, which no longer requires active control of deep-rooted vegetation on the cell cover. NRC has suggested that DOE reevaluate the effects of vegetation on cover performance in 10 to 20 years to confirm performance parameters and predictions. The timing for this assessment is therefore between 2007 and 2017.

Although vegetation is allowed to grow on the disposal cell, the cell is sprayed for noxious weeds. The Japanese knotweed infestation on the cell cap is still declining, but continued efforts are needed to reduce stands on the south slope (PL–4). Deep-rooted woody species continue to proliferate on the cell cap (i.e., sycamore, tree of heaven, elm, tulip poplar, black locust, catalpa, and maple). As the trees mature, there is some concern that uprooting could damage the disposal cell cover, which would require repair. Vegetative growth on the disposal cell will continue to be monitored.

No active seeps were found along the south slope of the disposal cell during the site inspection in 2010.

Area Between the Disposal Cell and Site Boundary—The area surrounding the disposal cell and inside the security fence was cleared during reclamation and is covered by thick grass and reestablishing hardwood trees. Periodic mowing maintains access to monitoring wells. The area east of the cell remains grassland.

2A Implementation of a new vegetation management plan in 2008 has been successful in controlling noxious and invasive plants across the site. A combination of spot herbicide application and more-frequent mowing continues to be effective and will continue. The plan includes utilizing a woodland right-of-way mix to reduce the resprouting of Japanese knotweed and other noxious weeds in areas cleared by spot herbicide application. A large patch of Japanese knotweed was cleared southwest of the disposal cell and reseeded. Revegetation of the area using the woodland mix was mostly successful along the slope but some additional grass is needed (PL–5). A test-

plot of the woodland right-of-way mix along the south fence is considered to be a success. Use of the woodland mix will be expanded across the site as deemed appropriate.

A French drain was installed along the base of the north side slope of the disposal cell in 1998 to prevent water from ponding next to the cell. Inspection findings dating back to 1998 indicate that, prior to installing the French drain, rainwater and snowmelt would collect off the north side of the disposal cell. Saturated soil and wetland vegetation (cattails and purple loosestrife) were present. At the same time that wetland vegetation was growing on the north slope of the disposal cell, seeps were occurring in the south slope of the disposal cell. It was thought that the source of water for the seeps could be the ponded water north of the cell. No water has been observed flowing from the seeps on the south slope of the disposal cell since the French drain was installed. In the spring of 2010, though, a new seep was observed on the south slope (seep 0611). The seep was sampled. No maximum concentration limit (MCL) exceedances were measured in the sample. Inspectors in 2010 observed cattails and purple loosestrife growing between the north slope of the disposal cell and the location of the French drain, indicating that the area might not be draining efficiently. This area will continue to be monitored to determine if the area of wetlands is expanding. Inspection of the outlet to the French drain indicates that the drain outlet is clear of obstructions.

A small, inactive beaver dam remains within the slough at the base of the south slope of the disposal cell, and water continues to collect behind it. The water level behind the dam is not high enough to saturate the tailings or impact the integrity of the disposal cell and appears unchanged from prior inspection. Therefore, DOE has elected not to remove the dam. Instead, DOE will continue to monitor the dam and its possible impacts on the disposal site.

Site Perimeter—A known seep along the north security fence, about 60 feet east of perimeter sign P8 and west of the disposal cell, was flowing at the time of the 2010 inspection. This area will continue to be monitored for seeps to determine if they threaten the disposal cell's integrity. Conceivably, the seeps also could destabilize the nearby railroad embankment. The water for this seep may be coming from other seeps on the bluffs, above and just north of the railroad tracks.

Outlying Area—The area beyond the site boundary for a distance of 0.25 mile was visually examined for signs of erosion, development, and other changes that might affect the site. North of the site, a dirt road parallels the railroad tracks and provides access to a long, narrow, wooded area that has been used as an illegal dump over the years. In 2010, no new trash was observed. The dump is not a threat to the disposal site but is an indication of the overall level of activity near the disposal site and may be a predictor of vandalism. For this reason, the area will continue to be monitored. All other areas around the site remained unchanged.

2.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No follow-up or contingent inspections were required in 2010.

2.3.3 Routine Maintenance and Repairs

In 2010, noxious and invasive weed control continued and the routes to the monitoring wells were mowed.

2.3.4 Groundwater Monitoring

2B In accordance with the LTSP, DOE monitors groundwater at this site as a best management practice to evaluate the disposal cell's performance. The revised LTSP stipulates that monitoring be performed every 5 years. DOE conducted groundwater monitoring in October 2009 and results were not available in time to include in the 2009 compliance report; therefore, the 2009 sampling results are presented in this report

The groundwater monitoring network consists of eight wells (in four pairs) that are monitored for four target analytes: lead, molybdenum, selenium, and uranium. In Table 1 to Subpart A of 40 CFR 192, the U.S. Environmental Protection Agency (EPA) has established MCLs for these analytes in groundwater. The wells in the monitoring network are listed in Table 2–2 and MCLs for the four target analytes in Table 2–3. Time-concentration plots, beginning in 1996, for the four analytes are shown on Figures 2–2 through 2–5.

Table 2–2. Groundwater Monitoring Network at the Burrell Disposal Site

Monitor Well	Hydrologic Relationship
MW−0420 & MW−0520	Upgradient, or background
MW−0422 & MW−0522	Crossgradient
MW−0423 & MW−0523	Downgradient
MW−0424 & MW−0524	Downgradient

Table 2–3. Maximum Concentration Limits for Groundwater at the Burrell Disposal Site

Constituent	MCL[a] (mg/L)
Lead	0.05
Molybdenum	0.1
Selenium	0.01
Uranium	0.044

[a]EPA MCLs as listed in 40 CFR 192, Subpart A, Table 1.

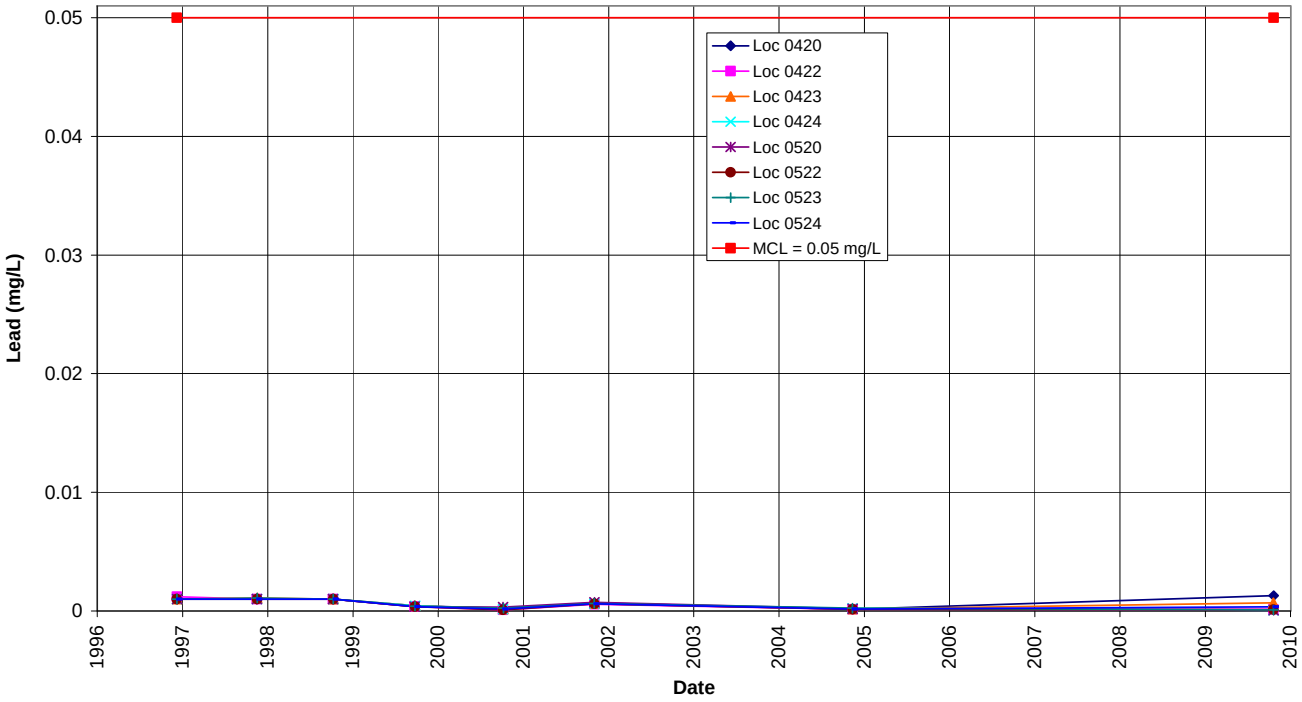

Figure 2–2. Time-Concentration Plot of Lead in Groundwater at the Burrell Disposal Site

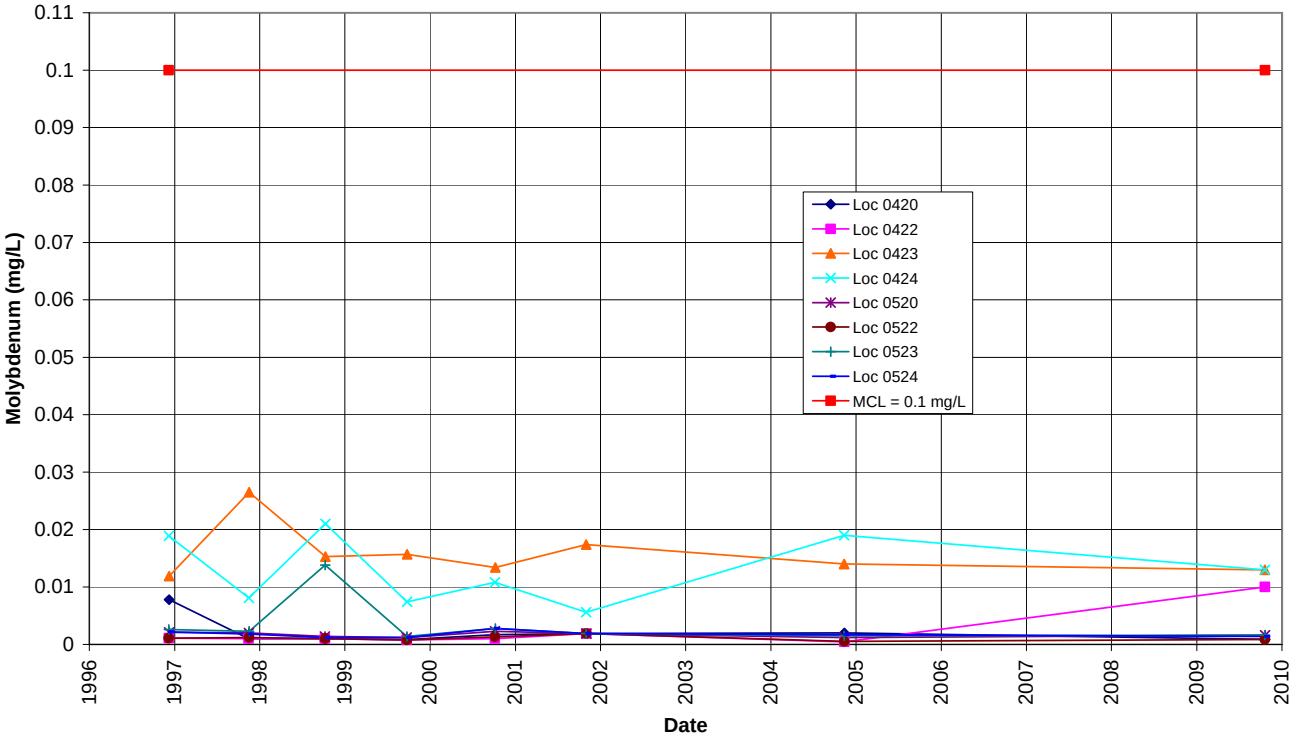

Figure 2–3. Time-Concentration Plot of Molybdenum in Groundwater at the Burrell Disposal Site

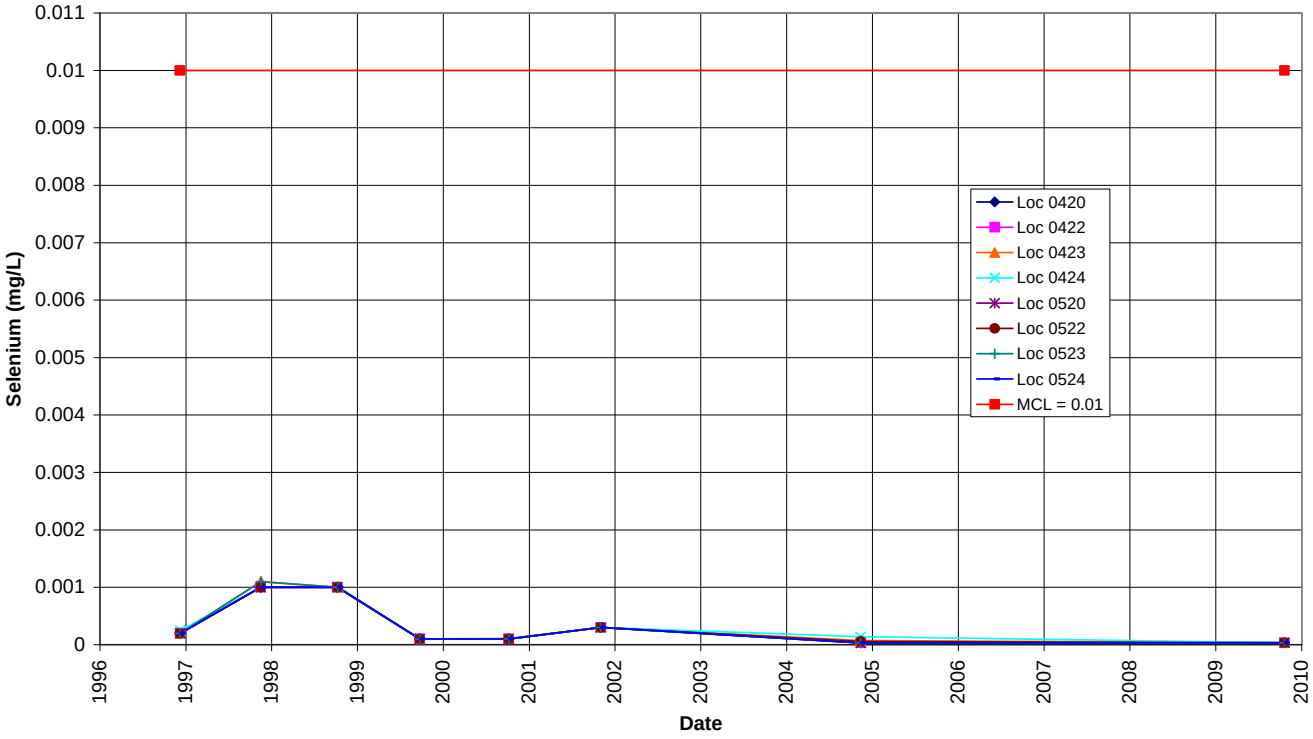

Figure 2–4. Time-Concentration Plot of Selenium in Groundwater at the Burrell Disposal Site

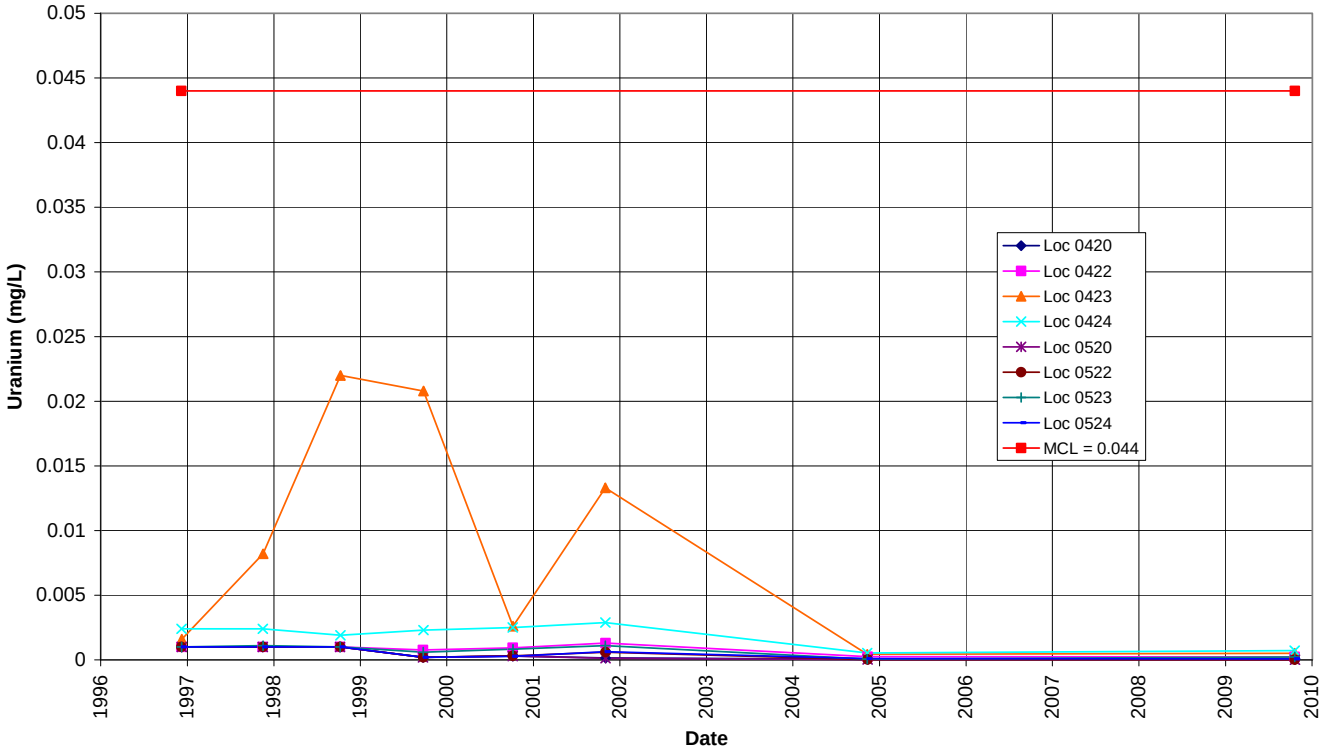

Figure 2–5. Time-Concentration Plot of Uranium in Groundwater at the Burrell Disposal Site

Each pair of wells consists of a shallow well, completed in unconsolidated fill and alluvium (400-series wells); and a deeper well, completed in the shallow bedrock of the Casselman Formation (500-series wells). In addition to the wells, two seeps at the bottom of the south side slope of the disposal cell are also sampled if they yield sufficient water. Samples were not collected from the seeps in 2009 due to insufficient or absent flows.

Concentrations of lead in groundwater in both the shallow alluvial wells (400-series wells) and the deeper bedrock wells (500-series wells) remained well below the MCL. The 2009 results from all locations were more than an order of magnitude below the MCL (Figure 2–2).

Concentrations of molybdenum in groundwater in both the shallow alluvial wells (400-series wells) and the deeper bedrock wells (500-series wells) remained well below the MCL. The 2009 results from all locations (except downgradient wells MW–0422, MW–0423 and MW–0424) were more than an order of magnitude below and at or near the laboratory detection limit. Concentrations in wells MW–0422, MW–0423 and MW–0424 were well below the MCL (Figure 2–3).

Concentrations of selenium in groundwater in both the shallow alluvial wells (400-series wells) and the deeper bedrock wells (500-series wells) remained well below the MCL. The 2009 results from all locations were more than two orders of magnitude below the MCL and approached the laboratory detection limit (Figure 2–4).

Concentrations of uranium in groundwater in both the shallow alluvial wells (400-series wells) and the deeper bedrock wells (500-series wells) remain well below the MCL. The 2009 results from all locations were two orders of magnitude or more below the MCL and approached the laboratory detection limit (Figure 2–5).

Given (1) that the monitoring network is satisfactory for its intended purpose, (2) that the concentration of the four target analytes remain well below the MCL and in most cases at or near the laboratory detection limit, and (3) that groundwater downgradient from the disposal cell is not significantly degraded relative to upgradient or background groundwater, DOE concludes that the disposal cell effectively isolates the contaminated waste from the groundwater environment. As stated in the revised LTSP, DOE has committed to monitor the groundwater on an every-fifth-year basis. After every such monitoring, DOE will review the data for trends or significant changes. DOE also will, from time to time and with NRC concurrence, review the need to continue monitoring and may determine to discontinue monitoring or alter the monitoring frequency.

2.3.5 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 2010.

2.3.6 Photographs

Table 2–4. Photographs Taken at the Burrell Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	360	Bent rail on top of south perimeter fence.
PL–2	290	View down the inside of the north perimeter fence.
PL–3	180	North side of the disposal cell.
PL–4	280	Japanese knotweed control on south side of the disposal cell.
PL–5	190	Looking south toward seeded slope.

BUR 10/2010. PL–1. Bent rail on top of south perimeter fence.

BUR 10/2010. PL–2. View down the inside of the north perimeter fence.

BUR 10/2010. PL–3. North side of the disposal cell.

BUR 10/2010. PL–4. Japanese knotweed control on south side of the disposal cell.

BUR 10/2010. PL–5. Looking south toward seeded slope.