# 1.0 Bluewater, New Mexico, Disposal Site

## 1.1 Compliance Summary

The Bluewater, New Mexico, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II Disposal Site was inspected on August 27, 2008, and was in excellent condition. Overall, the disposal cells and their cover materials are in excellent condition; however, several shallow depressions on the cover along the north edge of the main tailings disposal cell have been monitored since the site was transferred to DOE in 1997. They were surveyed prior to the inspection and the results will be evaluated to determine if repairs are necessary. Groundwater monitoring results indicate that all compliance requirements continue to be met. No cause for a follow-up inspection was identified.

## 1.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Bluewater, New Mexico, Disposal Site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the DOE Bluewater (UMTRCA Title II) Disposal Site Near Grants, New Mexico* (U.S. Department of Energy [DOE], Grand Junction, Colorado, July 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.28 (10 CFR 40.28). Table 1–1 lists license requirements for this site.

*Table 1–1. License Requirements for the Bluewater, New Mexico, Disposal Site*

| Requirement | Long-Term Surveillance Plan | This Report |
|---|---|---|
| Annual Inspection and Report | Sections 3.3 and 3.4 | Section 1.3.1 |
| Follow-up Inspections | Section 3.5 | Section 1.3.2 |
| Routine Maintenance and Emergency Measures | Section 3.6 | Section 1.3.3 |
| Environmental Monitoring | Section 3.7 | Section 1.3.4 |

**Institutional Controls**—The 3,300-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.28) in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title II sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the perimeter fence and around the disposal cells, and a locked gate at the site entrance. Verification of these institutional controls is part of the annual inspection. No off-site institutional controls are needed because contaminated groundwater is contained within the federal land boundary.

## 1.3 Compliance Review

### 1.3.1 Annual Inspection and Report

The disposal site, located approximately 9 miles northwest of Grants, New Mexico, and 1.5 miles northeast of Bluewater, New Mexico, was inspected on August 27, 2008. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figures 1–1 (south area) and 1–2 (north area). Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

### 1.3.1.1 Specific Site Surveillance Features

**Entrance Gate, Access Road, Site Access Gate, and Signs**—Access to the site is directly off Cibola County Road 334; no private property is crossed to gain site access. The entrance gate (at County Road 334) is a steel, double-swing stock gate. The gate is secured by a chain and locks belonging to DOE and the various utility companies that have rights-of-way across the site. The access road leads from the entrance gate to the main site access gate that also is a steel, double-swing stock gate. The access road is surfaced with crushed basalt and extends northward along a narrow strip of DOE property for approximately 1,700 feet from the entrance gate to the main site access gate. The entrance gate, access road, and access gate were all in good condition. Windblown sand tends to accumulate near the entrance gate and had buried the boundary monuments and portions of the perimeter fence. The sand is periodically removed from these locations.

Fifty-five warning signs are mounted on steel posts at access points along right-of-way intersections within the site boundary and around the main and carbonate tailings disposal cells. Perimeter sign P9A was missing and will be replaced. Perimeter signs P1, P3, and P10 have gunshot damage, but the signs are still legible. All other signs were in good condition.

**Site Marker and Boundary Monuments**—A granite site marker is located between the southwest corner of the main tailings disposal cell and the northwest corner of the carbonate tailings disposal cell. The marker was in excellent condition.

Twenty-four boundary monuments define the site boundary. These monuments are typically inside the perimeter fence and several feet inside the true corner or boundary line. Not all of the boundary monuments were verified during the inspection, but the monuments observed during the 2008 inspection were in good condition (PL–1). Some monuments tend to get covered by drifting sand, and metal t-posts have been driven at those locations to help locate them during inspections.

**Monitor Wells**—The groundwater-monitoring network consists of nine wells located inside the site boundary. Five wells are screened in the alluvial aquifer and the other four wells are screened in the bedrock San Andres Limestone-Glorieta Sandstone, which is the regulated uppermost aquifer at the site. The aluminum cap of well MW–E(M) was broken and the lock was missing; a new cap and lock were installed during the inspection (PL–2). The other well surface casings and locked caps were in good condition.

1A

### 1.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the main tailings disposal cell, including the acid tailings disposal area and the south bench; (2) the carbonate tailings disposal cell, including the asbestos disposal area, the polychlorinated biphenyl (PCB) disposal area, and associated landfills; (3) the region between the disposal structures and the site perimeter; and (4) the site perimeter and outlying area.

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

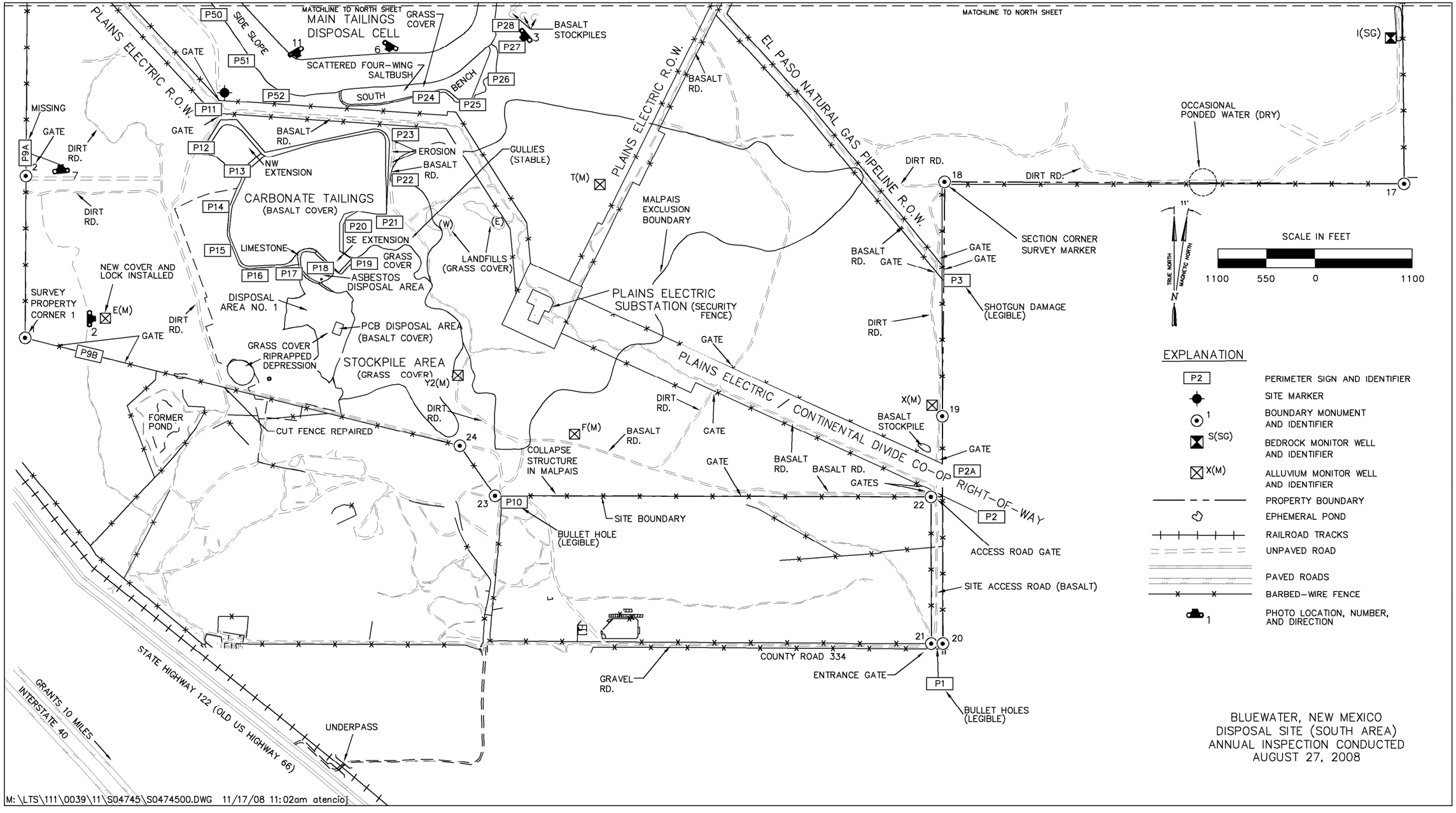


*Figure 1–1. 2008 Annual Compliance Drawing for the Bluewater, New Mexico, Disposal Site (South Area)*

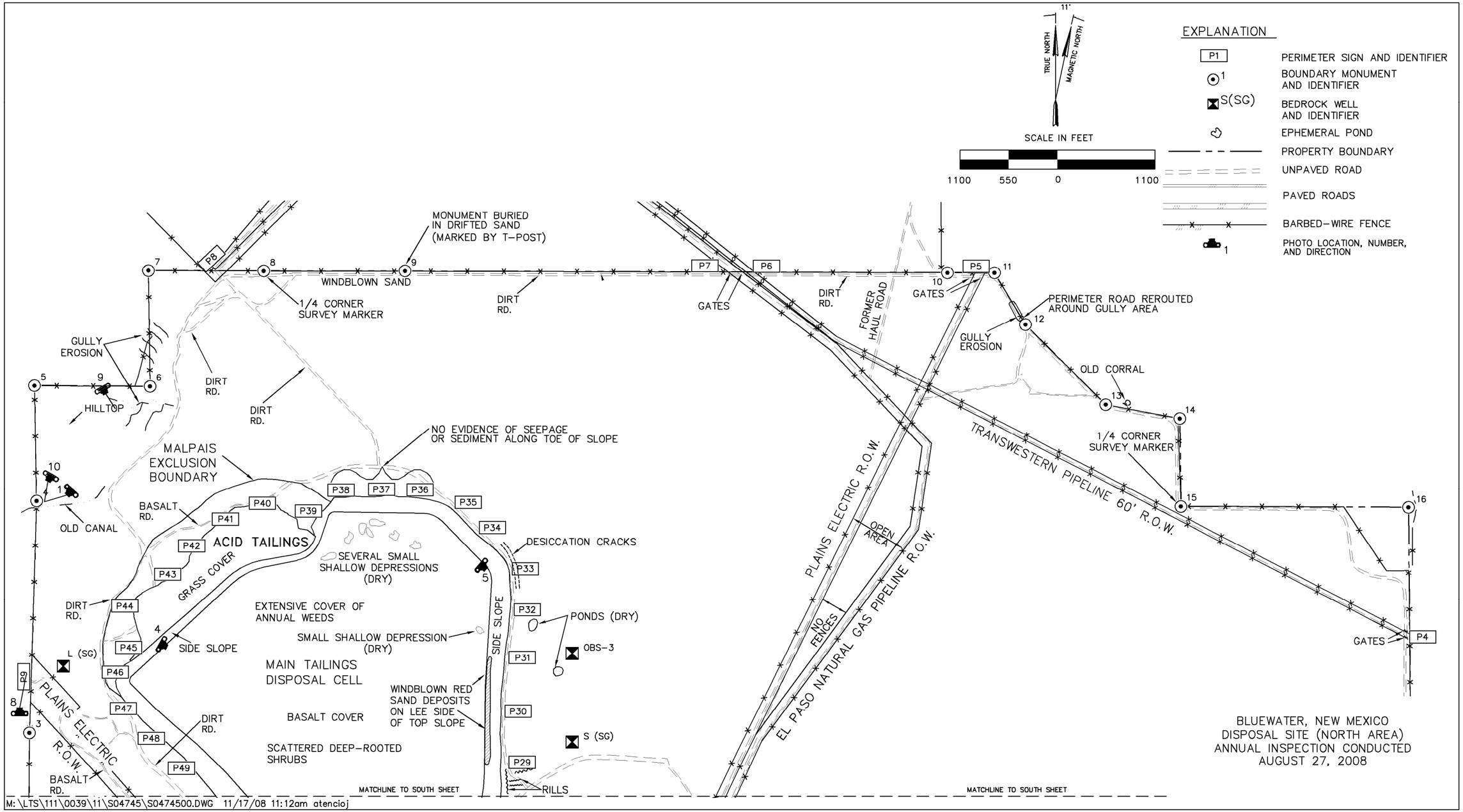


*Figure 1–2. 2008 Annual Compliance Drawing for the Bluewater, New Mexico, Disposal Site (North Area)*

**Main Tailings Disposal Cell, the Acid Tailings Disposal Area, and the South Bench Disposal Area**—These three disposal areas are contiguous and together constitute one large disposal area of approximately 320 acres; all were in excellent condition. The main tailings disposal cell is covered with basalt riprap and slopes northward. The top slope grade decreases from 3 to 4 percent at the south end to less than 0.5 percent at the north end. The top slopes of the acid tailings and the south bench (PL–3) disposal areas are essentially flat and covered by healthy grass. The side slopes of the three disposal areas are protected by basalt riprap. The riprap was in excellent condition.

As shown on photo PL–4, the top of the main tailings disposal cell had an extensive cover of annual weeds (primarily Russian thistle, which is not a listed noxious weed in New Mexico), along with some wildflowers and deep-rooted shrubs (rabbitbrush and four-wing saltbush). Patches of annual weeds also were present on the east side slope of the cell. Control of plant encroachment is not required by the LTSP.

Several small shallow depressions exist on the relatively flat north end of the top slope of the main tailings disposal cell. Although ponded water has been observed in the past, the depressions have been dry during inspections and other site visits in the last several years. Given that evaporation greatly exceeds precipitation in this area, ponding is believed to be infrequent and brief and, therefore, is not considered to be a concern at this time. Slimes from the settling ponds were placed in the northern part of the main tailings disposal cell, and areas containing slimes are more likely to settle than areas containing drier waste materials. The depressions will continue to be monitored for evidence of significant settling or displacement. A survey of the affected area was conducted prior to the 2008 inspection to compare the current surface configuration with the design drawings; the results will be evaluated to determine if repairs to the cover should be considered.

1B

Desiccation cracks are present in the soil adjacent to the northeast corner of the main tailings disposal cell. The features are caused by shrinkage of clay-rich backfill materials and do not degrade the stability of the cell. Small ponds often form in an area along the east side of the disposal cell and in other low spots following storm events and provide water for wildlife and wild burros that inhabit or travel through the site; the pond locations were dry at the time of the inspection (PL–5). The areas of ephemeral ponding are far enough from the cell to not impact it.

**Carbonate Tailings Disposal Cell, Asbestos and PCB Disposal Areas, and Landfills**—The top and side slopes of the carbonate tailings disposal cell are covered by basalt riprap. The top, for the most part, slopes gently eastward. The small northwest and southeast extensions slope in their respective directions. Annual weeds and scattered woody shrubs were present on the cell and its extensions (PL–6). The carbonate tailings disposal cell was in excellent condition.

The asbestos disposal area is a bowl-like feature located just south of the carbonate pile. The north, west, and south side slopes of this feature are covered by limestone riprap; the bottom of the bowl (the asbestos cell cover) is grass covered. A small depression was located along the south edge of the disposal area. The depression, probably the result of piping or collapse of uncontaminated fill material incompletely compacted during final grading, was first noted during the 1999 annual inspection but had not been a concern because it does not encroach on asbestos-containing materials. However, to mitigate the potential for encroachment into these materials, the depression was filled with crushed basalt rock during spring 2007. No additional settling had occurred since the repair was completed. The asbestos disposal area is in excellent condition.

The small riprap-covered PCB disposal area is in excellent condition. The two grass-covered landfill areas east of the carbonate tailings disposal cell also are in excellent condition. Two other disposal areas, Disposal Area Number 1 and the Stockpile Area, are south of the carbonate tailings disposal cell. Both are grass-covered and in excellent condition.

**Area Between the Disposal Cells and the Site Perimeter**—Other areas inside the site were inspected by driving the site perimeter road and other roads and tracks. Much of the southern and western parts of the site are inaccessible by vehicle because they are covered by basalt flows. Most of these areas were inspected on foot during the 2008 inspection (PL–7 through PL–10).

Several utility company rights-of-way cross the site. These rights-of-way are enclosed by stock fences with gates where the rights-of-way intersect one another, cross the site boundary, or cross the perimeter road. Roads along the rights-of-way typically are covered with crushed basalt to provide the utility companies with all-weather access.

Stockpiles of basalt riprap that can be used by DOE for road repairs are in two areas. One stockpile is located north of the access road gate; rock from this pile was used to repair the asbestos cell cover and the perimeter road in 2007. A cluster of three stockpiles is located east of the main tailings disposal cell.

An electric power substation is enclosed by a security fence near the center of the site along the Plains Electric Company right-of-way (PL–11). Fencing around this station was in good condition.

The vegetation was in good health in several areas of the site. However, due to runoff and wind erosion, a portion of the site northeast of the main tailings disposal cell remains relatively barren. DOE considered reuse of the site through controlled grazing of the vegetated areas of the site; however, the discontinuity of the vegetated areas and the lack of water for livestock made this use unfeasible.

**1C** As part of DOE's site reuse initiative, DOE, contractor, state, and utility representatives inspected the site in August 2008. An undisturbed area in the northeast portion of the site is under consideration for solar power development.

**Site Perimeter and Outlying Areas**—A local subcontractor has been retained to repair the fencing and periodically check for unauthorized livestock use or trespassing on site property. Grazing is not part of the current management plan for this site and, if livestock are discovered
**1D** on the site, the subcontractor is authorized to remove the animals. The subcontractor made several repairs to cut or damaged fence locations during 2008.

The perimeter road consists of a dirt track covered at places with crushed basalt. The road runs along the site boundary in much of the southern and most of the northern and eastern parts of the site. Portions of the road are susceptible to erosion and are repaired as needed to enable continued site access. The most recent repairs were conducted in spring 2007. Overall, the road was in adequate condition at the time of the 2008 inspection and repairs are not needed at this time.

Surrounding land is used for livestock grazing and wildlife habitat. The area outside the site boundary for 0.25 mile was visually inspected for erosion, development, change in land use, or

other phenomena that might affect the long-term integrity of the site. None of these impacts or changes was observed.

### 1.3.2 Follow-up Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed. No follow-up inspections were required in 2008.

### 1.3.3 Routine Maintenance and Emergency Measures

Several fence repairs were conducted during 2008. The site was checked at least once a month by a local subcontractor for evidence of trespassing or unauthorized grazing and to ensure that the perimeter fence is intact.

Emergency measures are corrective actions that DOE will take in response to unusual damage or disruption that threaten or compromise site health and safety, security, integrity, or compliance with 40 CFR 192. No emergency measures were required in 2008.

### 1.3.4 Environmental Monitoring

Groundwater monitoring is required at the Bluewater site. In accordance with the LTSP, the
1E alluvial aquifer background and point-of-compliance (POC) wells are sampled annually for polychlorinated biphenyls (PCBs) and every 3 years for molybdenum, selenium, and uranium (Table 1–2). The San Andres (bedrock) aquifer background and POC wells are sampled every 3 years for selenium and uranium. Alluvial aquifer well MW–X(M) and bedrock aquifer well MW–I(SG), point-of-exposure (POE) wells located along the east (downgradient) property boundary, will be sampled only if specified alternate concentration limits (ACLs) are exceeded at the respective alluvial and bedrock aquifer POC wells (Table 1–3). To date, sampling of the POE wells has not been required because ACLs have not been exceeded at the POC wells.

*Table 1–2. Groundwater Monitoring Network for the Bluewater, New Mexico, Disposal Site*

| Monitor Well | Network Application | Analytes | Frequency |
|---|---|---|---|
| MW–E(M) | Alluvium background well | Mo, Se, U, and PCBs | Every 3 years (PCBs annually) |
| MW–F(M) | Alluvium POC well | Mo, Se, U, and PCBs | Every 3 years (PCBs annually) |
| MW–T(M) | Alluvium POC well | Mo, Se, U, and PCBs | Every 3 years (PCBs annually) |
| MW–Y2(M) | Alluvium POC well | PCBs | Annually |
| MW–X(M) | Alluvium POE well | Mo, Se, U, and PCBs | If alluvial POC ACL exceeded |
| MW–L(SG) | Bedrock background well | Se and U | Every 3 years |
| MW–OBS–3 | Bedrock POC well | Se and U | Every 3 years |
| MW–S(SG) | Bedrock POC well | Se and U | Every 3 years |
| MW–I(SG) | Bedrock POE well | Se and U | If bedrock POC ACL exceeded |

Key: ACL = alternate concentration limit; Mo = molybdenum; PCB = polychlorinated biphenyl; POC = point-of-compliance; POE = point-of-exposure; Se = selenium; U = uranium

*Table 1–3. Groundwater Alternate Concentration Limits for the Bluewater, New Mexico, Disposal Site*

| POC Well | Analyte | ACL (mg/L) |
|---|---|---|
| Alluvium<br>MW–F(M) and MW–T(M) | Molybdenum<br>Selenium<br>Uranium | 0.10<br>0.05<br>0.44 |
| Bedrock<br>MW–OBS–3 and MW–S(SG) | Selenium<br>Uranium | 0.05<br>2.15 |

Key: ACL = alternate concentration limit; mg/L = milligrams per liter; POC = point of compliance

The most recent triennial sampling event was in November 2007. Analytical results from that sampling event are provided in Table 1–4. All concentrations were less than the specified ACL for each constituent. Uranium concentrations in alluvial well MW–T(M) have gradually increased from 0.1 milligram per liter in 1999 and have decreased in the bedrock wells; no other trends are apparent. PCBs have never been detected in any of the wells at the site and were not detected during that event.

*Table 1–4. 2007 Groundwater Monitoring Analytical Results at the Bluewater, New Mexico, Site*

| Constituent | Alluvium Wells | | | Bedrock Wells | | |
|---|---|---|---|---|---|---|
| | E(M) (Bkgd) | F(M) (POC) | T(M) (POC) | L(SG) (Bkgd) | OBS–3 (POC) | S(SG) (POC) |
| Molybdenum (mg/L) | 0.00047 | 0.00077 | 0.029 | N/A | N/A | N/A |
| Selenium (mg/L) | 0.000038 | 0.00097 | 0.0085 | ND | 0.000071 | 0.000066 |
| Uranium (mg/L) | 0.000036 | 0.0068 | 0.24 | 0.000042 | 0.00082 | 0.00022 |

The state of New Mexico and the U.S. Environmental Protection Agency are conducting a regional groundwater investigation to determine sources of contamination in the San Andres aquifer. The state sampled the applicable site wells in August 2008, and DOE sampled the wells in fall 2008. Elevated nitrate concentrations in the region are a concern, and this analyte was included in the suite of analytes for the Bluewater site. Results for this additional DOE sampling event will be provided in the 2009 compliance report. 1F

### 1.3.5 Photographs

| Photograph Location Number | Azimuth | Photograph Description |
|---|---|---|
| PL–1 | 225 | Boundary monument BM–4. |
| PL–2 | 90 | New cover and lock on monitor well MW–E(M). |
| PL–3 | 230 | South bench of the main tailings disposal cell. |
| PL–4 | 120 | Vegetation on the main tailings disposal cell cover. |
| PL–5 | 130 | View toward ephemeral pond area (dry) and well OBS–3. |
| PL–6 | 210 | Carbonate tailings disposal cell. |
| PL–7 | 355 | View north from boundary monument BM–2. |
| PL–8 | 0 | View north from perimeter sign P9. |
| PL–9 | 150 | Main tailings disposal cell viewed from the hilltop near boundary monument BM–5. |
| PL–10 | 210 | Old canal near boundary monument BM–4. |
| PL–11 | 150 | Electrical substation. |

*BLU 8/2008. PL–1. Boundary monument BM–4.*


*BLU 8/2008. PL–2. New cover and lock on monitor well MW–E(M).*

*BLU 8/2008. PL–3. South bench of the main tailings disposal cell.*

*BLU 8/2008. PL–4. Vegetation on the main tailings disposal cell cover.*

*BLU 8/2008. PL–5. View toward ephemeral pond area (dry) and well OBS–3.*

*BLU 8/2008. PL–6. Carbonate tailings disposal cell.*

*BLU 8/2008. PL–7. View north from boundary monument BM–2.*

*BLU 8/2008. PL–8. View north from perimeter sign P9.*

*BLU 8/2008. PL–9. Main tailings disposal cell viewed from the hilltop near boundary monument BM–5.*

*BLU 8/2008. PL–10. Old canal near boundary monument BM–4.*

*BLU 8/2008. PL–11. Electrical substation.*