

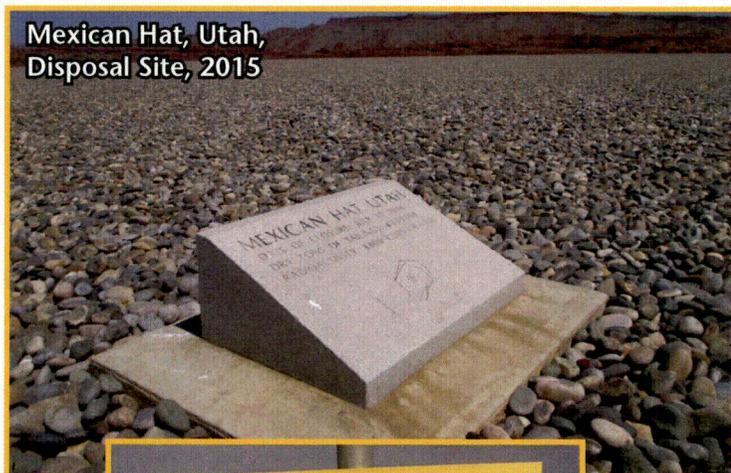


U.S. DEPARTMENT OF  
**ENERGY**

Legacy  
Management

**2015 Annual Site Inspection and  
Monitoring Report for Uranium Mill Tailings  
Radiation Control Act Title I Disposal Sites**

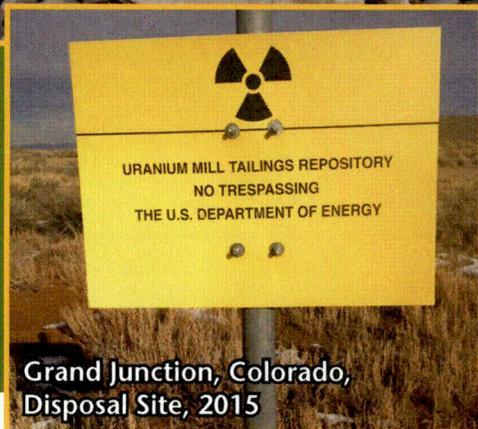
March 2016



Mexican Hat, Utah,  
Disposal Site, 2015



Shiprock, New Mexico,  
Disposal Site, 2015



Grand Junction, Colorado,  
Disposal Site, 2015



Gunnison, Colorado,  
Disposal Site, 2015

**U.S. Department of Energy  
Office of Legacy Management**

**2015 Annual Site Inspection and Monitoring Report  
for  
Uranium Mill Tailings Radiation Control Act  
Title I Disposal Sites**

**March 2016**

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## Abbreviations

ACL	alternate concentration limit
AML/UMTRA	Abandoned Mine Lands/Uranium Mill Tailings Remedial Action
BLM	U.S. Bureau of Land Management
BTV	background threshold value
CFR	<i>Code of Federal Regulations</i>
D <sub>50</sub>	mean diameter
DOE	U.S. Department of Energy
EDA	energy dissipation area
EPA	U.S. Environmental Protection Agency
LM	<i>Office of Legacy Management</i>
LTSP	Long-Term Surveillance Plan
MCL	maximum concentration limit
MDA	minimum detectable activity
mg/L	milligrams per liter
NMED	New Mexico Environment Department
NRC	U.S. Nuclear Regulatory Commission
PL	photograph location
PMP	probable maximum precipitation
POC	point-of-compliance
UBL	upper baseline limit
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978 (88 USC 7901 et seq.)

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## Executive Summary

This report, in fulfillment of a license requirement, presents the results of long-term surveillance and maintenance activities conducted by the U.S. Department of Energy (DOE) in 2015 at the 19 uranium mill tailings disposal sites established under Title I of the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978.<sup>1</sup> These activities verified that the UMTRCA Title I disposal sites remain in compliance with license requirements. Long-term surveillance plans (LTSPs) and site compliance reports are available on the Internet at <http://energy.gov/lm/sites/lm-sites>.

The DOE Office of Legacy Management operates 18 UMTRCA Title I sites under a general license granted by the U.S. Nuclear Regulatory Commission (NRC) in accordance with Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27). As required under the general license, an LTSP for each site was prepared by DOE and accepted by NRC.

The Grand Junction, Colorado, Disposal Site, also operated by DOE, is considered the nineteenth site, even though it will not be included under the general license until the open, operating portion of the disposal cell is closed. The open portion will be closed either when it is filled or in 2023. This site is inspected in accordance with an interim LTSP.

Long-term surveillance and maintenance services for these disposal sites include inspecting and maintaining the sites; monitoring environmental media and institutional controls; conducting corrective actions as necessary; and performing administrative, records, stakeholder relations, and other regulatory stewardship functions. Annual site inspections and monitoring are conducted in accordance with site-specific LTSPs and procedures established by DOE to comply with license requirements. Each site inspection is performed to verify the integrity of visible features at the site; to identify changes or new conditions that might affect the long-term performance of the site; and to determine the need, if any, for maintenance, follow-up inspections, or corrective action in accordance with the LTSP.

All of the sites require some degree of routine monitoring and maintenance, which can include groundwater and surface-water monitoring, minor erosion control, vegetation management, fence and gate repairs, sign replacement, and minor trash removal. The following non-routine activities<sup>2</sup> occurred in 2015:

- **Lakeview, Oregon:** DOE modified the rock monitoring sampling approach, at NRC's request, by using a pre-established monitoring grid in a subset area of the west side slope.

Results of the annual site inspection, maintenance, and monitoring activities are reported in the site-specific chapters that follow. Actions and issues are summarized in the following table, which includes an index number for each item.

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<sup>1</sup> Congress has directed that the Moab, Utah, Processing Site be remediated under Title I of UMTRCA. This site eventually will become the twentieth Title I disposal site.

<sup>2</sup> Non-routine activities are activities implemented in response to changes in site conditions, regulatory setting, or management structure following a regulatory compliance review.

Table ES-1. 2015 Summary of UMTRCA Title I Site Actions and Issues

Site	Chapter	Page	Index Number <sup>a</sup>	Actions and Issues
Ambrosia Lake, New Mexico	1	1-6	1A	No groundwater monitoring is required by the LTSP.
Burrell, Pennsylvania	2	2-7	2A	Conducted vegetation management.
Canonsburg, Pennsylvania	3	3-2 3-7 3-9	3A 3B 3C	Repair to vehicle gate was made. Additional perimeter signs installed. No groundwater/surface-water monitoring was required for 2015.
Durango, Colorado	4	4-6 4-7	4A 4B	Conducted vegetation management. Conducted groundwater monitoring.
Falls City, Texas	5	5-8	5A	Conducted groundwater monitoring.
Grand Junction, Colorado	6	6-7	6A	Conducted groundwater monitoring.
Green River, Utah	7	7-6 7-6 7-7	7A 7B 7C	Replaced missing perimeter sign. Removed telemetry system. Conducted groundwater monitoring.
Gunnison, Colorado	8	8-5 8-7	8A 8B	Conducted riprap degradation monitoring. No groundwater monitoring is required by the LTSP.
Lakeview, Oregon	9	9-6 9-14	9A 9B	Conducted rock gradation monitoring. No groundwater monitoring was required in 2015.
Lowman, Idaho	10	10-5 10-6	10A 10B	Identified erosion on outlying state-owned property. No groundwater monitoring is required by the LTSP.
Maybell, Colorado	11	11-6 11-7	11A 11B	Conducted vegetation management. No groundwater monitoring is required by the LTSP.
Mexican Hat, Utah	12	12-6 12-6 12-7 12-7	12A 12B 12C 12D	Replaced missing perimeter signs and posts. Removed brush and debris from seep area. No groundwater monitoring is required by the LTSP. Conducted seep monitoring.
Naturita, Colorado	13	13-6 13-6	13A 13B	Repaired perimeter fence. No groundwater monitoring required.
Rifle, Colorado	14	14-7 14-7	14A 14B	No groundwater monitoring required. Conducted water-level monitoring.
Salt Lake City, Utah	15	15-5 15-6 15-6	15A 15B 15C	Conducted riprap degradation monitoring. Conducted a radiological survey. No groundwater monitoring is required by the LTSP.
Shiprock, New Mexico	16	16-2 16-2 16-5 16-7 16-8	16A 16B 16C 16D 16E	Repair to entrance gate was made. Repaired perimeter fence. Conducted perimeter fence cleanup. No groundwater monitoring is required by the LTSP. Conducted vegetation management.
Slick Rock, Colorado	17	17-6 17-6	17A 17B	Updated contact information on entrance sign. No groundwater monitoring is required by the LTSP.
Spook, Wyoming	18	18-5 18-5	18A 18B	Repaired and replaced damaged perimeter signs. No groundwater monitoring required by the LTSP.
Tuba City, Arizona	19	19-6 19-6	19A 19B	Conducted vegetation management. Conducted groundwater monitoring.

<sup>a</sup> The index numbers can be found in the left margin next to the corresponding text in the respective site chapter.

## 1.0 Ambrosia Lake, New Mexico, Disposal Site

### 1.1 Compliance Summary

The Ambrosia Lake, New Mexico, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on August 19, 2015. The disposal cell was in excellent condition. Inspectors identified no maintenance needs or cause for a follow-up or contingency inspection.

### 1.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Ambrosia Lake, New Mexico, Disposal Site* (LTSP) (DOE/AL/62350-211, Rev. 1, U.S. Department of Energy [DOE], July 1996) and in procedures that DOE established to comply with the requirements of Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27). Table 1-1 lists these requirements.

Table 1-1. License Requirements for the Ambrosia Lake Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 1.4
Follow-Up or Contingency Inspections	Section 7.0	Section 1.5
Maintenance and Repairs	Section 8.0	Section 1.6
Groundwater Monitoring	Section 5.0	Section 1.7
Corrective Action	Section 9.0	Section 1.8

### 1.3 Institutional Controls

The 288-acre site (Figure 1-1) 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 1998. 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 site include federal ownership of the property and the following physical features that are inspected annually: perimeter warning signs, site markers, and survey and boundary monuments.

### 1.4 Inspection Results

The site, north of Grants, New Mexico, was inspected on August 19, 2015. The inspection was conducted by M. Widdop and R. Johnson of the DOE Legacy Management Support contractor.

The purposes of the inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that might affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring. Numbers in the left margin of this report refer to items summarized in Table ES-1 of the "Executive Summary."

#### 1.4.1 Site Surveillance Features

Figure 1-1 shows the locations of site surveillance features. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following

subsections. Photographs to support specific observations are identified in the text and on Figure 1-1 by photograph location (PL) numbers.

#### **1.4.1.1 Entrance Gate, Access Road, and Entrance Sign**

Access to the site is along a gravel road that crosses private property and leads to the site for approximately 1 mile from New Mexico State Highway 509. There is a locked gate across this road where it leaves Highway 509 because the road continues to private mining and grazing interests east of the site. The gate and access road are privately owned by Rio Algom Mining LLC (Rio Algom). DOE has been granted permanent access to the site. DOE does not maintain the gate or the access road. Inspectors found the access gate locked by a sampling crew supporting the U.S. Environmental Protection Agency investigation of groundwater conditions in the Ambrosia Lake Valley, and a representative of Rio Algom showed the inspectors an alternate route to the site across Rio Algom property. Rio Algom reinstalled the DOE lock on the access gate at a later date.

The entrance sign was in good condition (PL-1).

#### **1.4.1.2 Perimeter Signs**

The site is not fenced. Seventy perimeter signs, positioned on the site boundary, were in good condition. Posts for perimeter signs P1 through P15 include mining-restriction-area warning signs. Cattle have rubbed against and bent the mining restriction signs but the signs were otherwise in good condition (PL-2).

#### **1.4.1.3 Site Markers**

Granite site markers are located near the site entrance and on top of the disposal cell (PL-3). Both site markers were in excellent condition.

#### **1.4.1.4 Survey and Boundary Monuments**

Three combined survey and boundary monuments and five additional boundary monuments identify the property corners and boundary. Boundary monument BM-3 was not found and was apparently covered with soil. All of the other monuments were undisturbed and in good condition. Wind erosion has exposed the concrete base of boundary monument BM-8, but the monument is stable (PL-4).

#### **1.4.1.5 Monitoring Wells**

Monitoring wells 0409, 0675, and 0678 were in good condition. Gully formation adjacent to monitoring well 0678 appears to be stable, and the well is not impacted by the erosion.

#### **1.4.1.6 Mine Vent**

A mine vent shaft, associated with an abandoned underground mine, is within the site boundary in the northern portion of the site. The vent has a casing, which rises approximately 3 feet above the ground, and a spot-welded cover. The vent was secure at the time of the inspection (PL-5). Inspectors will continue to monitor the condition of the vent to ensure that the closure remains secure.

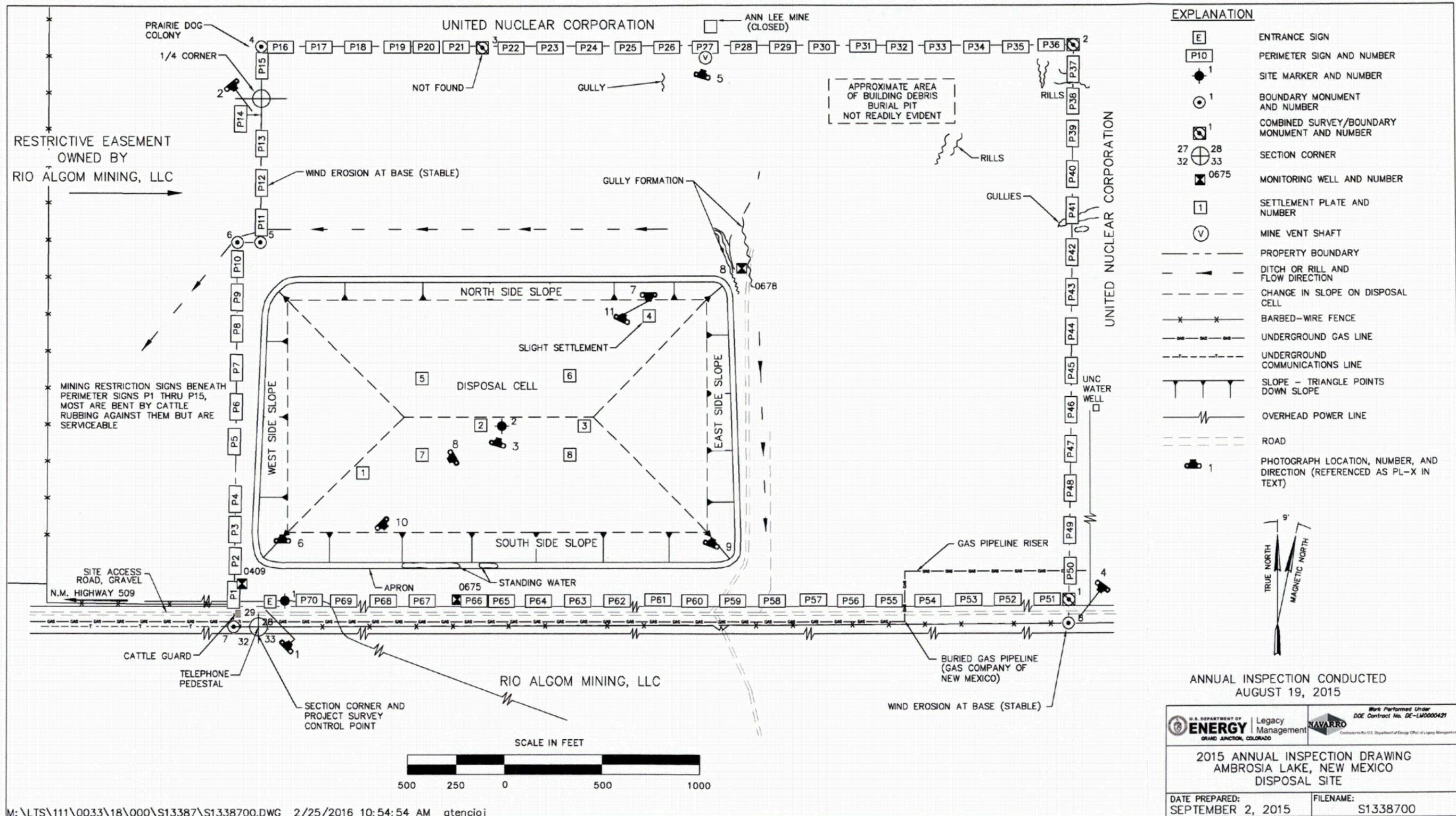


Figure 1-1. 2015 Annual Inspection Drawing for the Ambrosia Lake Disposal Site

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## **1.4.2 Inspection Areas**

In accordance with the LTSP, the site is divided into four inspection areas (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection. The inspection areas are: (1) the riprap-covered top of the disposal cell, (2) the riprap-covered side slopes and apron of the cell, (3) the graded and revegetated area between the disposal cell and the site perimeter, and (4) the outlying area.

Within each area, inspectors examined specific site surveillance features. Inspectors also looked for evidence of erosion, settling, slumping, or other disturbances that might affect the site’s integrity, protectiveness, or long-term performance.

### **1.4.2.1 Top of Disposal Cell**

The 91-acre disposal cell was completed in 1994. The basalt riprap-covered top slope of the disposal cell was in excellent condition (PL-6). There was no evidence of cracking, slumping, or erosion, and there was no indication of riprap degradation.

A shallow depression around settlement plate SP-4, near the northeast corner of the disposal cell cover, was first noted during the 1997 inspection and continued to grow in depth and area in subsequent years. The depression was repaired in August 2005. Visual observations during the 2015 inspection indicate that very minor settlement may have occurred since the depression was repaired (PL-7).

Scattered annual weeds and perennial grasses and forbs are growing on the disposal cell top slope (PL-8). In accordance with the LTSP, deep-rooted shrubs are to be removed from the cell cover. No deep-rooted shrubs were noted during the inspection.

### **1.4.2.2 Side Slopes and Apron**

The basalt riprap-covered side slopes and apron were in excellent condition and showed no evidence of cracking, settling, slumping, or erosion (PL-9). Standing water was present in a portion of the south apron (PL-10). This location is the topographic low spot along the base of the disposal cell and rainfall runoff collects in this area.

### **1.4.2.3 Graded and Revegetated Area**

In general, site vegetation appeared to be healthy. However, some areas are windswept and have little growth, particularly in an area north of the disposal cell where mill tailings had formerly been stockpiled. Because the site is not fenced, livestock occasionally enter the site. Inspectors found cattle grazing south of the cell. Occasional grazing will not affect cell performance or protectiveness and livestock do not walk on riprap-armored surfaces.

Rills and gullies within the DOE property north and east of the disposal cell have been monitored for several years (PL-11). These erosional features do not threaten the disposal cell’s performance or integrity because headward erosion is progressing away from the cell, and there is no significant sedimentation near the cell.

#### **1.4.2.4 Outlying Area**

The area within 0.25 mile of 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 impacts were observed.

Prairie dogs have established a colony near boundary monument BM-4. No site surveillance features are affected.

### **1.5 Follow-Up or Contingency Inspections**

DOE will conduct follow-up or contingency inspections if (1) an annual inspection or other site visit identifies a condition that requires a return to the site to evaluate the condition or (2) a citizen or outside agency notifies DOE that conditions at the site or in the vicinity of the site are substantially changed. No need for a follow-up or contingency inspection was identified.

### **1.6 Maintenance and Repairs**

No maintenance needs were identified.

### **1.7 Groundwater Monitoring**

1A In accordance with the LTSP, groundwater monitoring is not required at this site because (1) the groundwater is heavily contaminated from underground uranium mining and naturally occurring mineralization and (2) the uppermost aquifer is of limited use due to its low yield. Consequently, NRC concurred with the application of supplemental standards at the site and the exemption of both compliance and performance groundwater monitoring. However, at the request of the New Mexico Environment Department (NMED), DOE conducts groundwater monitoring at three wells as a best management practice.

Monitoring well 0675 is completed in weathered Mancos Shale just below its contact with the overlying alluvium, and monitoring well 0678 is completed in the Tres Hermanos B sandstone unit of the Mancos Shale. DOE originally agreed to sample these locations once every third year for 30 years; however, annual sampling began in November 2010 at the request of NMED. Monitoring results are provided to NMED and NRC.

DOE installed a new monitoring well (0409) in May 2011 in support of a regional groundwater investigation being conducted by NMED. The well, located on DOE property adjacent to the southwest corner of the disposal cell, is completed in an alluvium-filled paleochannel. The bottom of the well screen is at the contact between the alluvium and sandstone of the Tres Hermanos C unit of the Mancos Shale. The well is dry, which suggests that groundwater is not leaving the southwest portion of the site via alluvium.

### **1.8 Corrective Action**

In accordance with the LTSP, corrective action is taken to correct conditions that threaten the integrity of the disposal cell or compliance with 40 CFR 192. No need for corrective action was identified.

## 1.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	45	Entrance sign and site marker SMK-1.
PL-2	140	Perimeter sign P14.
PL-3	15	Site marker SMK-2.
PL-4	215	Boundary monument BM-8.
PL-5	15	Vent south of Ann Lee mine shaft.
PL-6	0	West edge of disposal cell top slope.
PL-7	180	Settlement plate SP-4.
PL-8	240	Vegetation on southeast portion of top slope.
PL-9	20	East side slope.
PL-10	135	South side slope and standing water in apron.
PL-11	25	Erosion north of disposal cell.



AMB 8/2015. PL-1. Entrance sign and site marker SMK-1.



AMB 8/2015. PL-2. Perimeter sign P14.



AMB 8/2015. PL-3. Site marker SMK-2.



AMB 8/2015. PL-4. Boundary monument BM-8.



*AMB 8/2015. PL-5. Vent south of Ann Lee mine shaft.*



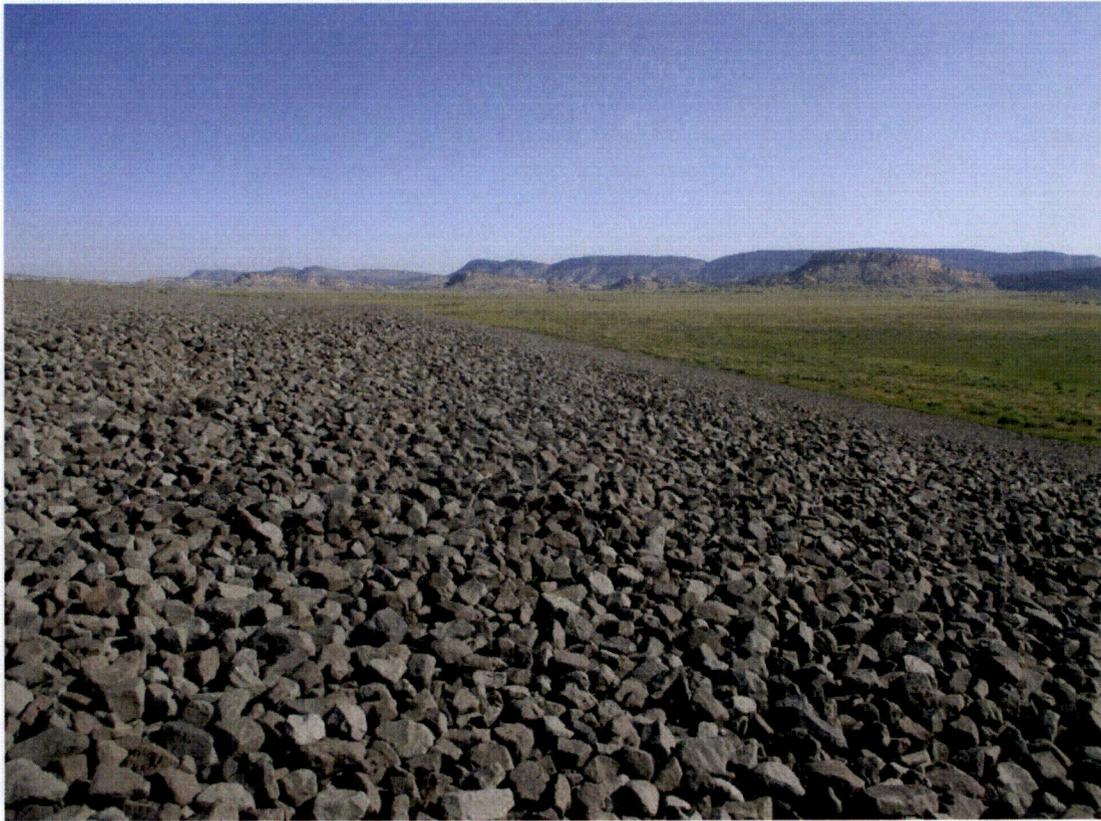
*AMB 8/2015. PL-6. West edge of disposal cell top slope.*



*AMB 8/2015. PL-7. Settlement plate SP-4.*



*AMB 8/2015. PL-8. Vegetation on southeast portion of top slope.*



*AMB 8/2015. PL-9. East side slope.*



*AMB 8/2015. PL-10. South side slope and standing water in apron.*



*AMB 8/2015. PL-11. Erosion north of disposal cell.*

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## 2.0 Burrell, Pennsylvania, Disposal Site

### 2.1 Compliance Summary

The Burrell, Pennsylvania, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on October 28, 2015. With the exception of a few minor maintenance items (i.e., a missing site entrance sign and a tree limb lying on the perimeter fence) the Burrell site is in excellent condition. No evidence of erosion or slope instability was observed on the disposal cell.

An effective vegetative management program that aligns with requirements set forth within the Long-Term Surveillance Plan (LTSP) remains successful. The continued combination of spot herbicide application and more frequent mowing has greatly reduced the extent of noxious weeds, including teasel, poison hemlock, and common reed. The approach used for control of Japanese knotweed is achieving desired results. The presence of resprouting weeds and rosettes indicates that continued diligence is needed. It is recommended that the spot-spray/mow process continue.

An eco-friendly pilot-project for reseeding distressed areas along the southern perimeter fence (that began in 2009) continues to be a success. Herbaceous cover in the pilot-project area is well-established, and it appears to have reduced re-establishment of noxious weeds following herbicide application. It is recommended that additional seeding be undertaken, as deemed appropriate, following herbicide application for noxious weeds sitewide.

Groundwater quality monitoring is conducted on a 5-year schedule. Sampling was last conducted in 2013. The next sampling event is planned for 2018. Groundwater monitoring results from samples collected in November 2013 indicated that the disposal cell continues to isolate the contaminated waste from the groundwater environment. Inspectors identified no other maintenance needs or cause for a follow-up or contingency inspection

### 2.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the revised *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], April 2000) and in procedures established by DOE to comply with the requirements of Title 10 *Code of Federal Regulations* Section 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 and 3.4	Section 2.4
Follow-Up or Contingency Inspections	Section 3.5	Section 2.5
Maintenance and Emergency Measures	Section 3.6	Section 2.6 and 2.7
Groundwater and Surface Water Monitoring	Section 3.7	Section 2.8.1

## **2.3 Institutional Controls**

The 72-acre site (Figure 2-1) 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 requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the site include federal ownership of the property and the following physical features that are inspected annually: perimeter warning signs, a site perimeter fence, and locked gates.

## **2.4 Inspection Results**

S. Smith and K. Broberg of the DOE Legacy Management Support contractor conducted the inspection on October 28, 2015. C. Carpenter (DOE Site Manager), D. Shearer (Pennsylvania Department of Environmental Protection), and T. Biller (Lawn RX) also participated in the inspection. Lawn RX is the subcontractor conducting herbicide services.

The purposes of the inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that might affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring. Numbers in the left margin of this report refer to items summarized in Table ES-1 of the “Executive Summary.”

### **2.4.1 Site Surveillance Features**

The locations of site surveillance features are shown in Figure 2-1. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections. Photographs to support specific observations are identified in the text and in Figure 2-1 by photograph location (PL) numbers.

#### **2.4.1.1 Access Road, Entrance Gates, and Entrance Sign**

An access road leads from Strangford Road, along a DOE right-of-way through the Burrows’ property (Tract 201-E) and across DOE’s leased crossing over Norfolk Southern Railroad tracks, to the entrance gate in the east end of the chainlink perimeter fence. The access road was easily passable in a sport utility vehicle; use of a low-clearance passenger car is not recommended.

Local residents historically have used the area along the DOE right-of-way for unpermitted dumping, hunting, target practice, and riding of all-terrain vehicles. Personnel associated with commercial interests use the road for access to the railroad tracks and several nearby natural gas wells. Previously, an attempt was made to control access across the right-of-way by maintaining a gate at Strangford Road and installing a guardrail on both sides of the gate. Local residents complained that the guardrail blocked access to parking areas and, consequently, DOE removed several sections. After years of replacing locks and after the gate was damaged beyond repair in 2002, DOE requested NRC concurrence in removing the gate and establishing institutional control for the site at the entrance gate of the perimeter fence. NRC concurred on April 28, 2003, and the gate along Strangford road was removed in fall 2003.

During this year’s inspection, site entrance gates were in good condition and properly locked. The south personnel gate (near perimeter sign P14) is in need of a new lock. Arrangements will

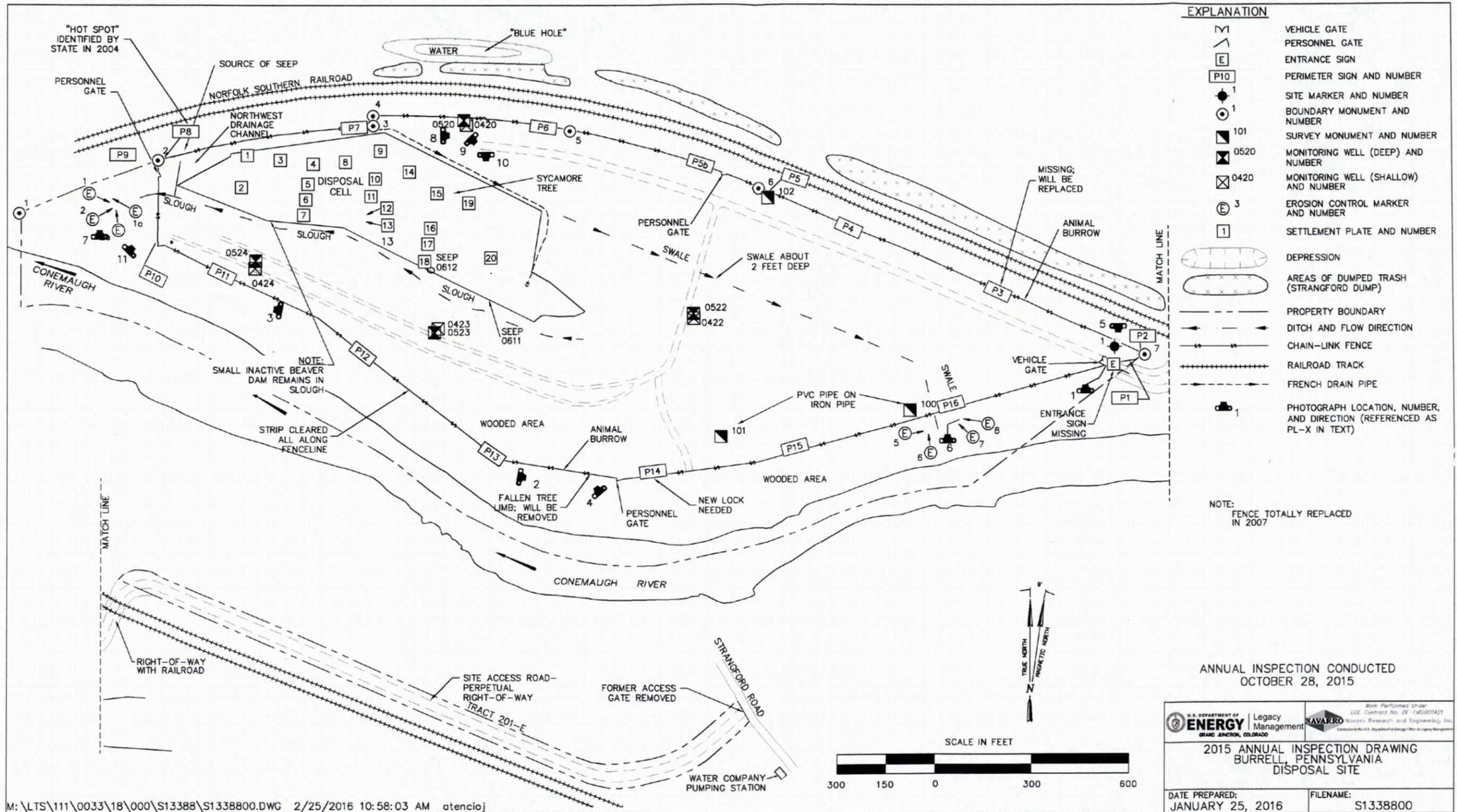


Figure 2-1. 2015 Annual Inspection Drawing for the Burrell Disposal Site

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be made in 2016 to have the existing lock replaced with a new waterproof lock. It was noted during the inspection that the main entrance gate could be further secured by installing a lockable J-post. A pipe is already installed in the ground beneath the gates that could easily receive the J-post (PL-1). The site entrance sign was missing from the main site entrance gate. A J-post will be installed and the site entrance sign will be replaced.

#### **2.4.1.2 Perimeter Fence and Perimeter Signs**

The chainlink perimeter fence that encircles the site was replaced in 2007, and it remains in good condition. The site herbicide subcontractor is doing an excellent job keeping the fence line clear of vegetation, which should prolong the life of the fence (PL-2 and PL-3).

The south fence received minor damage at several locations in 2014 due to fallen trees. All of the damage areas identified in the 2014 inspection report were repaired in 2015. A new area of minor damage was noted in 2015 due to another tree limb falling across the top rail of the south fence (PL-4). The limb was too large for inspectors to safely remove. The site maintenance subcontractor will remove the limb from the fence. Additional repairs to the fence are not needed.

As reported in previous inspection reports, several of the fence perimeter signs are damaged with bullet holes (e.g., P4) but remain serviceable. Perimeter sign P3 could not be located, and it will be replaced. Bullet holes in the perimeter fence signs were the only evidence of trespass noted during the inspection.

#### **2.4.1.3 Site Markers**

The Burrell site has one site marker. It is just inside the main entrance gate and was in excellent condition (PL-5).

#### **2.4.1.4 Survey Monuments and Boundary Monuments**

There are three survey monuments and seven boundary monuments at the Burrell site. All three survey monuments (SM-100, SM-101, and SM-102) are located at points on the property that originally afforded a sweeping view of the site during construction. Several years ago inspectors installed tall pieces of white PVC pipe near SM-100 and SM-101 to aid in locating them. Although the PVC pipe for SM-100 was located in 2014, the actual monument was not. Given the poor weather conditions encountered during this year's inspection, an effort to locate the monument using a metal detector was not made. A metal detector and GPS instrument will be used in 2016 to locate the marker.

Seven boundary monuments are located along the north perimeter fence. Five of the seven boundary monuments were located during the inspection and observed to be in good condition. Boundary monument BM-1, which is located to the west of the disposal cell, was not located due to the dense vegetation in the area. The site maintenance subcontractor will clear vegetation from around this monument. Boundary monument BM-5, which is located along the north fence line, also could not be located. A metal detector and GPS instrument will be used in the next inspection to locate that monument.

### **2.4.1.5 Erosion Control Markers**

There are eight erosion control markers at Burrell. All eight erosion control markers were located and were in good condition (PL-6 and PL-7).

### **2.4.1.6 Monitoring Wells**

All wells encountered during the inspection were properly locked (PL-8). The interiors of the monitoring wells were not inspected this year. The interiors were last inspected by the water sampling crew in November 2013.

As identified during the 2014 inspection, the concrete base/pad located around the surface casing of monitoring well 0523 is cracked. A few of the monitoring wells do not have a concrete base/pad (i.e., MW-0424). During the next scheduled sampling round in 2018, well pads will be repaired or installed as deemed appropriate.

## **2.4.2 Inspection Areas**

In accordance with the LTSP, the site is divided into four inspection areas (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection. The inspection areas are: (1) the disposal cell, (2) the area adjacent to the disposal cell, (3) the site perimeter, and (4) the outlying area, including the access road that leads to the site.

Within each area, inspectors examined specific site-surveillance features. Inspectors also looked for evidence of erosion, settling, slumping, or other disturbances that might affect the site’s integrity, protectiveness, or long-term performance.

### **2.4.2.1 Disposal Cell**

No indications of cell instability (e.g., slumping, bulging, or differential settlement) were noted by the inspectors (PL-9, PL-10, and PL-11). Rock quality remains good; degradation of the riprap was not evident. Due to the rain and slippery conditions, inspectors did not walk across the riprap cover to inspect seep 0611 (located on the south side slope of the disposal cell).

Vegetation control (including woody vegetation) on the disposal cell is not required for protection of human health and the environment. A screening-level risk assessment conducted by DOE from 1996 to 1997 determined that plant succession on the disposal cell does not present significant or credible risk to human health or the environment and might, by evapotranspiration, improve the long-term performance of the disposal cell.

NRC suggested that DOE reevaluate the effects of vegetation on cover performance in 10 or 20 years following the report, (which, based on 1997, would be by the year 2017) to confirm performance parameters and predictions. DOE is planning to conduct a follow-up assessment on the effect of vegetation on cover performance in 2016. The assessment will revisit the issue of vegetation growth on the cell cap to determine whether vegetation growth on the cell cap remains protective of human health and the environment, and whether it interferes with the ability of inspectors to determine cell cap stability during inspections.

Trees and large shrubs grow on the top and slopes of the cell cap. The trees are beginning to be rather large. A sycamore located on the top of the cell cap had a 14-inch circumference trunk in 2009 and a 16-inch circumference trunk in 2012 (as measured 4.5 feet above the ground). The location of this tree is noted on the inspection map, and the tree is identified with a survey ribbon so that future inspectors can revisit this tree and record additional growth. Due to poor weather conditions during this year's inspection (i.e., slippery riprap), inspectors did not venture on the riprap to check the tree.

2A Although vegetation is allowed to grow on the disposal cell, the cell is sprayed for noxious weeds. In 2008, a Vegetation Management Plan was issued for the Burrell site that included control of noxious and invasive vegetation on the cell cap for the purpose of facilitating inspection activities. Vegetation management efforts are effective at limiting the spread of noxious weeds. Control of woody noxious vegetation will continue as recommended.

#### **2.4.2.2 Area Adjacent to the Disposal Cell**

A French drain was installed north of the disposal cell in 1998 to prevent ponding of water next to the cell. The outlet for the French drain is located in the southeast corner of the disposal cell. The outlet was not flowing during the inspection. As noted below, flow from the outlet has never been observed, but given the large amount of rainfall that day, flow was expected. Water was not ponded anywhere along the French drain depression that runs parallel to the north slope of the disposal cell, indicating that the French drain was operating properly. Inspectors will continue to keep an eye on the French Drain area to verify that it is operating as designed.

Inspections dating back to 1998 indicate that, prior to installing the French drain, rainwater and snow melt would collect on the north side of the disposal cell and enter into a shallow depression located along the base of the north slope of the disposal cell. Saturated soil and wetland vegetation (cattails and purple loosestrife) were present in a 3-foot wide band along this depression. Design drawings indicated that this depression should have drained to the east, but final grading of the area around the northeast corner of the disposal cell left a high spot so the intended drainage did not occur. At the same time that water was ponding just north of the disposal cell, seeps were occurring in the south slope of the disposal cell. It was thought that the source of water for these seeps could be the ponded water north of the disposal cell. The French drain was installed in 1998 to correct this drainage problem. Water has not been observed flowing from the outlet of the French drain. Until 2010, no water was observed flowing from the seeps on the south slope of the disposal cell since the French Drain was installed. In spring 2010 however, a seep was observed on the south side of the disposal cell (seep 0611). The seep was sampled and no maximum concentration limit (MCL) exceedances were measured in the sample. Seep 0611 was not checked during this year's inspection because walking on the slippery riprap presented a work hazard.

A small inactive beaver dam remains in the slough south of the disposal cell. Inspectors did not walk down to the beaver dam during this year's inspection because of unsafe working conditions. The site herbicide contractor indicated that the dam was inactive in 2015 as no evidence of recent activity around the dam was observed (animal tracks, new cuts, etc.).

#### **2.4.2.3 Site Perimeter**

An active seep is located near the north security fence, about 60 feet east of perimeter sign P8 and west of the disposal cell. The seep was flowing during this year's inspection, and it appeared

to be about the same as last year. This area will continue to be monitored to determine whether the seep poses a threat to the integrity of the disposal cell. Conceivably, the seep could destabilize the nearby railroad embankment. The water for the seep along the fence line appears to be coming from the bluffs, north of the railroad tracks.

#### **2.4.2.4 Outlying Area**

The area within 0.25 mile of 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. 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 in the past. No new fresh piles of trash were observed during the inspection. The dumping of trash 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, inspectors will continue to note any dumping activity.

In 2004, a representative from the Pennsylvania Department of Environmental Protection pointed out to inspectors the presence of a “hot spot” (having gamma radiation levels of 5 millirems per hour) in the rock ballast adjacent to the railroad tracks northeast of perimeter sign P8. After the inspection, DOE checked site records and determined that the area in question was addressed in a Uranium Mill Tailings Remedial Action Project property completion report. Supplemental standards were applied to contamination beneath the tracks because the benefit of removal did not justify the cost and the contamination did not pose a risk. DOE communicated the results of the records search to the state in late 2004. The hot spot was discussed with State representatives again in 2006 and there are no concerns because the supplemental standards application established that under current land use there is negligible risk and land use is stable. The area is marked on the site inspection map for future reference.

### **2.5 Follow-Up Inspections**

DOE will conduct follow-up or contingency inspections if (1) an annual inspection or other site visit identifies a condition that requires a return to the site to evaluate the condition, or (2) a citizen or outside agency notifies DOE that conditions at the site or in the vicinity of the site are substantially changed. No need for a follow-up or contingency inspection was identified.

### **2.6 Maintenance and Repairs**

Installation of a J-post is planned on the main entrance gate to increase site security. During the inspection the site entrance sign and perimeter sign P3 were identified as missing; they will be replaced. A tree limb was found to be obstructing the south fence and will be removed. Vegetation management continues for both noxious weeds and noxious woody vegetation onsite by herbicide application following seeding. Monitoring well pads will be repaired or installed as needed.

### **2.7 Emergency Measures**

Emergency measures are the actions that DOE will take in response to “unusual damage or disruption” that threaten or compromise site safety, security, or integrity. DOE will contain or prevent dispersal of radioactive materials in the unlikely event of a breach in cover materials. No emergency measures were identified in 2015.

## 2.8 Environmental Monitoring

### 2.8.1 Groundwater Monitoring

In accordance with the LTSP, DOE monitors groundwater at Burrell as a best management practice to evaluate the disposal cell's performance. The groundwater monitoring effort consists of eight wells (in four pairs) that are monitored for four target analytes: lead, molybdenum, selenium, and uranium. In 40 CFR 192, Table 1, Subpart A, 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.

Table 2-2. Groundwater Monitoring Network at the Burrell, Pennsylvania, Disposal Site

Monitoring 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, Pennsylvania, Disposal Site

Constituent	MCL <sup>a</sup> (mg/L)
Lead	0.05
Molybdenum	0.1
Selenium	0.01
Uranium	0.044

<sup>a</sup>EPA MCLs as listed in 40 CFR 192, Table 1, Subpart A.

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 (0611 and 0612) are also sampled if they yield sufficient water.

Sampling is conducted on a 5-year schedule. Samples were last collected in 2013. Monitoring results from the 2013 sampling event were presented in the 2014 Inspection Report. As reported in the 2014 Inspection Report, the concentration of the four target analytes remain well below the MCLs and, in most cases, at or near the laboratory detection limit. Groundwater downgradient from the disposal cell was not significantly degraded relative to upgradient or background groundwater, and DOE concluded that the disposal cell effectively isolates its contaminated waste from the groundwater environment.

After each monitoring event, DOE reviews the data for trends or significant changes. From time to time, and with NRC concurrence, DOE will review the need to continue monitoring and may determine to discontinue monitoring or alter the monitoring frequency. The next round of groundwater sampling is scheduled for 2018. Sampling at Burrell is coordinated with sampling at the Canonsburg, Pennsylvania, and Parkersburg, West Virginia, disposal sites to improve efficiency and decrease travel costs.

## 2.8.2 Vegetation Management

Vegetation management activities are mostly successful in controlling the extent of noxious and invasive plants across the site. The combination of spot herbicide application and more frequent mowing is effective, with the exception of purple loosestrife. This species continues to be found in the swale located south and west of the disposal cell and the area between the toe of the north slope of the disposal cell and the French drain. Some additional loosestrife was located east of the disposal cell, in or around the swale that drains to the east. Purple loosestrife is classified as a noxious weed in Pennsylvania.

Areas of heavy infestation have left bare spots following control measures, resulting in other invasive species moving in. Therefore, it is recommended that seeding activities follow spot herbicide application in areas of heavy infestation. Seeded areas in 2009 and 2010 have established well, and similar mixes can be used to prevent recurrent establishment of noxious weeds.

Wooded areas remained heavily infested with noxious weeds. Pursuant to the vegetation management plan, the fence line and access paths remain clear.

The spot-spray/mow process across the site will be continued. The vegetation inspection map will be used as a guide for herbicide application, but it is recommended that a complete site walkdown be conducted to ensure adequate coverage. An appropriate seed mix will be broadcast in heavily infested areas following herbicide application.

## 2.9 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that might affect the integrity of the disposal cell or compliance with 40 CFR 192. No corrective action was identified during the inspection.

## 2.10 Photographs

Photo Location Number	Azimuth	Photograph Description
1	NA	Pipe in ground, vehicle gate, east side of site.
2	100	South perimeter fence line.
3	280	South perimeter fence line.
4	320	Tree limb on top of fence.
5	NA	Site marker.
6	NA	Erosion control marker ECM-8.
7	NA	Erosion control marker ECM-2A.
8	90	Monitoring well 0520.
9	135	Northeast end of the disposal cell.
10	180	North side of the disposal cell.
11	45	West side of the disposal cell



*BUR 10/2015. PL-1. Pipe in ground, vehicle gate, east side of site.*



*BUR 10/2015. PL-2. South perimeter fence line.*



*BUR 10/2015. PL-3. South perimeter fence line.*



*BUR 10/2015. PL-4. Tree limb on top of fence.*



*BUR 10/2015. PL-5. Site marker.*



*BUR 10/2015. PL-6. Erosion control marker ECM-8.*



*BUR 10/2015. PL-7. Erosion control marker ECM-2A.*



*BUR 10/2015. PL-8. Monitoring well 0520.*



*BUR 10/2015. PL-9. Northeast end of the disposal cell.*



*BUR 10/2015. PL-10. North side of the disposal cell.*



*BUR 10/2015. PL-11. West side of the disposal cell*

## 3.0 Canonsburg, Pennsylvania, Disposal Site

### 3.1 Compliance Summary

The Canonsburg, Pennsylvania, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on October 27, 2015. The site was in excellent condition. No evidence of erosion or slope instability was observed on the disposal cell. A trespass campsite was discovered hidden among the trees in the southwest corner of the property, outside the perimeter fence. The Canonsburg Police Department was notified; however, law enforcement could not locate the occupant of the camp. The Canonsburg Police Department will continue to patrol the area in order to find the camper, and to decrease the potential for future trespass.

Water quality monitoring is conducted on a 5-year schedule. Sampling was last conducted in 2013. The next sampling event is scheduled for 2018. Inspectors identified no maintenance needs or cause for a follow-up inspection.

### 3.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the U.S. Department of Energy Canonsburg Uranium Mill Tailings Disposal Site, Canonsburg, Pennsylvania* (LTSP) (LMS/CAN/S00404-1.0, U.S. Department of Energy [DOE], March 2013) and procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27). Table 3-1 lists these requirements.

Table 3-1. License Requirements for the Canonsburg Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.3	Section 3.4
Follow-Up Inspections	Section 3.4	Section 3.5
Maintenance and Repairs	Section 3.5	Section 3.6
Environmental Monitoring	Section 3.7	Section 3.7
Emergency Response	Section 3.6	Section 3.8

### 3.3 Institutional Controls

The Canonsburg disposal site is managed in accordance with requirements for UMTRCA Title I sites. DOE, as the U.S. Nuclear Regulatory Commission (NRC) licensee, is responsible for the site's custody and long-term care. The site-specific institutional controls include federal ownership of the property and the following physical features that are inspected annually: warning/no trespassing signs (perimeter signs) placed along the property boundary, a site perimeter fence, and locked gates at the site entrances.

Institutional controls also apply to Area C and Tract 117, which are located southeast of Strabane Avenue. Area C (3.1 Acres) was sold and transferred in 2005 and Tract 117 (0.431 acres) was sold and transferred in 2009 to the same private owner. DOE and the Commonwealth of Pennsylvania complied with restrictions on parcel transfers stipulated in UMTRCA and the Cooperative Agreement between DOE and the Commonwealth. The deed for Area C and Tract 117 establishes restrictions to limit excavation in the areas, prohibits the disturbance of the

stream bank, maintains access for monitoring and stream bank maintenance, and prevents the areas from being used for residential purposes. Use of groundwater is not restricted. Adherence to these institutional controls is evaluated during site inspections.

The owner of the property is constructing storage units (PL-1). Access to monitoring wells MW-0424 and MW-0414B is being maintained. The area around monitoring well MW-0414B is becoming overgrown with weeds (PL-2). Drainage from the storage unit foundation is directed behind monitoring well MW-0414B via a pipe (PL-3). Inspectors plan to keep an eye on this area to assess how/if drainage from the pipe might impact the area near the monitoring well.

### **3.4 Inspection Results**

The site, located in Canonsburg, Pennsylvania, was inspected on October 27, 2015. The inspection was conducted by S. Smith and K. Broberg of the DOE Legacy Management Support contractor. C. Carpenter (DOE Site Manager) and T. Biller (Lawn RX) also participated in the inspection. Lawn RX is the subcontractor conducting herbicide services.

The purposes of the inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that might affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring. Numbers in the left margin of this report refer to items summarized in Table ES-1 of the “Executive Summary.”

#### **3.4.1 Site Surveillance Features**

The locations of site surveillance features are shown in Figure 3-1. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections. Photographs to support specific observations are identified in the text and in Figure 3-1 by photograph location (PL) numbers.

##### **3.4.1.1 Entrance Gates, Entrance Signs, and Access Road**

Access to the Canonsburg site is directly off of Strabane Avenue. The main entrance gate for the site was locked and in good condition. The personnel gate in the southwest corner of the site has a broken hasp that will be repaired. The gate is currently secured with a chain (PL-4). The hasp on the gate along with the lock will be repaired. The other personnel and vehicle gates were in good condition.

##### **3.4.1.2 Perimeter Fence and Perimeter Signs**

3A The security fence was replaced in 2007 and is in excellent condition. The north vehicle gate hinge was repaired in 2015 and is in good condition (PL-5). A vegetation-free buffer zone is being maintained around the entire site security fence.

An area of erosion under the west perimeter fence remains (see Figure 3-1). The area appears to be stable and has not grown in size in several years (PL-6). For added security, the gap that is present between the bottom of the fence and the ground surface will be better secured with a few stakes and some wires or additional fence fabric.

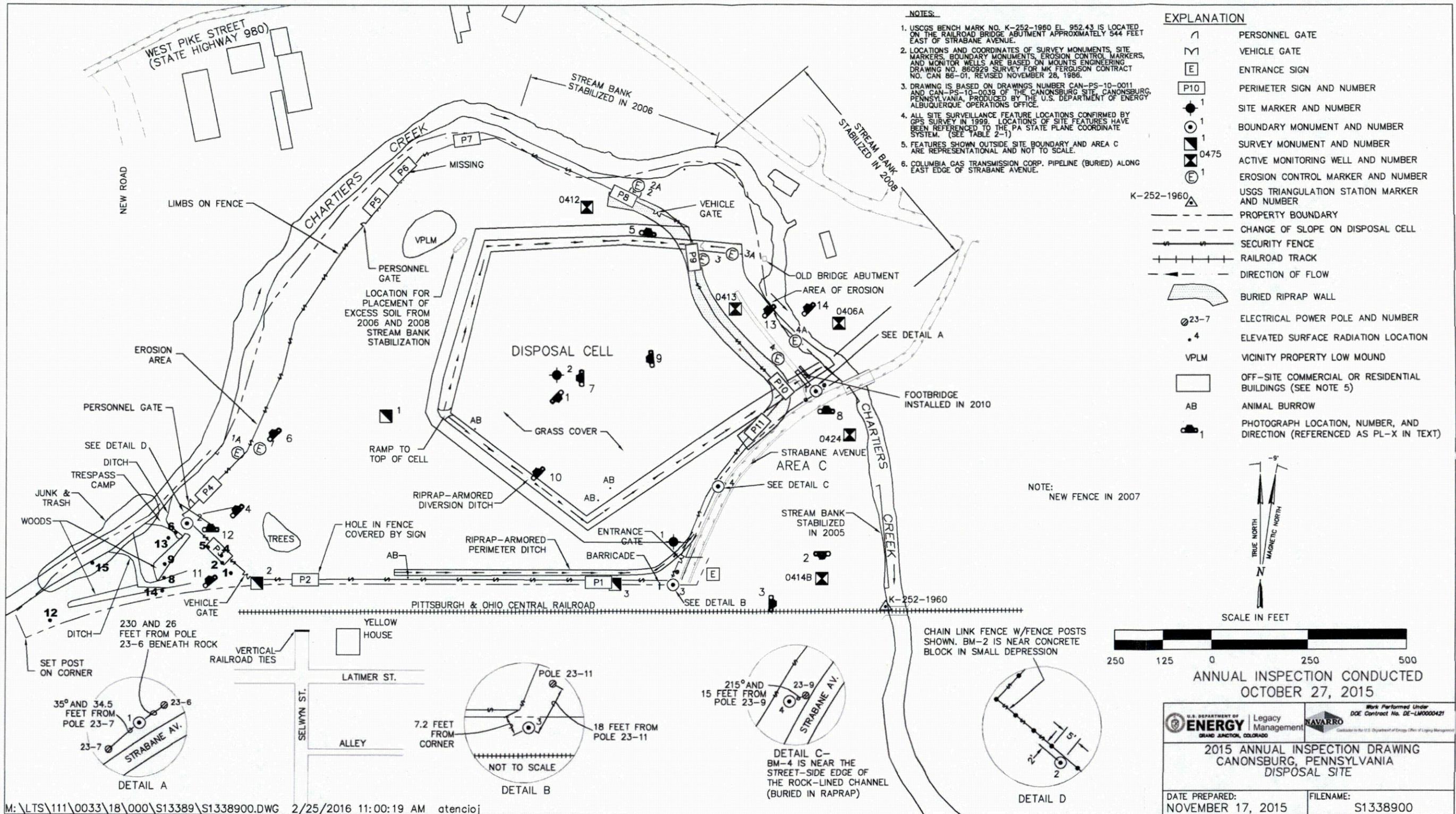


Figure 3-1. 2015 Annual Inspection Drawing for the Canonsburg Disposal Site

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The perimeter security fence has 11 attached signs identifying the site. With the exception of perimeter signs P2 and P6, all perimeter fence signs were in good condition. Perimeter sign P2 is held in place with zip ties, and covers a small hole in the fence where the original P2 sign was stolen in 2011. The sign remains serviceable. Perimeter sign P6 was missing, and will be replaced.

#### **3.4.1.3 Site Markers**

The site has two markers. Both site markers were in good condition (PL-7).

#### **3.4.1.4 Survey Monuments and Boundary Monuments**

The site has three survey monuments and four boundary monuments. Survey and boundary monuments were in good condition, with the exception of boundary monument BM-1, which could not be located. It is believed that BM-1 was buried under gravel during the last stream bank stabilization action along Chartiers Creek. An effort will be made during the next inspection to dig and locate the monument.

The guardrail along Strabane Avenue near boundary monument BM-1 was repositioned a little during the last stream bank stabilization effort. A concrete footer remains that has a few metal pins protruding. The pins present a tire hazard and will be cut off flush with the ground surface. During the inspection, a safety cone was placed over the pins as a temporary measure until the pins can be cut off (PL-8).

#### **3.4.1.5 Erosion Control Markers**

The site has 4 pairs of erosion control markers. All 4 pairs were in good condition.

#### **3.4.1.6 Monitoring Wells**

The site has five groundwater monitoring wells (MW-0406A, MW-0412, MW-0413, MW-0414B, and MW-0424), which are inspected when the wells are sampled. The wells were last sampled in November 2013 and are scheduled to be sampled again in 2018. The 5-year sampling schedule is coordinated with sampling at the Burrell, Pennsylvania, UMTRCA Title I Disposal Site and the Parkersburg, West Virginia, Disposal Site to improve efficiency and reduce travel costs. All monitoring wells were properly locked during the inspection.

### **3.4.2 Inspection Areas**

To ensure a thorough and efficient inspection, the site was divided into five inspection areas (referred to as "transects" in the LTSP): (1) the disposal cell, (2) the grass-covered area surrounding the disposal cell, (3) the diversion channels and perimeter ditches, (4) the site perimeter, and (5) 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 disturbances that might affect the site's integrity or long-term performance.

### 3.4.2.1 Disposal Cell

The grass-covered disposal cell was in excellent condition. No evidence of erosion or slope instability was observed during the inspection (PL-9).

Animal burrows occur on the cell cover. Because the buried tailings are overlain by a 36-inch thick clay layer (radon barrier), an 18-inch thick rock layer, and a 12-inch thick topsoil layer, biointrusion down to or through the radon barrier is unlikely. Therefore such burrows should not pose a risk to cell integrity or public health. The location and significance of burrows will continue to be monitored by inspectors each year. No new burrows were noted on the cell during the inspection.

### 3.4.2.2 Grass-Covered Area Surrounding the Disposal Cell

The Canonsburg site consists primarily of mowed grasses within the perimeter fence and on the disposal cell cap, with seeded fescues and crown vetch present across the site. The “spray and mow” approach to vegetation management at the site continues to be effective. Noxious weeds within the fenced area are limited to re-sprouting seedlings, which were observed in portions of mowed areas.

A small pedestrian bridge was installed northeast of the disposal cell in 2010. The pedestrian bridge was in excellent condition. Inspectors painted the footbridge during last year’s inspection. Some of the paint was peeling. The bridge will need to be repainted probably within the next 2 to 3 years. Inspectors conducted a Bridge Inspection and found it to be in excellent condition.

### 3.4.2.3 Diversion Channels and Perimeter Ditches

Rock in the engineered channels and ditches surrounding the disposal cell was in good condition. Rock deterioration does not appear to be a problem. Future inspections will look at rock conditions within the diversion ditch and indications of poor rock durability will be noted. No indications of poor rock durability were noted in 2015.

The presence of woody vegetation in the channels and ditches was not observed (PL-10). Physical removal and spot herbicide applications have been effective at reducing woody vegetation. Periodic walkdowns and spot herbicide applications will continue.

### 3.4.2.4 Site Perimeter

**Southwest Parcel:** In 2007, a radiological survey was conducted on this small parcel of land to evaluate the potential opportunity to release it for industrial reuse. The survey identified isolated radium-226 (Ra-226) contamination in soil, in excess of established average criterion for the property. Under current property usage these radiological conditions do not pose a level of risk to personnel and no corrective measures are required. Due to the isolated areas of Ra-226 contamination, the entire parcel of property did not satisfy established radiological criteria for release for beneficial reuse. The decision was made in 2008 to take no action, and to remove this small parcel as a candidate for reuse. Through ownership, DOE will control land use. Inspectors will check the area for evidence of trespass.

A plastics company has cleared some of DOE’s property south of the railroad track and spread gravel to create a turnaround for their trucks. The size of the turnaround appeared to be slightly

larger during the 2015 inspection (PL-11). Also, some junk and trash is present in the wooded portion of the land parcel.

3B Trespass was observed during the inspection. A campsite was discovered in the southwest corner of the site, outside of the locked perimeter fence, hidden among the trees. The Canonsburg Police Department responded, but the occupant of the campsite could not be located. The Canonsburg Police Department will follow up and try to locate the camper. In addition, increased patrols in the future will help prevent further trespass events. Inspectors installed additional signage along the perimeter fence in the southwest corner of the site as an additional deterrent to future trespass (PL-12).

### 3.4.2.5 Outlying Area

**Chartiers Creek Bank:** Chartiers Creek is an active, meandering waterway that is only partially restrained on the east end of the disposal site. The creek is slowly cutting into the bank and has required several stream bank stabilization projects along the east and north sides of the site between 2001 and 2009.

Heavy mowing equipment operating near the edge of the stream bank could be undermining the integrity of the bank. Inspectors installed four t-posts around the erosion area to make it more visible to the mowing crews (PL-13). Mowing crews will be instructed to keep heavy equipment back from the edge of the stream bank to avoid undermining the integrity of the bank. Vegetation growth on the riprap-armored southern bank is being controlled so that visual inspections of how well the riprap is holding up can be obtained. The stream bank west of the perimeter fence appears to remain in a stable condition. Bedrock outcrops and mature trees indicate that the bank is stable. The stream bank north of the perimeter fence is also in good condition. The planted vegetation within the floodplain appears to be well established. A small area of erosion (noted during last year's inspection) along the stream bank north of the disposal cell, believed to be caused by surface water runoff to the creek, was observed to be about the same size this year (PL-14).

**Area C and Tract 117:** Area C and Tract 117 form a triangular, grass-covered parcel of vacant property located east of the site that is bounded by Strabane Avenue, Chartiers Creek, and the Pittsburgh and Ohio Central Railroad. Both area C and Tract 117 have been sold to the same private owner. Area C (3.1 acres) was sold and transferred in 2005 and Tract 117 (0.431 Acres) was sold and transferred in 2009.

Area C is remediated except for two thorium anomalies that lie at a depth of about 8 feet. When the Canonsburg site was remediated, in-growth of thorium was not considered as a cleanup criterion for meeting the radium-in-soil standard in the future. In-growth calculations indicate the Ra-226 activities in soil will exceed the subsurface standard near the end of the 1,000-year longevity requirement for the disposal cell, which was taken to represent the intent of the rule for the soil standards for 40 CFR 192. DOE has an interest in preserving the configuration and integrity of the stream bank and maintaining access to monitoring locations on Area C and Tract 117. No evidence was observed during the inspection that any of the institutional controls in place for Area C and Tract 117 have been violated.

The landowner of Area C and Tract 117 has elevated the ground surface. The landowner is in the process of building above ground storage units (PL-1). The Property Deed shows that the ground

surface was raised approximately 6 feet using clean fill material prior to construction of the storage building. Excavation ICs call for no structure excavation deeper than 4 feet or utilities excavation deeper than 6 feet. These excavation ICs do not appear to be violated.

DOE has a two groundwater monitoring wells in Area C and Tract 117 (MW-0424 and MW-0414B, respectively) that are part of the groundwater-monitoring network. DOE ensured ongoing access to these wells through the sale agreements. The private property owner has done a good job maintaining access to the wells, and has graded the land surface so that surface water will not collect and pool around the well pads. Inspectors noted that drainage from the storage unit foundation is directed behind monitoring well MW-0414B via a pipe (PL-3). Inspectors will continue to monitor this area to assess how/if the drainage pipe might impact the monitoring well area.

**Strabane Avenue:** The maintenance subcontractor shall periodically pick up trash on and adjacent to DOE property to maintain the property's appearance. Future inspectors will carry large, heavy-duty trash bags with them for spot cleanup. Inspectors observed Strabane Avenue, next to the site, to be relatively clear of trash. Collection of trash during the inspection was not conducted.

### **3.5 Follow-Up Inspections**

DOE will conduct follow-up or contingency inspections if (1) an annual inspection or other site visit identifies a condition that requires a return to the site to evaluate the condition, or (2) a citizen or outside agency notifies DOE that conditions at the site or in the vicinity of the site are substantially changed. No need for a follow-up or contingency inspection was identified.

### **3.6 Maintenance and Repairs**

A broken hasp on the southwest personnel gate near boundary monument BM-2 and the associated lock will be replaced. As a measure of added security, the gap currently present beneath the bottom of perimeter fence (north of perimeter sign P4) will be addressed. Steel pins protruding from the concrete footer near BM-1 will be removed to prevent tire accidents and perimeter sign P6 will be replaced.

### **3.7 Environmental Monitoring**

#### **3.7.1 Groundwater Monitoring**

DOE monitors groundwater and surface water at the Canonsburg site to comply with the requirements in the revised LTSP. The revised LTSP combines the objectives of both the original LTSP (issued in 1995) and the *Ground Water Compliance Action Plan and Application for Alternative Concentration Limits for the Canonsburg, Pennsylvania, UMTRA Project Site* (UOO35901, DOE, February 2000). Monitoring described in the original LTSP was a best management practice because NRC determined the cell performance monitoring to ensure compliance with remedial actions discussed in Subpart A of 40 CFR 192 was not required since the disposal cell's design was adequate to provide long-term protection of human health and the environment. The groundwater compliance action plan required monitoring for a period of no less than 5 years (through 2004) and up to 30 years (through 2029), which is the estimated time for any contamination present to naturally attenuate.

3C In 2011, DOE evaluated the groundwater and surface water monitoring program as required by the revised LTSP. The assessment recommended that following the collection of samples in 2011 the frequency of monitoring be reduced from annual to once every 5 years, for cell performance purposes. NRC approval for the sampling change was received in 2012. Groundwater and surface water sampling was conducted in November 2013. Sampling at Canonsburg is being coordinated with the Burrell and Parkersburg sites to improve efficiency and decrease travel costs. The next sampling event is scheduled for 2018.

As reported in the 2014 Inspection Report, groundwater uranium concentrations in 2013 were considerably below the established alternate concentration limit. With the exception of monitoring wells MW-0412 and MW-0413, uranium concentrations in 2013 were also below the maximum concentration limit. Only one surface water location (0602) is sampled under the revised LTSP. The uranium concentration of surface water at location 0602 in 2013 remained below the target concentration of 0.01 milligrams per liter.

### **3.7.2 Vegetation Management**

In accordance with the LTSP, vegetation management is conducted as needed (1) to eliminate shrubs and trees from establishing on the disposal cell and in the rock-lined diversion channels and perimeter drainage ditches and (2) to maintain the grass vegetative cover.

The spray and mow approach to vegetation management continues to be effective. Noxious weeds within the fenced area are limited to re-sprouting seedlings, which were observed in portions of mowed areas. Tree of heaven (an invasive tree) has been identified at the site and is being treated for eradication from the site. Physical removal and spot herbicide applications have been effective at reducing woody vegetation in the channels and ditches.

### **3.8 Emergency Response**

Emergency response is action DOE will take in response to “unusual damage or disruption” that threatens or compromises site safety, security, or integrity (10 CFR 40, Appendix A, Criterion 12). No need for an emergency response was identified.

### 3.9 Photographs

Photo Location Number	Azimuth	Photograph Description
PL-1	135	Looking southeast from the top of the disposal cell toward Area C.
PL-2	180	Monitoring well MW-0414B.
PL-3	90	Drainage pipe from storage building, next to monitoring well MW-0414B.
PL-4	315	Chain lock on southwest personnel gate, near boundary monument BM-2.
PL-5	10	Repaired hinge on northeast vehicle gate.
PL-6	315	Gap beneath fence fabric and ground in area of erosion.
PL-7	NA	Site marker SMK-1 on top of the disposal cell.
PL-8	NA	Cone over concrete with pins.
PL-9	265	Looking west from disposal cell.
PL-10	315	Armored diversion ditch on the southeast side of the disposal cell.
PL-11	320	Truck turnaround near railroad tracks.
PL-12	NA	New trespassing sign installed on the perimeter fence in the southwest corner of the site.
PL-13	315	T-posts installed around erosion area.
PL-14	315	Small area of erosion along the bank of Chartiers Creek, above armored riprap.



*CAN 10/2015. PL-1. Looking southeast from the top of the disposal cell toward Area C.*



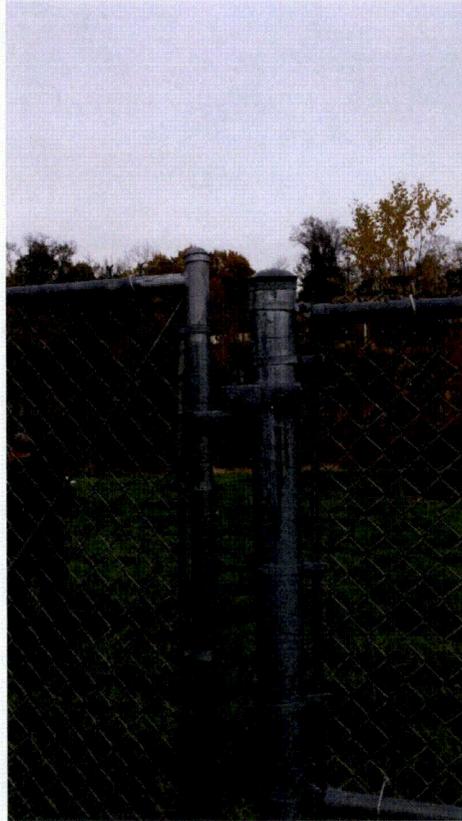
*CAN 10/2015. PL-2. Monitoring well MW-0414B.*



*CAN 10/2015. PL-3. Drainage pipe from storage building, next to monitoring well MW-0414B.*



*CAN 10/2015. PL-4. Chain lock on southwest personnel gate, near boundary monument BM-2.*



*CAN 10/2015. PL-5. Repaired hinge on northeast vehicle gate.*



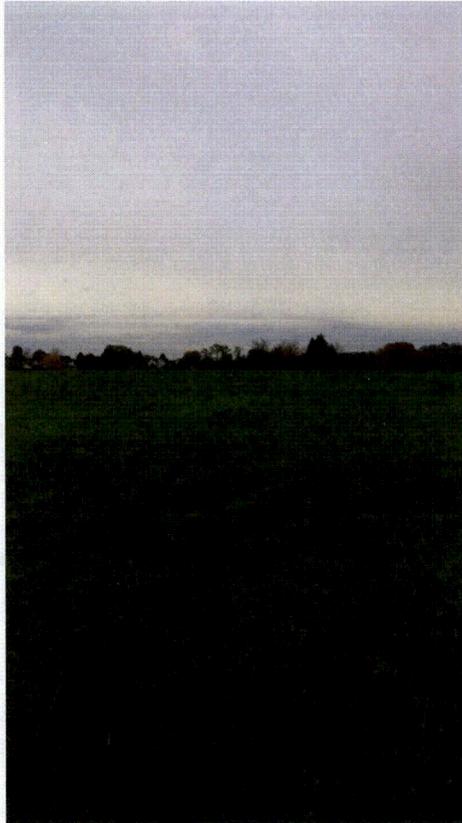
*CAN 10/2015. PL-6. Gap beneath fence fabric and ground in area of erosion.*



*CAN 10/2015. PL-7. Site marker SMK-1 on top of the disposal cell.*



*CAN 10/2015. PL-8. Cone over concrete with pins.*



*CAN 10/2015. PL-9. Looking west from disposal cell.*



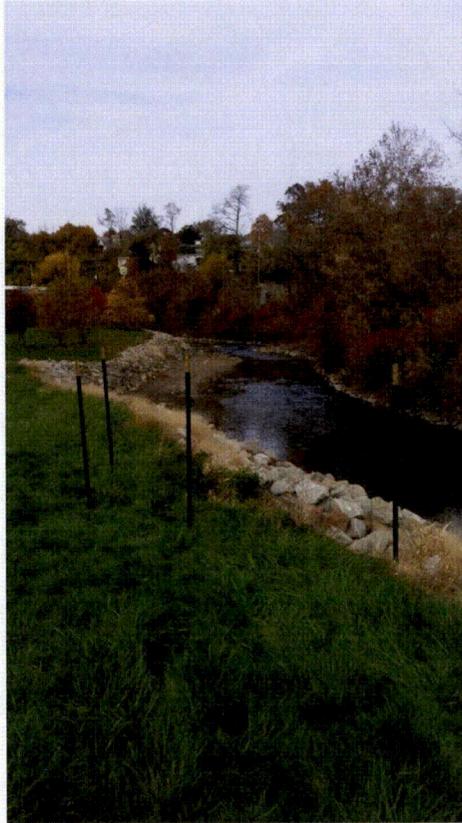
*CAN 10/2015. PL-10. Armored diversion ditch on the southeast side of the disposal cell.*



*CAN 10/2015. PL-11. Truck turnaround near railroad tracks.*



*CAN 10/2015. PL-12. New trespassing sign installed on the perimeter fence in the southwest corner of the site.*



*CAN 10/2015. PL-13. T-posts installed around erosion area.*



*CAN 10/2015. PL-14. Small area of erosion along the bank of Chartiers Creek, above armored riprap.*

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## 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 June 2, 2015. The disposal cell was in good condition. Vegetation on top of the disposal cell was healthy, and several small shrubs growing on the side slopes will be controlled. A small depression observed in 2014 on the disposal cell side slope was no longer apparent. Inspectors identified no maintenance needs or cause for a follow-up or contingency inspection.

### 4.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Durango, Colorado, Disposal Site (LTSP)* (LMS/DUD/S06297-0.1, U.S. Department of Energy [DOE], April 2015) and procedures that DOE established to comply with requirements of Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27). Table 4-1 lists these requirements.

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

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.3	Section 4.4
Follow-Up Inspections	Section 3.4	Section 4.5
Maintenance	Section 3.5	Section 4.6
Emergency Measures	Section 3.5	Section 4.7
Environmental Monitoring	Section 3.6	Section 4.8
Corrective Action	Section 3.6	Section 4.9

### 4.3 Institutional Controls

The 121-acre disposal site (Figure 4-1) 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. Institutional controls at the site include federal ownership of the property and the following physical features that are inspected annually: perimeter warning signs, site markers, survey and boundary monuments, and a locked gate at the site entrance.

### 4.4 Inspection Results

The site, southwest of Durango, Colorado, was inspected on June 2, 2015. The inspection was conducted by L. Sheader and T. Jasso of the DOE Legacy Management Support contractor. D. Miller (DOE Office of Legacy Management Contractor), J. Dayvault (DOE Site Manager), and M. Cosby (Colorado Department of Public Health and Environment) attended the inspection.

The purposes of the inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that might affect site integrity, and to determine the need, if any,

for maintenance or additional inspections and monitoring. Numbers in the left margin of this report refer to items summarized in Table ES-1 of the “Executive Summary.”

#### **4.4.1 Site Surveillance Features**

Figure 4-1 shows the locations of site surveillance features. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections. Photographs to support specific observations are identified in the text and on Figure 4-1 by photograph location (PL) numbers.

##### **4.4.1.1 Entrance Gates and Entrance Sign**

The entrance gate along County Road 212 was locked and in good condition, and the older, original entrance gate was also locked and in good condition. The entrance sign was damaged by bullets but still legible (PL-1).

##### **4.4.1.2 Perimeter Signs**

Eighty-four perimeter signs mark the unfenced site boundary (PL-2). Two signs (P83 and P84) were installed after the 2014 annual inspection. Numerous perimeter signs have bullet holes or other markings. Although they remain legible, they are beginning to weather and will need to be replaced in the next few years. Damaged signs are shown on Figure 4-1.

Some perimeter signs, slightly undercut by erosion, were monitored. Perimeter sign P2 has been missing for several years and will not be replaced, as adjacent signs are within sight. In accordance with the updated LTSP, signs P40 through P43 were not observed. Due to time constraints, signs P13, P44, P45 (undercut by erosion), and P46 were also not observed in 2015. Sign P1, missing in 2014, has been replaced.

##### **4.4.1.3 Site Markers**

Site marker SMK-1 was historically damaged by gunfire and was repaired (PL-3). Site marker SMK-2 was in good condition.

##### **4.4.1.4 Survey and Boundary Monuments**

All survey and boundary monuments are in good condition except as follows. Boundary monument BM-3 and two of its reference monuments are situated in a small gully and were threatened by erosion in the past; the monuments are now stable, but one of the witness corners was undercut by erosion in 2014. One of the reference monuments for boundary monument BM-4 has been bent to the ground and the cap has been removed, but BM-4 is stable. Repair of any of these features is not warranted at this time. Boundary monument BM-6 was destroyed years ago and will not be replaced because both of its witness corners are present. Boundary monument BM-6 was not visited during the 2015 inspection.

##### **4.4.1.5 Monitoring Wells**

Padlocks on all of the site groundwater monitoring wells encountered during the annual inspection were functional, locked, and in good condition.

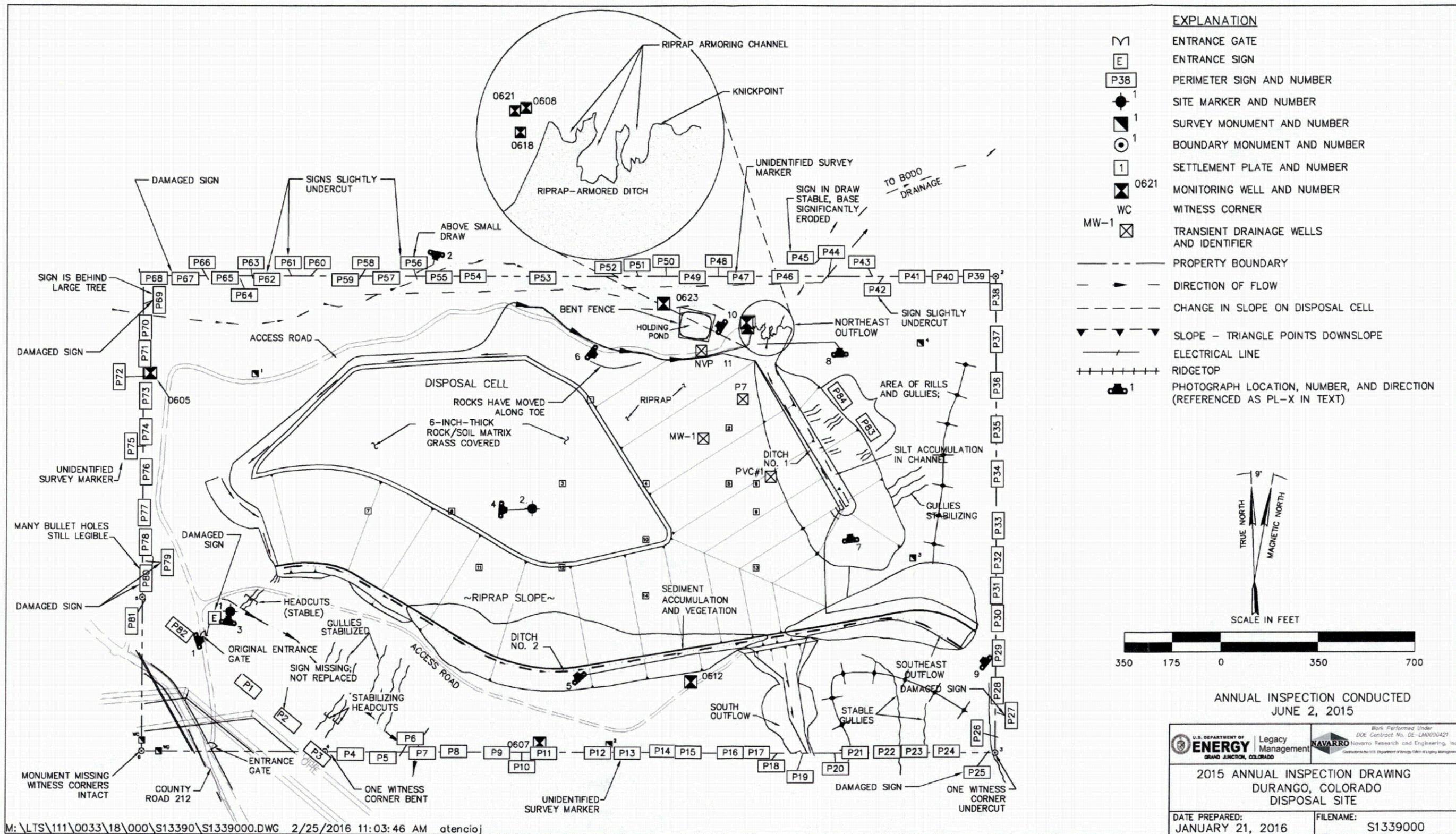


Figure 4-1. 2015 Annual Inspection Drawing for the Durango Disposal Site

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## **4.4.2 Inspection Areas**

In accordance with the LTSP, the site is divided into six inspection areas (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection. The inspection areas are: (1) the top of the disposal cell, (2) the side slopes of the disposal cell, (3) the drainage ditches, (4) the holding pond, (5) the site boundary, and (6) the outlying area.

Within each area, inspectors examined specific site surveillance features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or long-term performance.

### **4.4.2.1 Top of Disposal Cell**

The top of the disposal cell has a vegetated cover and is in excellent condition (PL-4). No evidence of settling, slumping, erosion, or deep rooted vegetation was observed.

### **4.4.2.2 Side Slopes of Disposal Cell**

The riprap-covered side slopes of the disposal cell are in good condition (PL-5). Significant disturbances resulting from natural processes, such as subsidence, rock deterioration, or slope failure, were not observed. Some rocks have moved at the toe of the slope on the north side of the cell, creating a linear depression approximately 18 feet long and 2.5 feet deep (PL-6). This area will continue to be monitored.

In the past, woody species have become established on the cell’s side slopes. Once they reach 3 feet in height, they are removed or treated with herbicide in accordance with the LTSP. Several shrubs approaching 3 feet tall were observed during the inspection. They were treated with herbicide during a separate visit.

In 2014, a small depression was found on the rock slope where large rocks were removed, possibly by an animal. The depression was no longer evident in 2015.

### **4.4.2.3 Drainage Ditches**

Rock-armored drainage ditches are constructed beneath the toe of the side slope on the northwest, south, and east sides of the disposal cell. Storm water is directed into these ditches and conveyed away from the disposal site into natural drainages. The ditches have sufficient depth and rock protection to carry runoff from a probable maximum precipitation (PMP) event. Erosion and mass wasting occurs on some of the steep slopes above these channels. These gullies occasionally become active during large storms, but they do not threaten the integrity of the disposal cell. The eroded sediment is deposited in the rock-armored channel, creating locales favoring plant growth (PL-7). As no excessive sediment deposits or vegetation were observed during the inspection, the performance of the drainage ditches would not be compromised in a PMP event. The ditches will continue to be monitored.

The riprap-covered outflows of the ditches were designed to self-armor, and no significant changes to these areas were observed in 2015 (PL-8). Channels below the outflows are also monitored, and they were stable and in good condition (PL-9).

#### **4.4.2.4 Holding Pond**

The holding pond in the northeast corner of the disposal cell was in good condition (PL-10). The fence was bent in one place, but no sign of access was evident. A shed that previously housed the pond's pump and instruments had been demolished, but the cases enclosing the instruments were in good condition. The holding pond system is scheduled to be removed in 2016.

#### **4.4.2.5 Site Boundary**

The site is not fenced. Boundary monuments and perimeter signs delineate the boundary except as follows. The boundary of the site marked by boundary monument BM-6 is not delineated with signs, because the signs cut across the corner of the site (signs P82, P1, and P3 in Figure 4-1).

#### **4.4.2.6 Outlying Area**

The area beyond the site boundary for a distance of 0.25 mile was visually observed for signs of erosion, development, or other phenomena that might affect the long-term integrity of the site. No such impacts were observed. Colorado Parks and Wildlife manages land to the north, west, and east of the site, and the U.S. Bureau of Reclamation manages land to the south. A water intake and pumping plant structure are located at the Animas River on the site of the former raffinate ponds. A pipeline associated with the project is adjacent to County Road 212 and passes just south of the disposal site. The primary land uses are wildlife habitat and recreation. Mountain bikers and other recreationists commonly use County Road 212.

### **4.5 Follow-Up Inspections**

DOE will conduct follow-up or contingency inspections if (1) an annual inspection or other site visit identifies a condition that requires a return to the site to evaluate the condition, or (2) a citizen or outside agency notifies DOE that conditions at the site or in the vicinity of the site are substantially changed. No need for a follow-up or contingency inspection was identified.

### **4.6 Maintenance**

- 4A No maintenance issues were identified, although some perimeter signs will need to be replaced in the next few years. A separate event was completed following the inspection to treat the noxious weeds and shrubs growing on the side slopes of the cell with herbicides.

### **4.7 Emergency Measures**

An emergency measure is action DOE will take in response to "unusual damage or disruption" that threatens or compromises site safety, security, or integrity (10 CFR 40, Appendix A, Criterion 12). No need for an emergency measure was identified.

## 4.8 Environmental Monitoring

### 4.8.1 Groundwater Monitoring

4B In accordance with the LTSP, groundwater is monitored at the 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 (0605) and three downgradient point-of-compliance (POC) wells (0607, 0612, and 0621). Three wells are completed in the alluvium (0608, 0618, and 0623).

The alluvium and the groundwater it contains are of very limited extent, so the alluvium is not considered to be an aquifer. Also, there are no discharge points of alluvial groundwater to the surface. The alluvium is monitored as a best management practice, however, because it is possible that some alluvial groundwater may infiltrate into the bedrock aquifer. The original monitoring network did not include well 0618, but monitoring was initiated in 2002 because the well intercepts the full, saturated thickness of the alluvium.

*Table 4-2. Groundwater Monitoring Network at the Durango Disposal Site*

Monitoring Well	Well Compliance Type	Hydrologic Relationship
0605	Background	Upgradient (uppermost aquifer)
0607	Point-of-Compliance	Downgradient (uppermost aquifer)
0612	Point-of-Compliance	Downgradient (uppermost aquifer)
0621	Point-of-Compliance	Downgradient (uppermost aquifer)
0608	Best Management Practice	Downgradient (alluvium)
0618	Best Management Practice	Downgradient (alluvium)
0623	Best Management Practice	Upgradient (alluvium)

Groundwater samples are collected annually and analyzed for three indicator parameters: molybdenum, selenium, and uranium, all measured in milligrams per liter (mg/L). The site-specific standards used for the three indicator parameters are the respective maximum observed background concentrations reported in groundwater samples collected from wells completed in the bedrock aquifer as identified in Table 2-3 of the LTSP. These site-specific standards are provided below in Table 4-3.

*Table 4-3. Site-Specific Groundwater Standards for the Durango Disposal Site, Based on Background*

Constituent	Standard (mg/L)
Molybdenum	0.22
Selenium	0.042
Uranium	0.077

Beginning in 2014, POC wells 0607 and 0612 have shown a slight increase in selenium concentrations (Figures 4-2 through 4-4). Even so, uranium, molybdenum, and selenium concentrations in the POC wells in the uppermost aquifer are well below the respective standards. Therefore, the aquifer is in compliance with the LTSP groundwater monitoring requirements.

Though not required for compliance, wells completed in the alluvium are also monitored. Uranium concentrations in well 0618 have consistently been higher than concentrations in the other wells onsite. To monitor the increased uranium observed in well 0618, wells 0608, 0618, and 0621 are sampled monthly as weather permits. Figure 4-2 shows an overall increasing trend in uranium concentrations in well 0618 since 2008. Uranium concentrations had been increasing slightly in well 0608, but returned to average concentrations in 2015. Because well 0618 is not a POC well and not screened in the uppermost aquifer, the concentrations in this well do not affect compliance with the LTSP and do not pose a risk to human health and the environment. However, the potential cause of this increase continues to be investigated.

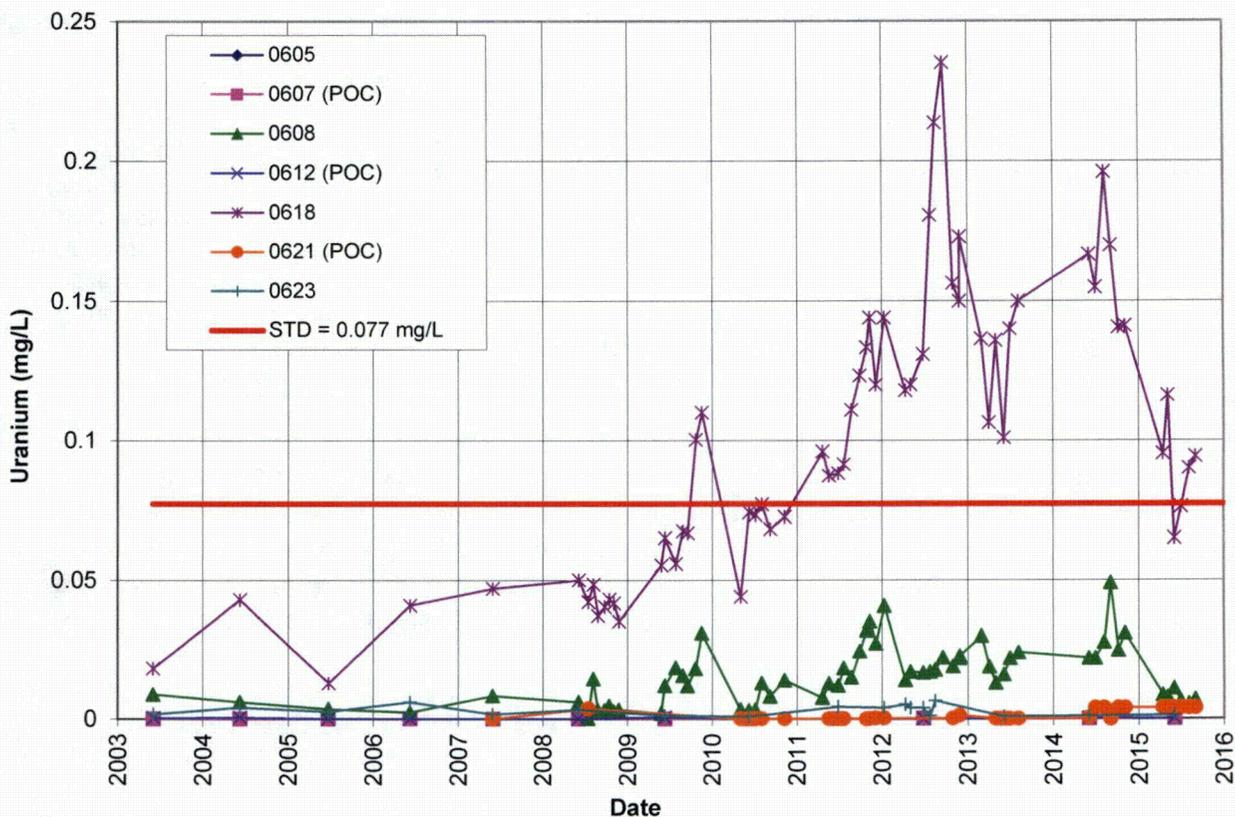


Figure 4-2. Time-Concentration Plot of Uranium in Groundwater at the Durango Disposal Site

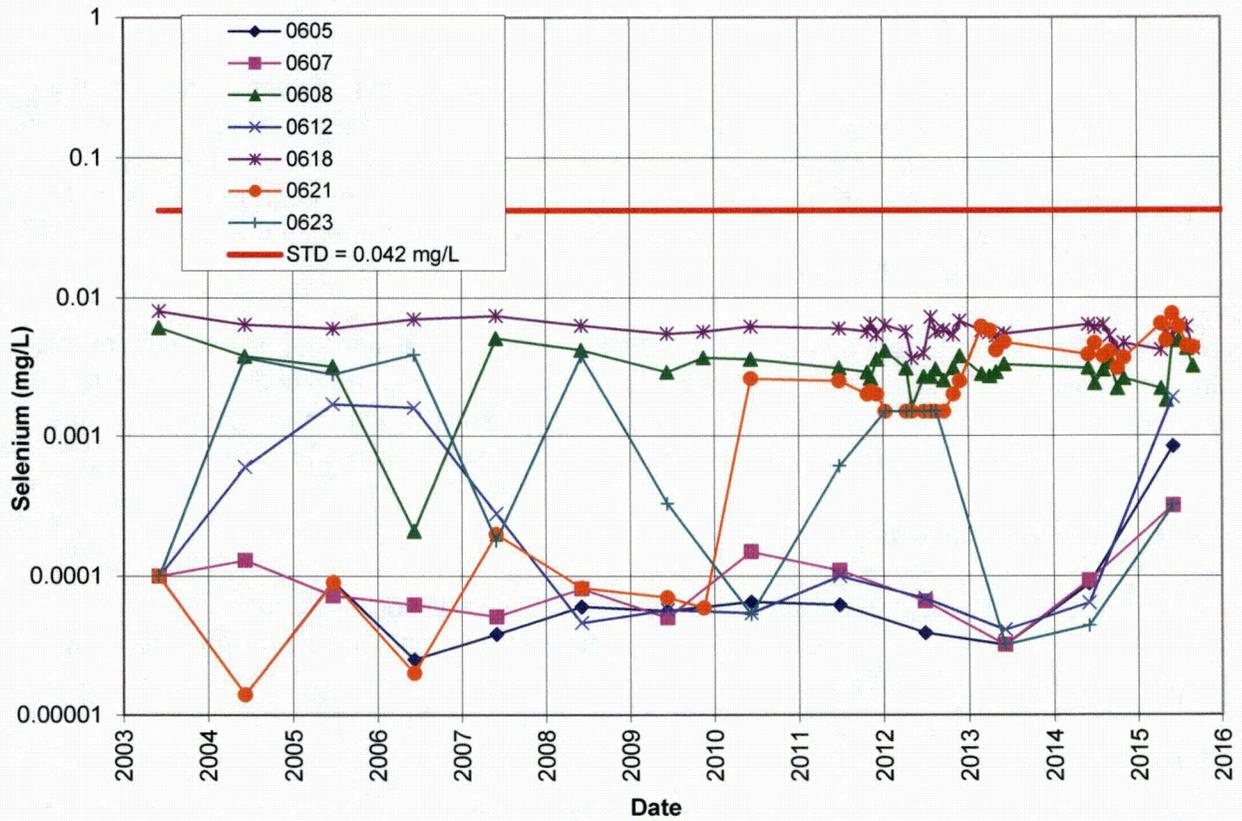


Figure 4-3. Time-Concentration Plot of Selenium in Groundwater at the Durango Disposal Site

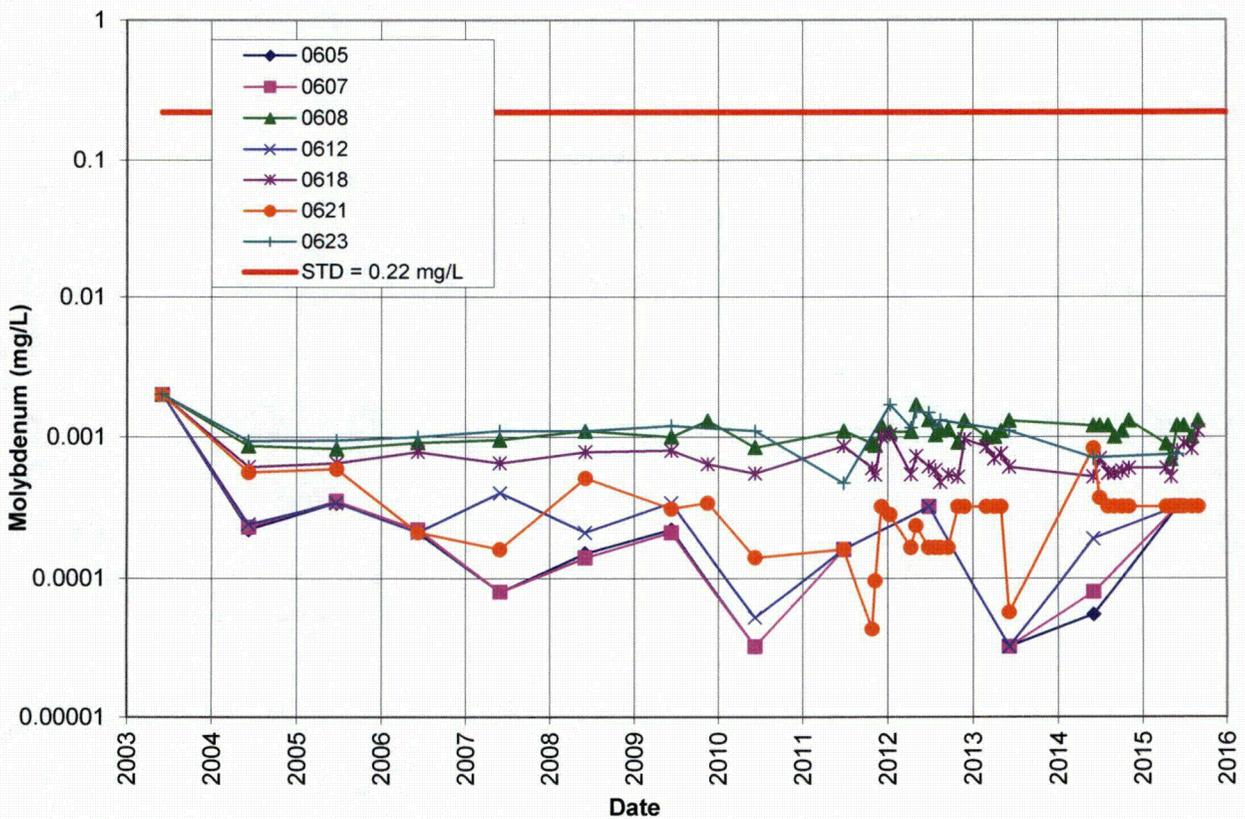


Figure 4-4. Time-Concentration Plot of Molybdenum in Groundwater at the Durango Disposal Site

## 4.8.2 Vegetation Monitoring

Vegetation on top of the cell remains healthy. The LTSP requires that unwanted plants on the cell cover are to be removed by either selective spraying or mechanical removal when their shoot height equals or exceeds 3.5 feet. Although the aboveground height of dryland alfalfa will never exceed the height criterion, it is known to be a deep-rooted plant; therefore, this species is also controlled on the disposal cell cover. Scattered alfalfa plants were found on the cover during the inspection and were sprayed with herbicide.

Several shrubs approaching 3 feet in height were found on the cell side slopes and were treated with herbicide during a separate visit. Federal law requires noxious weed control at the site. Although weed control is not included in the annual inspection, inspectors make note of any large infestations of noxious weeds. Only scattered weeds were observed in 2015.

## 4.9 Corrective Action

In accordance with the LTSP, corrective action will be taken when an established concentration limit is verified to have been exceeded for one or more constituents in a POC well. No need for corrective action was identified.

## 4.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	75	Entrance sign, damaged by bullets.
PL-2	195	Perimeter sign P56, slightly undercut.
PL-3	10	Site marker SMK-1, repaired in 2015.
PL-4	95	Vegetation on disposal cell cover.
PL-5	320	Side slope of the cell.
PL-6	130	Rock displacement on cell.
PL-7	355	Ditch No. 1.
PL-8	360	Self-armoring outlet of Ditch No. 1.
PL-9	310	Outlet of southeast outflow.
PL-10	305	Holding pond and fence.



*DUD 6/2015. PL-1. Entrance sign, damaged by bullets.*



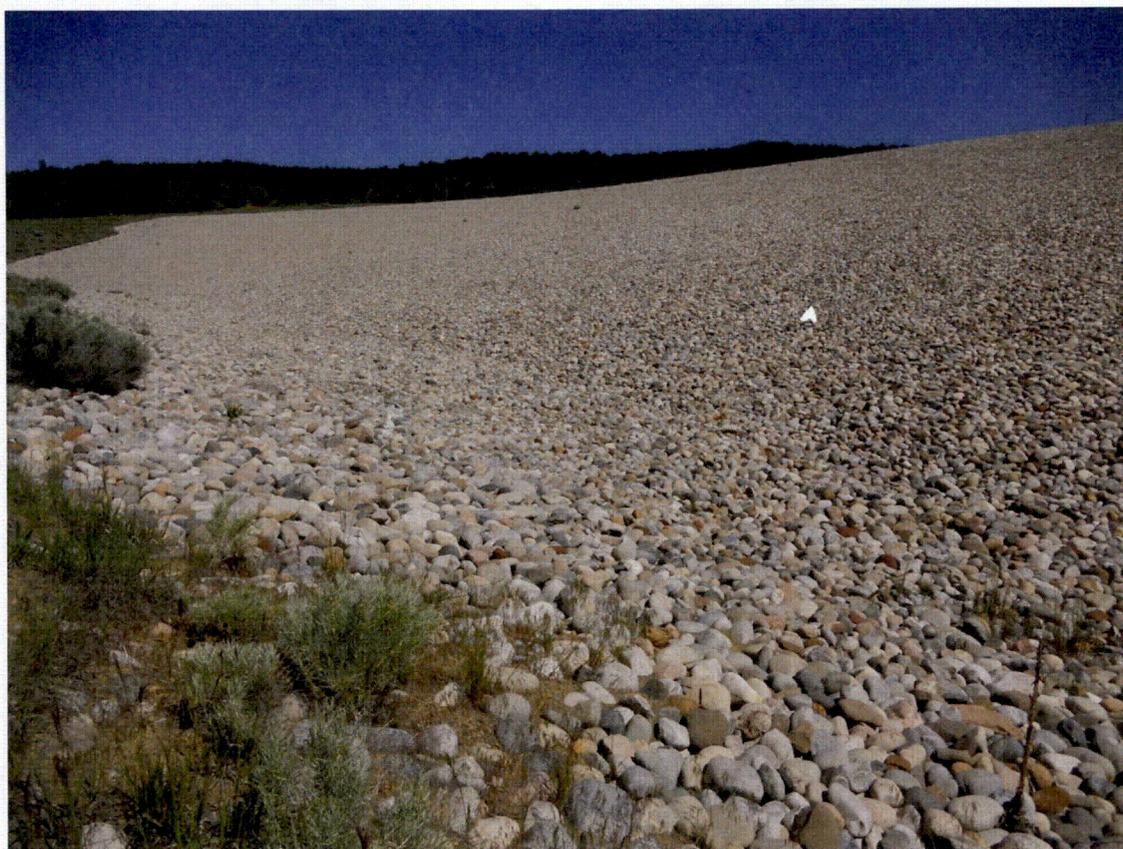
*DUD 6/2015. PL-2. Perimeter Sign P56, slightly undercut.*



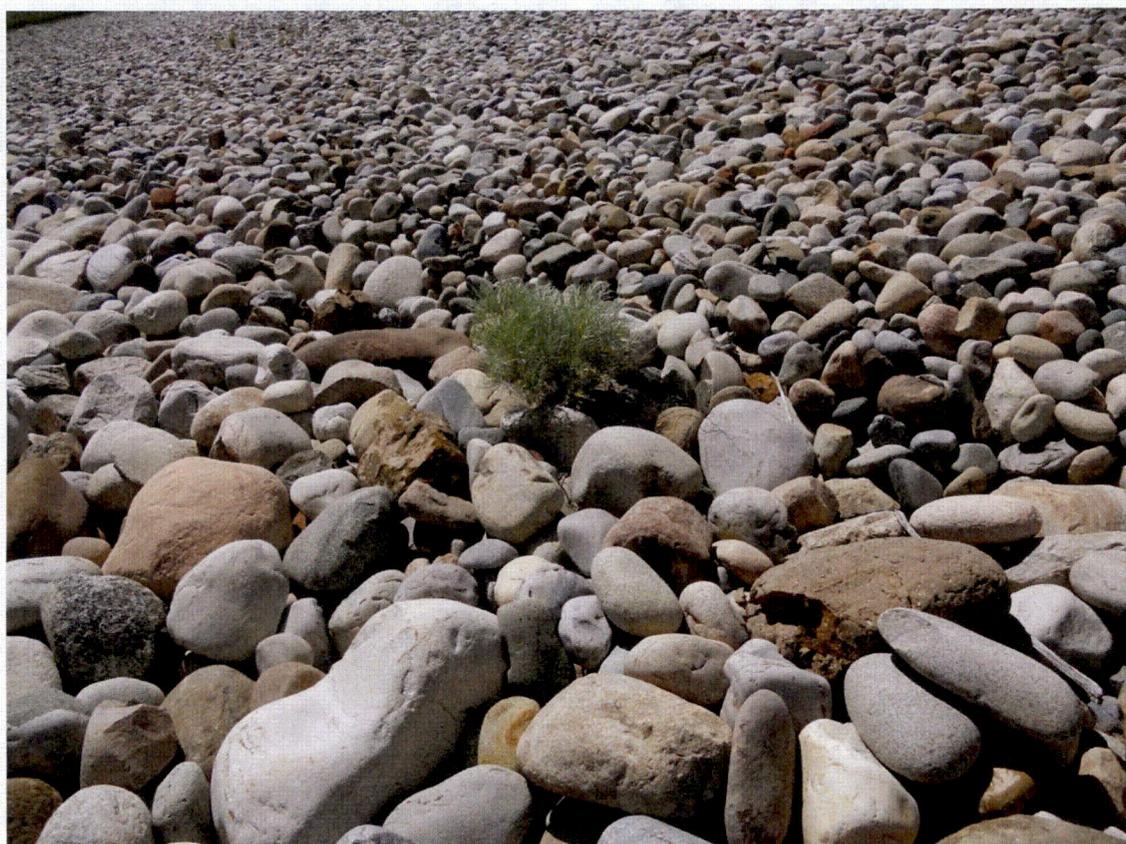
*DUD 6/2015. PL-3. Site marker SMK-1, repaired in 2015.*



*DUD 6/2015. PL-4. Vegetation on disposal cell cover.*



*DUD 6/2015. PL-5. Side slope of the cell.*



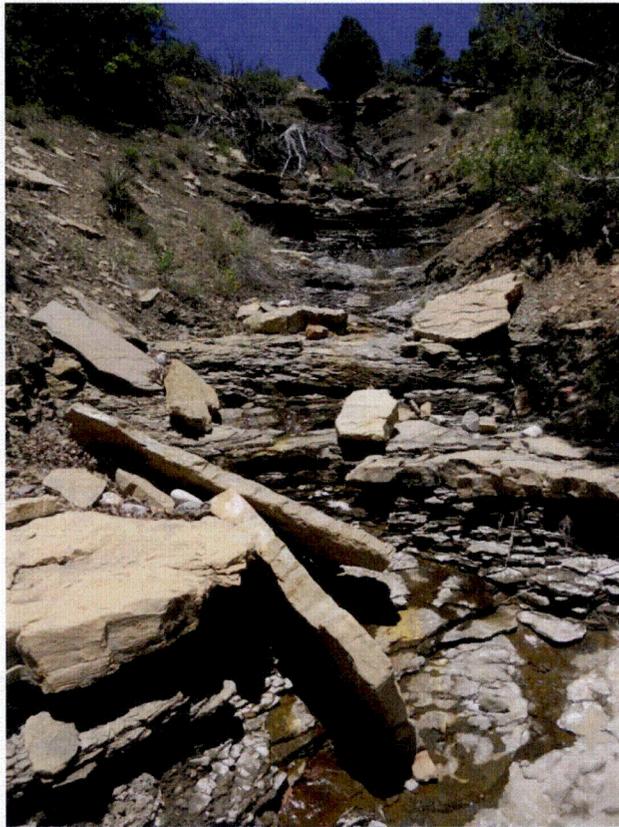
*DUD 6/2015. PL-6. Rock displacement on cell.*



*DUD 6/2015. PL-7. Ditch No. 1.*



*DUD 6/2015. PL-8. Self-armoring outlet of Ditch No. 1.*



*DUD 6/2015. PL-9. Outlet of southeast outflow.*



*DUD 6/2015. PL-10. Holding pond and fence.*

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