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Post-Closure Inspection and Monitoring Report for Corrective Action Unit 417: Central Nevada Test Area Surface, Hot Creek Valley, Nevada

For Calendar Year 2006

June 2007

U.S. Department of Energy

Office of Legacy Management

Work Performed Under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management.
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Work Performed by S.M. Stoller Corporation under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado

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Acronyms and Abbreviations

CAP	Corrective Action Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
CEMP	Community Environmental Monitoring Program
cm	centimeter(s)
CMP	Central Mud Pit
CNTA	Central Nevada Test Area
CR	Closure Report
DOE/NV	U.S. Department of Energy, Nevada Operations Office
ft	foot (feet)
in.	inch(es)
km	kilometer(s)
m	meter(s)
m^2	square meter(s)
mi	mile(s)
NDEP	Nevada Division of Environmental Protection
NNSA/NV	U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office
SM	subsidence monument
TDR	time domain reflectometry
VMC	Volumetric Moisture Content

End of current text

Executive Summary

Corrective Action Unit (CAU) 417, Central Nevada Test Area - Surface, is located in Hot Creek Valley in northern Nye County, Nevada, and consists of three areas commonly referred to as UC-1, UC-3, and UC-4. CAU 417 consists of 34 Corrective Action Sites (CASs) which were closed in 2000 (U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office, 2001).

Three CASs at UC-1 were closed in place with administrative controls. At CAS 58-09-01, Central Mud Pit (CMP), a vegetated soil cover was constructed over the mud pit. At the remaining two sites, CAS 58-09-02, Mud Pit, and CAS 58-09-05, Mud Pits (3), aboveground monuments and warning signs were installed to mark the CAS boundaries.

Three CASs at UC-3 were closed in place with administrative controls. Aboveground monuments and warning signs were installed to mark the site boundaries at CAS 58-09-06, Mud Pits (5), CAS 58-25-01, Spill, and CAS 58-10-01, Shaker Pad Area.

Two CASs that consist of five sites at UC-4 were closed in place with administrative controls. At CAS 58-09-03, Mud Pits (5), an engineered soil cover was constructed over Mud Pit C. At the remaining three sites in CAS 58-09-03 and at CAS 58-10-05, Shaker Pad Area, aboveground monuments and warning signs were installed to mark the site boundaries.

The remaining 26 CASs at CAU 417 were either clean-closed or closed by taking no further action.

Quarterly post-closure inspections are performed at CASs that were closed in place. During calendar year 2006, site inspections were performed on April 19, June 27, September 20, and December 5.

The inspections conducted at the UC-1 CMP revealed that no new cracks or fractures had developed until the fourth quarterly inspection, during which a crack was discovered requiring repair within 90 days. In addition, it was noted during the fourth quarterly inspection that four signs were not legible, and it was recommended to replace these signs. The vegetation on the cover was healthy, and no issues were identified with the monuments or fencing. All monuments and signs at Mud Pits A and E were in excellent condition. No other maintenance or repairs were recommended.

The inspections at UC-3 indicated that the sites were in good condition. During the fourth quarterly inspection, it was noted that six signs needed to be replaced. No other issues or concerns were identified.

Inspections performed at UC-4 Mud Pit C cover during the first and fourth quarters revealed that erosion rills had formed. The erosion rill discovered during the first quarterly inspection was repaired in June, and the erosion rill discovered during the fourth quarterly inspection will be repaired within 90 days of the inspection. In addition, it was noted during the fourth quarterly inspection that two signs needed to be replaced. No issues were identified with the warning signs and monuments at the other four UC-4 locations. No other maintenance or repairs were recommended.

Subsidence surveys were conducted at the UC-1 CMP and UC-4 Mud Pit C in April and September of 2006. The results of the subsidence surveys indicate that the covers are performing as expected, and no unusual subsidence was observed.

The June vegetation survey of the UC-1 CMP cover and adjacent areas indicated that the revegetation has been very successful, and a viable plant community has established on both the CMP and the perimeter disturbances. The vegetation should continue to be monitored to document any changes in the plant community and identify conditions that could potentially require remedial action in order to maintain a viable vegetative cover on the site. Vegetation surveys should be conducted only as required.

Precipitation during 2006 was below average, with an annual rainfall total of 7.54 centimeters (2.97 inches).

Soil moisture content data show that the UC-1 CMP cover is performing as designed, with evapotranspiration effectively removing water from the cover.

A Federal Facility Agreement and Consent Order requirement for this task is to conduct quarterly inspections of the caps. This proof-of-concept period was for a five year timeframe which was completed with this fourth-quarter's inspection. Based upon the history of only minor erosional repairs being necessary at the sites, with no other issues being identified, it is recommended to reduce the frequency of site inspections from quarterly to annually. It is also recommended to reduce the frequency of subsidence surveys from twice per year to annually and continue collection of soil moisture data for the UC-1 CMP cover.

1.0 Introduction

Corrective Action Unit (CAU) 417, Central Nevada Test Area (CNTA) – Surface, is located in Hot Creek Valley, Nye County, Nevada, approximately 22.5 kilometers (km) (14 miles [mi]) west of U.S. Highway 6, approximately 137 km (85 mi) northeast of Tonopah, Nevada (Figure 1–1). CAU 417 consists of 34 Corrective Action Sites (CASs) located at three distinct land withdrawal areas commonly referred to as UC-1, UC-3, and UC-4.

1.1 Scope and Objectives

This report has been prepared according to the Post-Closure Monitoring Plan contained in the CAU 417 Closure Report (CR) (U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office [NNSA/NV], 2001) and the *Federal Facility Agreement and Consent Order* of 1996.

This report provides an analysis and summary of site inspections, subsidence surveys, meteorological information, and soil moisture monitoring data for calendar year 2006. The report also contains recommendations following the five year proof-of-concept phase of long-term monitoring. Inspections are conducted quarterly to document the physical condition of the CAU 417 soil covers, monuments, signs, fencing, and use-restricted areas. Subsidence surveys of the UC-1 Central Mud Pit (CMP) and UC-4 Mud Pit C covers are done semiannually, and surveys of the CMP cover vegetation are conducted periodically. In addition, the UC-1 CMP cover is instrumented to monitor the soil moisture conditions within the upper 1.2 meters (m) (4 feet [ft]) of the cover to determine if the cover is performing as designed.

1.2 Background

CNTA consists of three emplacement boreholes (UC-1, UC-3, and UC-4) that were drilled for nuclear tests. A nuclear device for Project Faultless was detonated on January 19, 1968, in emplacement borehole UC-1 at a depth of approximately 975 m (3,200 ft) below ground surface. The other two emplacement boreholes (UC-3 and UC-4) were never used. Boreholes UC-1, UC-3, and UC-4 comprise three separate land withdrawal areas, which range in size from approximately 1 to 1.5 square miles (Figure 1–2). All three CNTA land withdrawal areas are accessible to the public.

Site closure activities are detailed in the CR for CAU 417 (NNSA/NV, 2001). CAU 417 consists of 34 CASs. Three CASs at UC-1 were closed in place with administrative controls. At the UC-1 CMP (CAS 58-09-01), a vegetated soil cover was constructed over the mud pit. At the remaining two CASs at UC-1, aboveground monuments and warning signs were installed. Three CASs at UC-3 were closed in place with administrative controls, and aboveground monuments and warning signs were installed. Two CASs at UC-4 consisting of five sites were closed in place with administrative controls. At the UC-4 Mud Pit C (CAS 58-09-03), an engineered soil cover was constructed. At the remaining four sites, aboveground monuments and warning signs were installed. The remaining 34 CASs were either clean-closed or closed by taking no further action.

The UC-1 CMP contains hydrocarbon- and chromium-impacted soil and drilling mud. Immediately west of and adjacent to the UC-1 CMP, a trench was excavated, and hydrocarbon-impacted mud from other CNTA mud pits was relocated to the trench. A single engineered monolayer cover was constructed to close both the CMP and the adjacent relocation

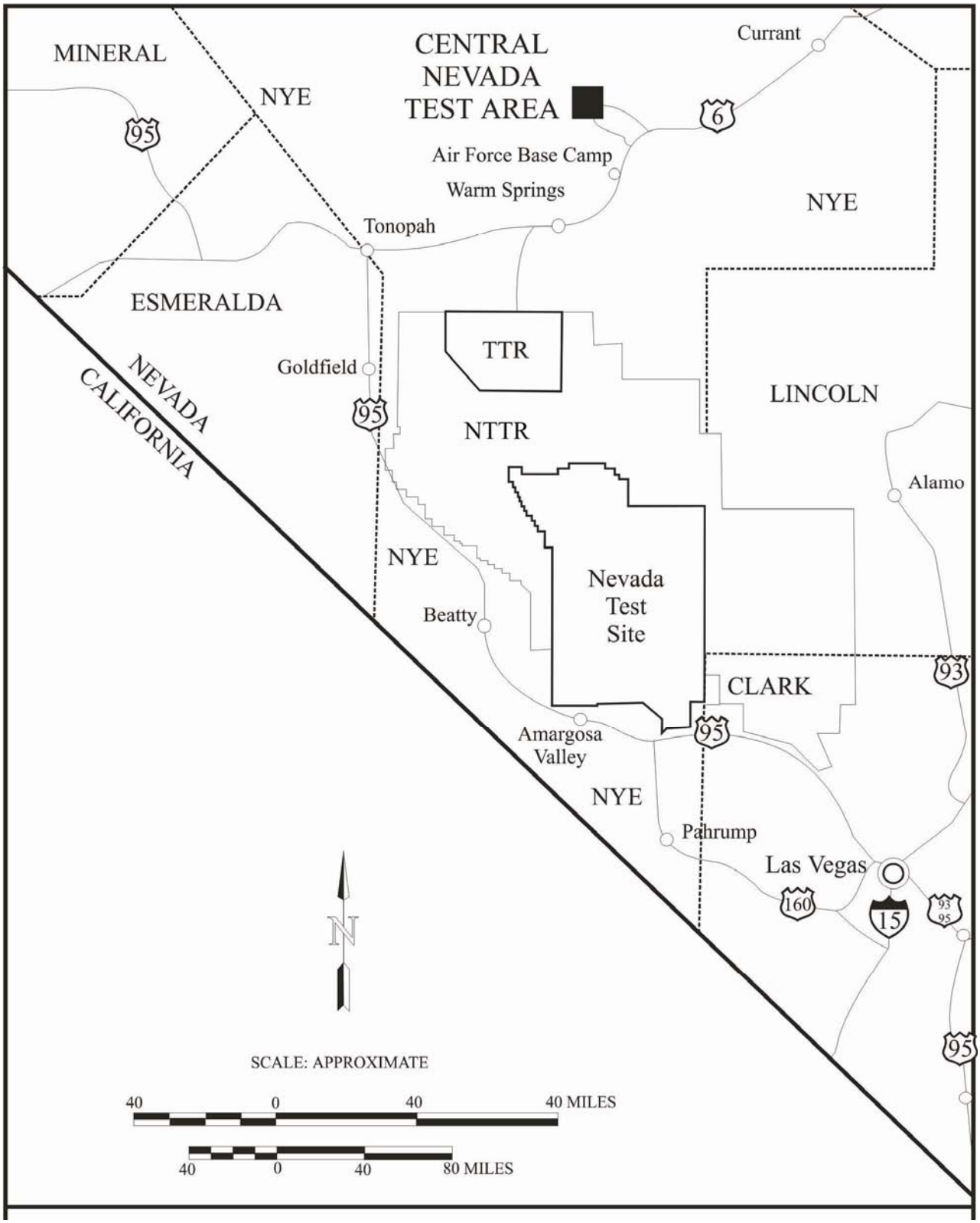

Figure 1–1. Central Nevada Test Area Location Map

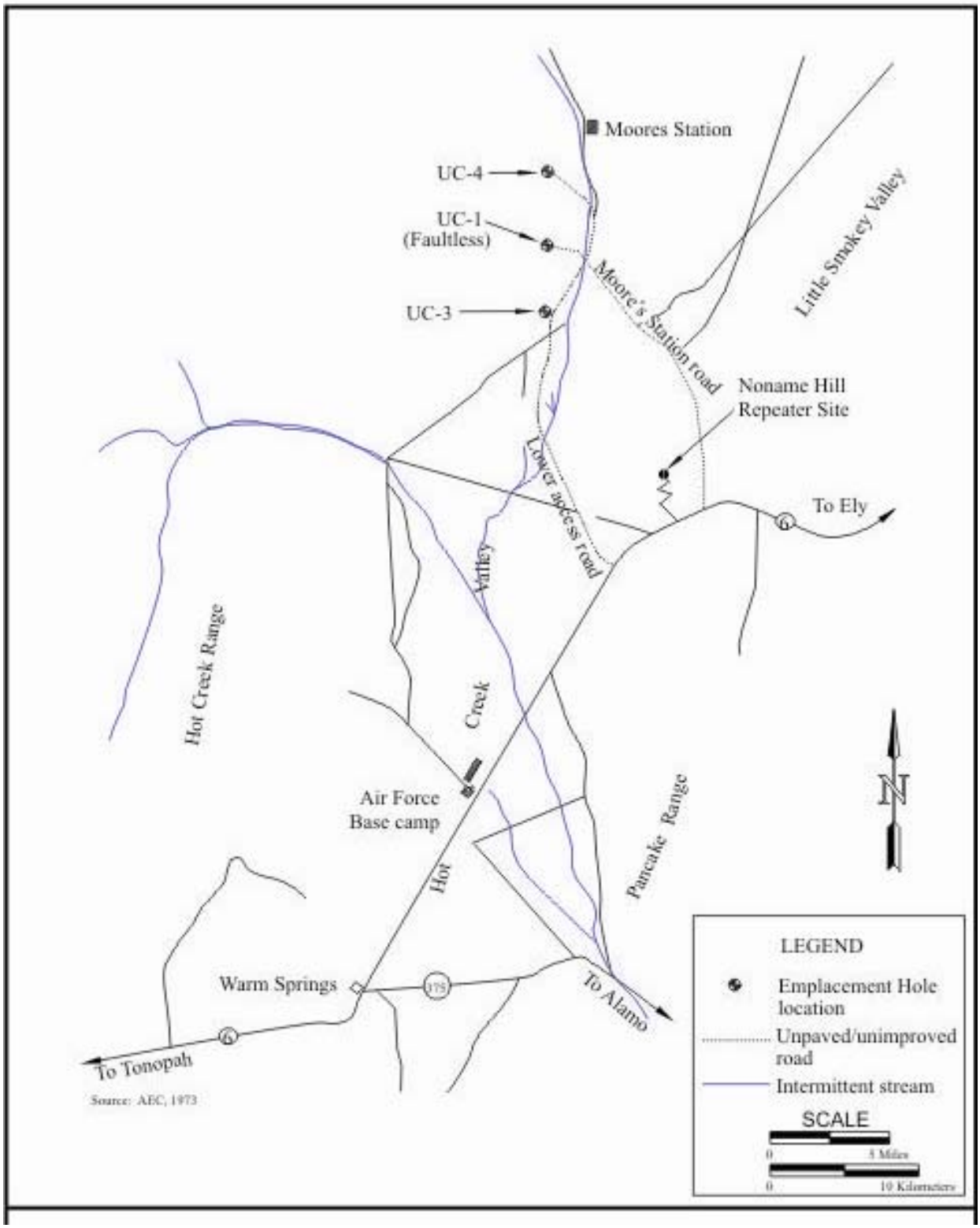

Figure 1–2. CAU 417, Central Nevada Test Area - Surface Map

trench. The cover is vegetated and instrumented with time domain reflectometry (TDR) sensors to monitor the soil moisture content in the cover. The UC-4 Mud Pit C was closed with an engineered cover to prove the cover design and construction methods that would be used at the UC-1 CMP. The cover includes a geosynthetic clay liner and is neither vegetated nor instrumented.

1.3 Geologic Setting

CNTA is located in the north-central portion of the Hot Creek Valley within the Basin and Range physiographic province. This province consists of regularly spaced, roughly north-south trending mountain ranges separated by alluvial valleys formed by faulting. The UC-1 site lies at an elevation of 1,860 m (6,100 ft) above mean sea level and is bordered by the Hot Creek Range to the west, at an elevation of 1,370 m (4,500 ft) above the valley floor. The Pancake Range to the east of UC-1 rises 550 m (1,800 ft) above the valley floor. The Hot Creek Range is composed of Paleozoic sedimentary rocks and Tertiary volcanic rocks. The Paleozoic rocks comprise sandstones, quartzite, limestone, and dolomite, while the Tertiary volcanic rocks comprise welded tuff, nonwelded bedded tuff, argillized and zeolitized tuff, conglomeratic tuffaceous sandstone, carbonaceous siltstone, and rhyolite (Healey, 1968). The alluvium at UC-1 is approximately 730 m (2,400 ft) thick and is underlain by tuffaceous sediments and zeolitized tuffs to a depth of approximately 998 m (3,275 ft) (Barnes, 1968). The Morey Peak-Hot Creek Caldera is thought to be buried by deposits of tuff and alluvium beneath the northern portion of Hot Creek Valley (Healey, 1968).

The Project Faultless test resulted in the subsidence of an irregularly shaped area of approximately 0.9 square kilometers (0.6 square miles). As a result, one northeast-trending fault scarp extends beneath the south eastern corner of the UC-1 Mud Pit and cover, with as much as 4.6 m (15 ft) of vertical displacement. Normal drainage patterns were disrupted by the formation of this scarp, so flood diversion channels were constructed to protect the cover and prevent infiltration along the fault scarp (NNSA/NV, 2001). Depth to the water table at the UC-1 CMP is approximately 168 m (550 ft).

2.0 Post-Closure Monitoring Requirements

2.1 Background

Post-closure requirements for CAU 417 are described in the CR (NNSA/NV, 2001) and are detailed in the following sections. Post-closure activities are intended to determine the following:

- Whether maintenance and/or repairs to the UC-1 CMP or UC-4 Mud Pit C covers, fences, or diversion channels are needed
- Whether the UC-1 CMP or UC-4 Mud Pit C covers are subsiding
- Whether the UC-1 CMP cover is performing as designed
- The health of the vegetation on the UC-1 CMP cover
- Whether maintenance and/or repairs to the aboveground monuments or warning signs are needed
- Whether modifications to the administrative controls are needed

2.2 Site Inspections

Post-closure inspections of CAU 417 are performed quarterly. Each site inspection is documented on an inspection checklist, and site photographs and field notes are taken. Copies of the inspection checklists, field notes, and photographs for calendar year 2006 are included in Appendix A of this report. The post-closure inspections consist of the following:

- A detailed inspection of the UC-1 CMP cover and UC-4 Mud Pit C cover and fencing, including walking the entire perimeter of the fence and documenting the condition of the barbed wire and chicken wire fencing, warning signs, and entrance gate
- A visual inspection of all aboveground monuments, attached warning signs, and affixed survey pins placed at UC-1, UC-3, and UC-4 sites for signs of wear, disturbance, vandalism, animal burrows, etc.
- Repair of monuments and/or attached signs during site inspection visits or, if necessary, at a later time in the calendar year
- A determination of the condition of the two subsidence monuments (SMs) on the UC-4 cover and the 12 SMs on the UC-1 CMP cover (a subsidence survey of all SMs is conducted twice a year to determine if the covers have subsided)
- Documentation of any changes to the covers or fenced area, including, but not limited to, the presence of trash/debris inside the fenced area, animal burrows on the covers or under the perimeter fence, erosion features on the covers or diversion channels, and any change in the health of the UC-1 CMP cover vegetation

2.3 Soil Moisture Monitoring

The CNTA UC-1 CMP cover is designed to limit infiltration of moisture into the disposal unit by evapotranspiration from vegetation that was established on the cover for that purpose. The cover is monitored using TDR sensors to provide a profile of the moisture content in the cover. The moisture content profile will determine whether the cover is performing as designed and if it is in compliance with the closure plan and agreements.

The moisture content is obtained using a Campbell Scientific TDR-100 and a data logger housed in an instrument vault located just off the southern edge of the cover. TDR sensors were buried in the cover at two locations during cover construction. At both locations, two TDR sensors were placed at each of the following depths: 0.15, 0.46, 0.76, and 1.07 m (0.5, 1.5, 2.5, and 3.5 ft) below the surface of the cover (Figure 2–1). The TDR nests are located approximately 48 m (157 ft) northwest and 48 m (157 ft) northeast of the instrument vault. Data are collected daily from each TDR sensor and stored in a data logger located in the instrument vault. The stored TDR and precipitation data are automatically transmitted via a satellite uplink to a Geostationary Operational Environmental Satellite for relay to the National Oceanic and Atmospheric Administration's Wallops Island, Virginia, earth station. The data are retrieved from the earth station twice weekly for processing, analysis, and archiving.

The TDR probes were calibrated for Volumetric Moisture Content (VMC) using a "dry-down" method with native soil and the full cable length. The results of the calibration indicated that a site-specific calibration equation should be used instead of the standard Topp equation. It was also found that because of the long cable lengths and soil conductivities, the TDR reflection end points were extremely flat under saturated and near-saturated conditions, resulting in unreliable data in these regions.

A fourth-order polynomial fit of the calibration data over the range of 5 to 35 percent VMC yielded the following calibration equation:

$$\text{VMC (\%)} = -308.701 + 373.1803(L/L) - 163.644(L/L)^2 + 31.82972(L/L)^3 - 2.25548(L/L)^4$$

Where L/L is the ratio of trace length to probe length as recorded by the data logger.

2.4 Compliance Criteria

The point of compliance for the UC-1 CMP cover is the depth of the deepest TDR soil moisture probe, which is approximately 1.07 m (3.5 ft) below ground surface. Cover compliance will be based on the moisture content of the cover once steady-state conditions are reached. Cover performance modeling presented in the CAU 417 Corrective Action Plan (CAP) (U.S. Department of Energy, Nevada Operations Office [DOE/NV], 2000) predicted that steady-state conditions will be achieved within ten years of cover construction, which was completed in September of 2000. At that time, it is expected that soil moisture trigger values will be agreed upon as compliance criteria with NDEP.

If moisture data indicate that the cover is not operating according to established compliance criteria, the NDEP will be notified of the noncompliance within 14 days. After NDEP has been notified of noncompliance, a work plan will be submitted to NDEP within 90 days outlining the proposed remediation/investigation plan. All corrective actions will be documented in this report.

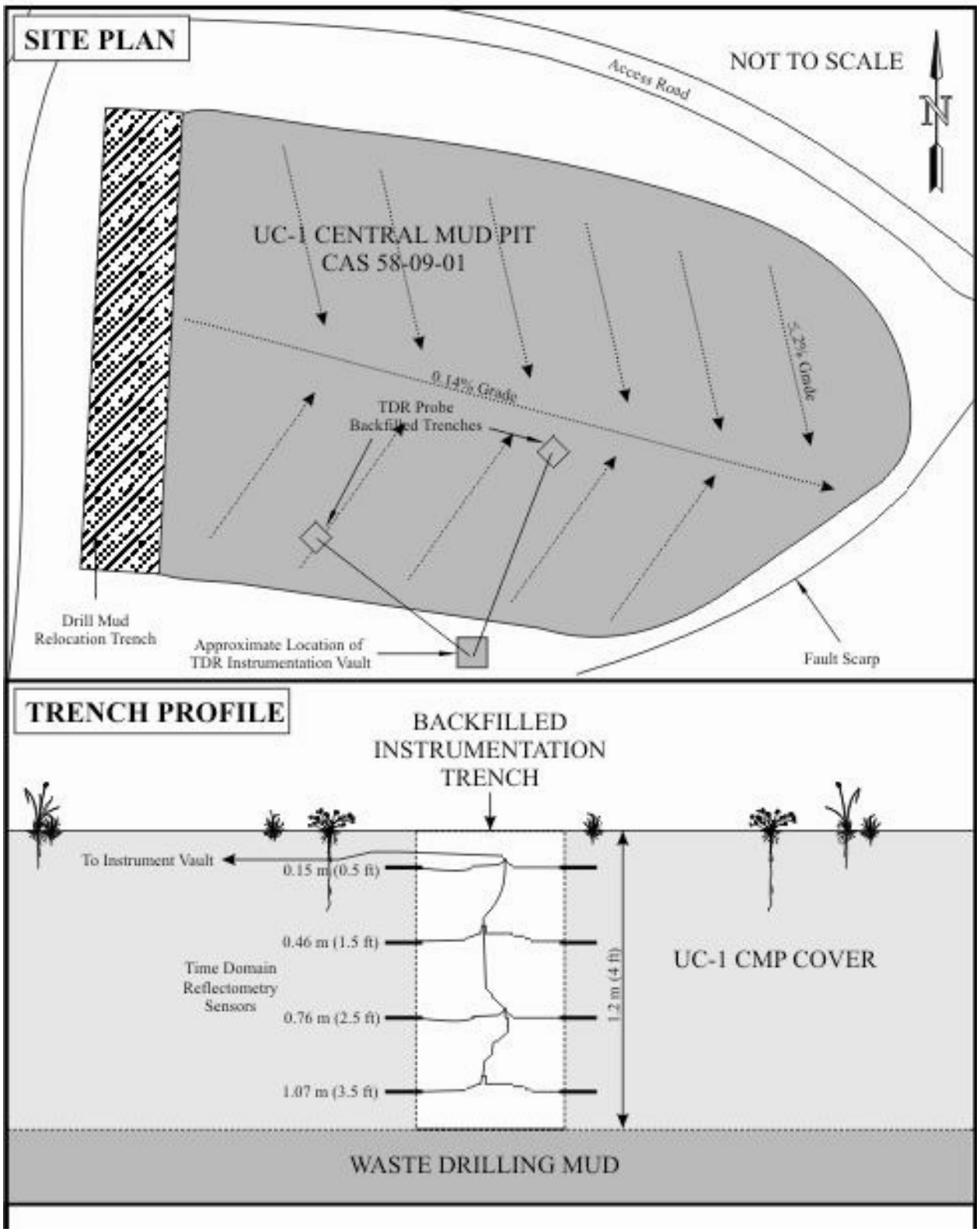

Figure 2–1. UC-1 CMP Cover Monitoring Instrumentation

2.5 Reporting Requirements

Quarterly post-closure inspections are to continue for five years following the completion of closure field activities. All inspection and maintenance activities conducted during the year are documented and included in an annual report. The annual report is submitted by the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office to NDEP and includes the following information:

- A brief narrative and discussion of all post-closure inspection activities and observations
- Copies of all completed inspection checklists and maintenance records
- UC-1 CMP soil moisture content profiles through the previous year
- Subsidence survey data
- Specific recommendations for non-standard maintenance or changes in post-closure requirements

All closure and post-closure monitoring documentation is maintained in project files and is available on request.

3.0 Site Inspections, Surveys, and Maintenance

3.1 Site Inspection Results

3.1.1 First Quarterly Inspection

The first quarterly inspection was performed on April 19, 2006.

3.1.1.1 UC-1

The overall condition of the CMP site was good, and all observations indicated continued integrity of the cover, fencing, signs, and vegetation. Surface cracks on the cover had been repaired in February of 2006, and no new cracks or erosion rills were observed. In addition, all monuments and signs at Mud Pit A and Mud Pit E were in excellent condition with no issues or concerns. No maintenance or repairs were recommended.

3.1.1.2 UC-3

The site was in good condition. All monuments and signs were in good order with no issues or concerns found. No maintenance or repairs were recommended.

3.1.1.3 UC-4

The fencing and signs were in good condition at Mud Pit C, with some minor wear on the signs. Soil erosion rills on the Mud Pit C cover had been repaired in November of 2005. A new erosion rill was observed on the southeast corner of the Mud Pit C cover, and repair was required within 90 days of this inspection. The monuments and signs at Mud Pits A, B, and D, and Area X were all in good condition. No other maintenance or repairs were recommended.

3.1.2 Second Quarterly Inspection

The second quarterly inspection was performed on June 27, 2006.

3.1.2.1 UC-1

The CMP site was in excellent condition. No issues were identified with the cover, fencing, or signs. The CMP cover was in excellent condition with healthy vegetation and no cracks present. All observations indicated the continued integrity of the cover. All monuments and signs at Mud Pit A and Mud Pit E were in excellent condition with no issues or concerns. No maintenance or repairs were recommended.

3.1.2.2 UC-3

The site was in good condition. All monuments and signs were in good order with no issues or concerns identified. No maintenance or repairs were recommended.

3.1.2.3 UC-4

The site was in excellent condition. The erosion rill on the southeast corner of the Mud Pit C had been repaired since the last inspection, and no new cracks or erosion rills were observed. The fencing and signs were in good condition at Mud Pit C. No issues were noted with Mud Pits A, B, and D, or Area X. No maintenance or repairs were recommended.

3.1.3 Third Quarterly Inspection

The third quarterly inspection was performed on September 20, 2006.

3.1.3.1 UC-1

The CMP site was in good condition. No cracks were noted, and the vegetation on the cover was healthy. No issues were identified with the cover, fencing, or signs. It was recommended to apply adhesive around the brass survey markers during the next survey. All monuments and signs at Mud Pit A and Mud Pit E were in excellent condition with no issues or concerns. No other maintenance or repairs were recommended.

3.1.3.2 UC-3

The site was in excellent condition. All signs and monuments were in excellent condition. No issues or concerns were observed, and no maintenance or repairs were recommended.

3.1.3.3 UC-4

The site was in good condition. Two small erosion rills were noted on the Mud Pit C cover, but did not require repair. The fencing and signs at Mud Pit C were in good condition. All signs and monuments at Mud Pits A, B, and D, and Area X were in good condition, with some normal wear. No maintenance or repairs were recommended.

3.1.4 Fourth Quarterly Inspection

The fourth quarterly inspection was performed on December 5, 2006.

3.1.4.1 UC-1

A new crack was discovered at the CMP site, and it was recommended to repair the crack within 90 days. In addition, four signs were not legible, and it was recommended to replace these signs. The vegetation on the cover was healthy. No issues were identified with the monuments or fencing. All monuments and signs at Mud Pits A and E were in excellent condition. No other maintenance or repairs were recommended.

3.1.4.2 UC-3

During the inspection, it was noted that six signs were not legible, and it was recommended to replace these signs. The monuments were in good condition, and no other maintenance or repairs were recommended.

3.1.4.3 UC-4

A new erosion rill was observed on the east edge of the Mud Pit C cover, and repair was required within 90 days. In addition, it was recommended to replace two signs that were not legible. The fencing was in good condition. The monuments and signs at Mud Pits A, B, and D, and Area X were all in good condition. No other maintenance or repairs were recommended.

3.2 Subsidence Survey

3.2.1 UC-1 Background

The UC-1 CMP cover was designed to remove moisture from the underlying drilling mud through evapotranspiration of vegetation. The cover consists of a 1.2-m (4-ft) thick vegetated stabilization layer on top of a supportive geogrid that is in contact with the underlying hydrocarbon-impacted drilling mud. The vegetated cover consists of a 0.6-m (2-ft) layer of borrow soil and hydrocarbon-impacted materials obtained from UC-1, UC-3, and UC-4, with a top layer consisting of 0.6 m (2 ft) of clean borrow material. The cover is sloped inward and designed to direct runoff into an existing drainage channel (NNSA/NV, 2001).

Twelve SMs have been installed on the UC-1 CMP cover for measuring subsidence of the CMP and the relocation trench (NNSA/NV, 2001). A survey plat of the SM locations can be found in Appendix B of this report. The baseline subsidence survey was completed on December 4, 2000, and is used as the reference survey to calculate subsidence for each subsequent survey. Biannual subsidence monitoring began in February 2002 and is conducted in the first and third quarters of each year. The UC-1 baseline survey locations and elevations are provided in Table 3–1.

Settling due to the weight of the cover on the drilling mud was projected to be less than 20 centimeters (cm) (8 inches [in.]), with 90 percent of this settling expected to occur over a period of 3 to 13.5 years. As the cover settles, water will be squeezed from the drilling mud and will be available for evapotranspiration through the vegetated cover. Monthly surveys were conducted from December 2000 through September 2001 to determine if the settling rate of the cover was within the predicted range as detailed in the CAP (DOE/NV, 2000). Because the mud was placed in the pit as slurry, it is expected to be relatively homogenous, and differential settling is expected to be minimal. Settling of the cover was expected to be directly proportional to the mud thickness and vary across the length of the CMP. The SMs for the CMP cover are denoted as SM-2, SM-3, SM-4, SM-6, SM-7, SM-8, SM-10, SM-11, and SM-12.

Settling of the relocation trench (SM-1, SM-5, and SM-9) was projected to be approximately 23 cm (9 in.), with 90 percent of this settling expected to occur between over a period of 16 to 65 years (DOE/NV, 2000). Because the material in this area is relatively homogenous, differential settling is not expected to occur.

Table 3–1. UC-1 Monument Coordinates and Baseline Elevations

Subsidence Monument	Coordinates[a] (m)		Baseline Elevation (m) December 4, 2000
	Northing (ft)	Easting (ft)	
SM-1	6,430,874.2869	539,588.2339	1836.604
SM-2	6,430,863.3239	539,644.8195	1835.154
SM-3	6,430,855.2553	539,684.3327	1834.995
SM-4	6,430,849.7763	539,715.7991	1834.854
SM-5	6,430,852.0243	539,585.4651	1836.541
SM-6	6,430,841.7590	539,641.4674	1834.887
SM-7	6,430,834.5289	539,680.5243	1834.709
SM-8	6,430,828.6994	539,712.4350	1834.681
SM-9	6,430,828.8720	539,582.4750	1836.547
SM-10	6,430,818.6353	539,638.2030	1834.943
SM-11	6,430,812.8276	539,676.0839	1834.744
SM-12	6,430,806.7973	539,708.9837	1834.635

[a]Horizontal datum U.S. State Plane 1983; vertical datum National Geodetic Vertical Datum of 1929.

3.2.2 UC-4 Background

The UC-4 Mud Pit C cover was constructed to assist in the design and planning for the UC-1 CMP cover. The UC-4 cover used a geosynthetic clay liner as opposed to the vegetated monolayer cover used at UC-1. Two permanent SMs (west and east monuments) were installed in the cover for measuring the subsidence of the cover. A survey plat of the SM locations is included in Appendix B of this report. The baseline subsidence survey was completed on October 12, 1999, and is used as the reference survey to calculate subsidence for each subsequent survey. The UC-4 baseline survey locations and elevations are provided in Table 3–2.

Based on site-specific geotechnical data, the amount of settling of the UC-4 cover and mud pit was projected to be less than 5 cm (2 in.), with 90 percent of this settling expected to occur within the first year. Monthly surveys were conducted from October 1999 through June 2000 to determine if the settling rate of the cover was within the predicted range detailed in the CAP (DOE/NV, 2000).

Table 3–2. UC-4 Monument Coordinates and Baseline Elevations

Subsidence Monument	Coordinates[a] (m)		Baseline Elevation (m) October 12, 1999
	Northing (ft)	Easting (ft)	
West Monument	6,435,982.965	538,966.436	1999.269
East Monument	6,435,978.404	538,992.231	1999.062

[a]Horizontal datum U.S. State Plane 1983; vertical datum North American Vertical Datum of 1929

3.2.3 UC-1 Subsidence Survey Results

Elevations and baseline subsidence data are provided in Table 3–3 and Figure 3–1. The settling trend observed since December 2000 appears to have stabilized during the current monitoring period. The degree of settling in both the relocation trench and in the CMP is within the predicted range and shows no unusual subsidence. The data collected over the CMP section of the cover indicate that the largest subsidence is located along the center line of the CMP (SM-6, SM-7, and SM-8). This was expected due to the thicker layer of underlying mud in this area. The northern monuments, SM-2 and SM-3, show the least subsidence due to the thinner layer of underlying mud along this margin of the cover. The greatest degree of settling continues to be on SM-6, which has subsided a total of 14.8 cm (5.8 in.) since the baseline survey in December 2000.

3.2.4 UC-4 Subsidence Survey Results

Elevations and baseline subsidence data are provided in Table 3–4 and Figure 3−2. Neither monument showed any appreciable movement since the 2005 surveys. Settling of the west monument is slightly greater than the predicted settling of 5 cm (2 in.), with a total subsidence of 6.4 cm (2.5 in.) since the baseline survey in October 1999. The east monument has subsided a total of 2.8 cm (1.1 in.) since the baseline survey. The largest changes occurred within the first year. Settling of the cover appears to have stabilized.

3.3 Vegetation Survey

3.3.1 Background

The fenced UC-1 CMP cover and adjacent unfenced disturbed area were seeded in 2000, and 5,000 transplants were planted on the cover in 2001. Evapotranspiration by the vegetation reduces infiltration and of rainwater through the cover. The vegetation also helps reduce erosion of the cover by wind and water by reducing surface velocities.

Post-closure requirements for this site include periodic vegetation surveys to assess the health and stability of the plant cover and to monitor its effectiveness. A preliminary evaluation of the site was conducted in July 2001 to confirm germination, and subsequent surveys were conducted in October 2001, March 2002, September 2002, June 2003, June 2004, June 2005, and June 2006 to evaluate the density, diversity, and overall condition of the vegetation. These evaluations demonstrated successful establishment of healthy plant communities and adequate resistance of the plants to cold weather. Seeded vegetation in the adjacent area outside the fence has not done as well as the vegetation on the cover due to animal grazing.

On June 12, 2006, a vegetation survey was performed and is summarized in the following sections. An area with a well-established native plant community was used to provide a reference point with which to compare the cover vegetation. The complete vegetation monitoring report is included in Appendix C of this report.

Table 3–3. UC-1 Monument Elevations and Subsidence

Date	Elevation At Top of Monument[a] Subsidence (m)											
	SM-1	**SM-2**	**SM-3**	**SM-4**	**SM-5**	**SM-6**	**SM-7**	**SM-8**	**SM-9**	**SM-10**	**SM-11**	**SM-12**
12/04/2000 Baseline	**1836.604**	**1835.154**	**1834.995**	**1834.854**	**1836.541**	**1834.887**	**1834.709**	**1834.681**	**1836.547**	**1834.943**	**1834.744**	**1834.635**
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
01/10/2001	1836.603	1835.149	1834.991	1834.850	1836.540	1834.880	1834.704	1834.676	1836.545	1834.940	1834.741	1834.641
	-0.001	-0.005	-0.004	-0.004	-0.001	-0.007	-0.005	-0.005	-0.002	-0.003	-0.003	0.006
02/06/2001	1836.607	1835.150	1834.992	1834.849	1836.540	1834.879	1834.703	1834.674	1836.545	1834.937	1834.738	1834.630
	0.003	-0.004	-0.003	-0.005	-0.001	-0.008	-0.006	-0.007	-0.002	-0.006	-0.006	-0.005
03/13/2001	1836.595	1835.147	1834.992	1834.845	1836.538	1834.874	1834.699	1834.669	1836.534	1834.933	1834.735	1834.622
	-0.009	-0.007	-0.003	-0.009	-0.003	-0.013	-0.010	-0.012	-0.013	-0.010	-0.009	-0.013
04/11/2001	1836.584	1835.144	1834.991	1834.841	1836.535	1834.869	1834.693	1834.662	1836.531	1834.928	1834.731	1834.618
	-0.020	-0.010	-0.004	-0.013	-0.006	-0.018	-0.016	-0.019	-0.016	-0.015	-0.013	-0.017
05/09/2001	1836.581	1835.144	1834.993	1834.841	1836.534	1834.869	1834.691	1834.661	1836.529	1834.925	1834.728	1834.618
	-0.023	-0.010	-0.002	-0.013	-0.007	-0.018	-0.018	-0.020	-0.018	-0.018	-0.016	-0.017
06/12/2001	1836.579	1835.142	1834.992	1834.840	1836.534	1834.864	1834.689	1834.659	1836.529	1834.922	1834.726	1834.617
	-0.025	-0.012	-0.003	-0.014	-0.007	-0.023	-0.020	-0.022	-0.018	-0.021	-0.018	-0.018
07/18/2001	1836.577	1835.141	1834.991	1834.838	1836.532	1834.862	1834.686	1834.656	1836.529	1834.920	1834.723	1834.614
	-0.027	-0.013	-0.004	-0.016	-0.009	-0.025	-0.023	-0.025	-0.018	-0.023	-0.021	-0.021
08/14/2001	1836.575	1835.140	1834.991	1834.838	1836.531	1834.859	1834.685	1834.655	1836.529	1834.921	1834.723	1834.614
	-0.029	-0.014	-0.004	-0.016	-0.010	-0.028	-0.024	-0.026	-0.018	-0.022	-0.021	-0.021
09/12/2001	1836.582	1835.138	1834.988	1834.834	1836.530	1834.854	1834.681	1834.650	1836.527	1834.914	1834.719	1834.610
	-0.022	-0.016	-0.007	-0.020	-0.011	-0.033	-0.028	-0.031	-0.020	-0.029	-0.025	-0.025
02/13/2002	1836.568	1835.132	1834.978	1834.824	1836.529	1834.835	1834.666	1834.636	1836.523	1834.900	1834.703	1834.597
	-0.036	-0.022	-0.017	-0.030	-0.012	-0.052	-0.043	-0.045	-0.024	-0.043	-0.041	-0.038
08/26/2002	1836.555	1835.129	1834.976	1834.819	1836.523	1834.823	1834.656	1834.627	1836.513	1834.893	1834.695	1834.590
	-0.049	-0.025	-0.019	-0.035	-0.018	-0.064	-0.053	-0.054	-0.034	-0.050	-0.049	-0.045
03/06/2003	1836.552	1835.123	1834.972	1834.811	1836.519	1834.805	1834.644	1834.615	1836.509	1834.880	1834.682	1834.577
	-0.052	-0.031	-0.023	-0.043	-0.022	-0.082	-0.065	-0.066	-0.038	-0.063	-0.062	-0.058
09/26/2003	1836.545	1835.122	1834.973	1834.807	1836.509	1834.795	1834.638	1834.609	1836.500	1834.874	1834.677	1834.573
	-0.059	-0.032	-0.022	-0.047	-0.032	-0.092	-0.071	-0.072	-0.047	-0.069	-0.067	-0.062
03/10/2004	1836.544	1835.116	1834.968	1834.800	1836.507	1834.781	1834.628	1834.598	1836.496	1834.864	1834.666	1834.562
	-0.060	-0.038	-0.027	-0.054	-0.034	-0.106	-0.081	-0.083	-0.051	-0.079	-0.078	-0.073
09/15/2004	1836.541	1835.117	1834.970	1834.800	1836.503	1834.776	1834.626	1834.596	1836.496	1834.862	1834.665	1834.560
	-0.063	-0.037	-0.025	-0.054	-0.038	-0.111	-0.083	-0.085	-0.051	-0.081	-0.079	-0.075
03/22/2005	1836.535	1835.110	1834.967	1834.793	1836.499	1834.760	1834.615	1834.584	1836.492	1834.851	1834.653	1834.551
	-0.069	-0.044	-0.028	-0.061	-0.042	-0.127	-0.094	-0.097	-0.055	-0.092	-0.091	-0.084
09/21/2005	1836.527	1835.110	1834.968	1834.793	1836.494	1834.755	1834.613	1834.583	1836.490	1834.849	1834.650	1834.548
	-0.077	-0.044	-0.027	-0.061	-0.047	-0.132	-0.096	-0.098	-0.057	-0.094	-0.094	-0.087
04/19/2006	1836.527	1835.105	1834.964	1834.788	1836.494	1834.743	1834.606	1834.575	1836.490	1834.843	1834.643	1834.542
	-0.077	-0.049	-0.031	-0.066	-0.047	-0.144	-0.103	-0.106	-0.057	-0.100	-0.101	-0.093
09/19/2006	1836.524	1835.105	1834.963	1834.788	1836.491	1834.739	1834.604	1834.573	1836.488	1834.840	1834.641	1834.540
	-0.080	-0.049	-0.032	-0.066	-0.050	-0.148	-0.105	-0.108	-0.059	-0.103	-0.103	-0.095

[a]Vertical datum National Geodetic Vertical Datum of 1929 in meters

Table 3–4. UC-4 Monument Elevations and Subsidence

Date	Elevation at Top of Monument[a] Subsidence (m)	
	West Monument	East Monument
10/12/1999 Baseline	1999.269	1999.062
	0.000	0.000
11/29/1999	1999.260	1999.056
	-0.009	-0.006
01/14/2000	1999.254	1999.052
	-0.015	-0.010
02/28/2000	1999.251	1999.053
	-0.018	-0.009
03/28/2000	1999.247	1999.052
	-0.022	-0.010
04/27/2000	1999.242	1999.05
	-0.027	-0.012
06/01/2000	1999.241	1999.05
	-0.028	-0.012
02/13/2002	1999.216	1999.037
	-0.053	-0.025
08/27/2002	1999.214	1999.039
	-0.055	-0.023
03/06/2003	1999.21	1999.036
	-0.059	-0.026
09/26/2003	1999.207	1999.035
	-0.062	-0.027
03/10/2004	1999.208	1999.036
	-0.061	-0.026
09/14/2004	1999.209	1999.041
	-0.060	-0.021
03/22/2005	1999.206	1999.037
	-0.063	-0.025
09/21/2005	1999.206	1999.036
	-0.063	-0.026
04/18/2006	1999.203	1999.033
	-0.066	-0.029
09/19/2006	1999.205	1999.034
	-0.064	-0.028

[a]Vertical datum National Geodetic Vertical Datum of 1929 in meters

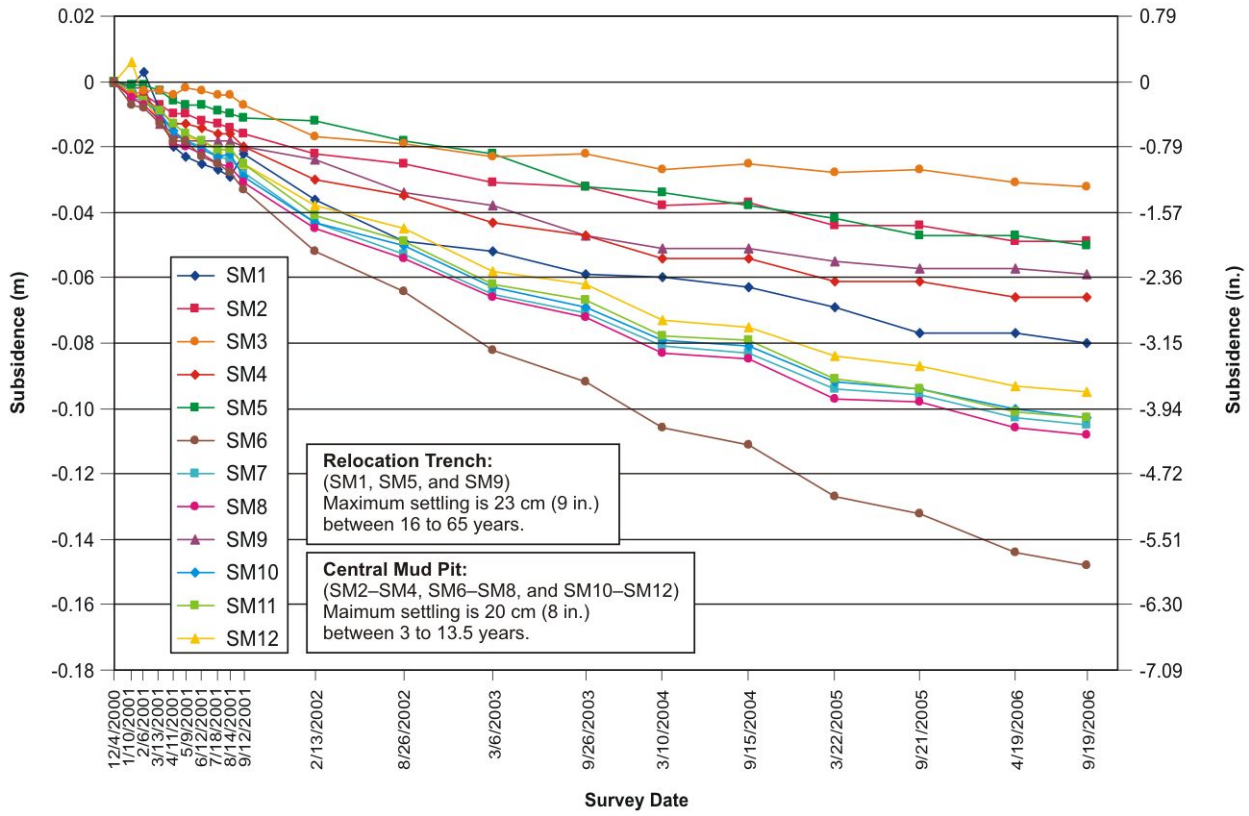

Figure 3–1. UC-1 Cover Settlement

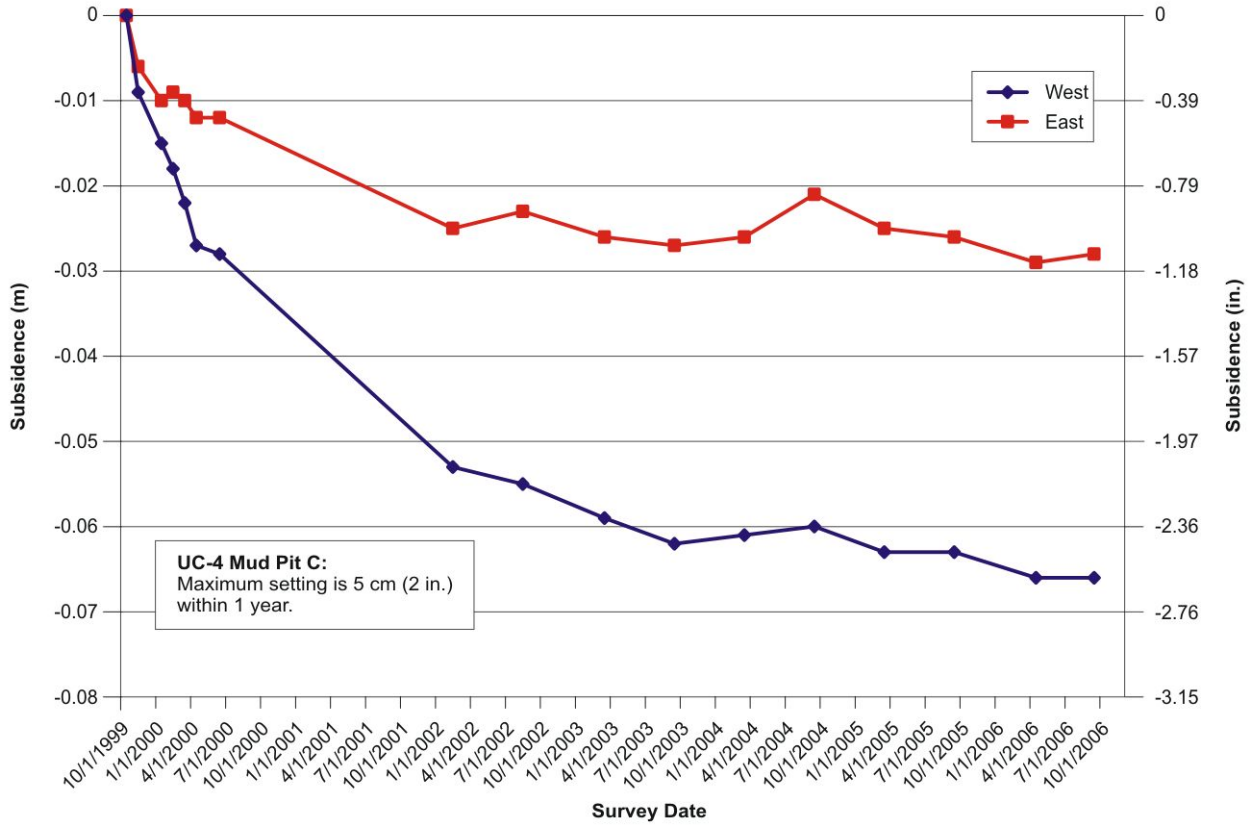

Figure 3–2. UC-4 Cover Settlement

3.3.2 Vegetation Survey Results

Vegetation success is evaluated by comparing plant cover and density to a reference area of well-established plants. Vegetation is considered successful when a predetermined percentage of perennial plant cover and density on the adjacent, undisturbed plant community is achieved. Using a standard of 70 percent, which is typically used in the reclamation industry, a standard for plant cover is established at 24.0 percent, and a standard for plant density is established at 5.0 perennial plants per square meter (m^2).

Based on these standards, successful revegetation has been achieved on the CMP. Plant cover exceeds the standard by 2 percent, and plant density is approximately three times the standard. Shrub cover on the CMP exceeds the standard of 21.7 percent, and grass cover is approximately double the standard. Shrub density continues to be much higher than on the reference area. Shrub density on the CMP was approximately six times the standard. The density of grasses, however, was slightly less than the standard.

Reclamation success was also achieved for the disturbances around the perimeter of the CMP but only when summed over shrubs and grasses. Both shrub cover and density exceeded standards, but grass cover and density were below the standard. Even though grass cover decreased on the perimeter disturbances, overall plant cover was the highest since the site was revegetated.

3.3.3 Summary and Conclusions of Vegetation Survey

The 2006 vegetation survey results indicate the revegetation has been very successful. The vegetation should continue to be monitored to document any changes in the plant community and identify conditions that could potentially require remedial action in order to maintain a viable vegetative cover. However, given the apparent success of the vegetation program, it is suggested that future surveys be conducted once every two years or as needed to help monitor the health of the vegetation. TDR soil moisture monitoring will continue to provide a measure of the success of the vegetated cover to limit infiltration of precipitation to the waste materials below. Quarterly visual inspections and photographic documentation will also provide a means to monitor changes in the state of vegetation on the cover.

3.4 Maintenance and Repair

If a site inspection detects that either the UC-1 CMP cover or UC-4 Mud Pit C cover is not in compliance, conditions requiring major repairs are noted, or any other problems in critical areas are noted, the issue will be evaluated and reported to NDEP within 60 days of detection. The following guidelines apply to CAU 417 maintenance and repairs:

- Cracks, settling features, erosion rills, and animal burrows larger than 15 cm (6 in.) deep which extend 1 m (3 ft) or more, and that do not compromise the UC-1 CMP or UC-4 Mud Pit C covers, will be evaluated and repaired within 90 days of detection.
- Non-critical cracks, settling features, erosion rills, and animal burrows less than 15 cm (6 in.) deep which extend less than 1 m (3 ft) will be repaired during the site inspection visit.
- Damage to the fencing, warning signs, or monuments will be evaluated and repaired within 90 days of detection.

- Major damage to use-restriction warning signs or monuments will be evaluated and repaired during subsequent site inspections.
- All repair work will preserve the original “as-built” design and will be documented in the annual post-closure report.

Copies of the field notes and the photographs taken during the maintenance and repair activities conducted during 2006 are included in Appendix A of this report.

3.4.1 UC-1 Maintenance and Repair

- In January of 2006, the satellite transmitter that transmits the TDR and precipitation data was replaced with a temporary unit.
- In February of 2006, surface cracks requiring repair that had been observed during the December 2005 inspection were repaired by adding native soil to the cracks and manually compacting the fill.
- In April of 2006, during the first quarterly inspection, the temporary satellite transmitter was replaced with a permanent unit.
- In December of 2006, during the fourth quarterly inspection, the precipitation gauge was repaired by refilling the liquid in the precipitation adapter on the rain gauge.

3.4.2 UC-3 Maintenance and Repair

No issues or concerns were found during the inspections in 2006; therefore, no maintenance or repairs were performed.

3.4.3 UC-4 Maintenance and Repair

An erosion rill located on the southeast corner of the Mud Pit C cover was found during the first quarterly inspection and repaired in June of 2006 by filling the rill with native soil.

4.0 Soil Moisture Monitoring

4.1 Precipitation Data

Precipitation data are normally collected at the UC-1 CMP cover by a Campbell Scientific TE525 tipping bucket rain gauge fitted with a CS705 precipitation adapter for snowfall measurements. The rain gauge data are collected and stored by the data logger until the daily TDR and precipitation data are transmitted via a satellite uplink to an earth station in Wallops Island, Virginia. The data are retrieved from the earth station periodically for processing, analysis, and archive.

The precipitation gauge at UC-1 became inoperative in May 2006 due to a low liquid level in the precipitation adapter on the rain gauge. Data from the Pancake Community Environmental Monitoring Program (CEMP) station were used from the date of last recorded rainfall from the UC-1 gauge until the repair of the gauge was completed in December 2006. The Pancake CEMP meteorological weather station is the closest station to CNTA and is located approximately 37 km (23 mi) south of UC-1.

The precipitation is presented in Figure 4–1. The total precipitation for calendar year 2006 was 7.54 cm (2.97 in.), which is considerably lower than levels experienced over the past few years.

4.2 Soil Moisture Monitoring Results

4.2.1 Results

Graphs of the TDR-derived soil moisture content, combined with precipitation data, are presented in Figure 4–2 through Figure 4–5. At each TDR location (east and west), two separate stacks of four TDR probes, designated as Nest A and Nest B, are set approximately 1 m (3.3 ft) apart for a redundant measurement profile. The east nest is located near the centerline of the cover to monitor the area where maximum moisture content would be expected, near the cover drainage channel and over an area of maximum mud thickness where the weight of the cover would force the most excess water from the underlying drilling mud. The west nest is located farther up the flank of the CMP cover where the underlying mud layer is thinner and is more representative of the cover in general.

In November 2002, the ground surface above each TDR nest was irrigated with 20 gallons of water to encourage seed germination. Inspections during subsequent years indicate that vegetation has become established in the areas around the nests, but is sparse directly above the TDR nests.

Figure 4–2 through Figure 4–5 show several responses: the initial conditions, wetting events, and the return to steady-state conditions under both barren and vegetated conditions. The initial conditions reflect the intrinsic moisture conditions of the disturbed soil. During the installation of the TDR probes, the trenching and compaction of each of the soil lift disturbed the soil profile and resulted in a nonuniform vertical soil moisture profile. Consequently, some depths appeared wetter than others and will remain so until the system reaches equilibrium. Vegetation is not present directly over the TDR nests, only surrounding them. Therefore, some excess infiltration and lower than normal evapotranspiration can be expected until the vegetation over the TDR nests become established.

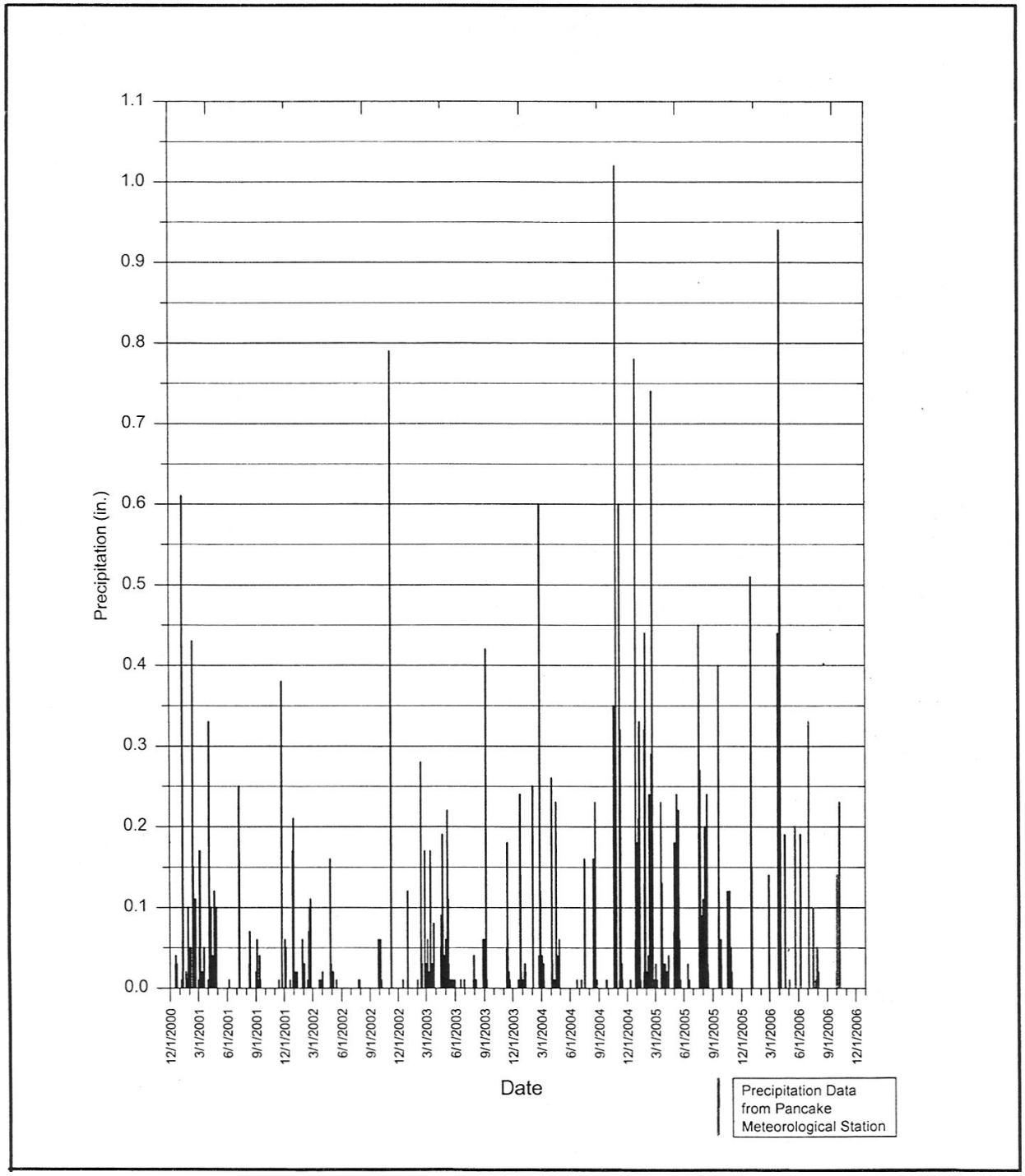

Figure 4–1. UC-1 Precipitation

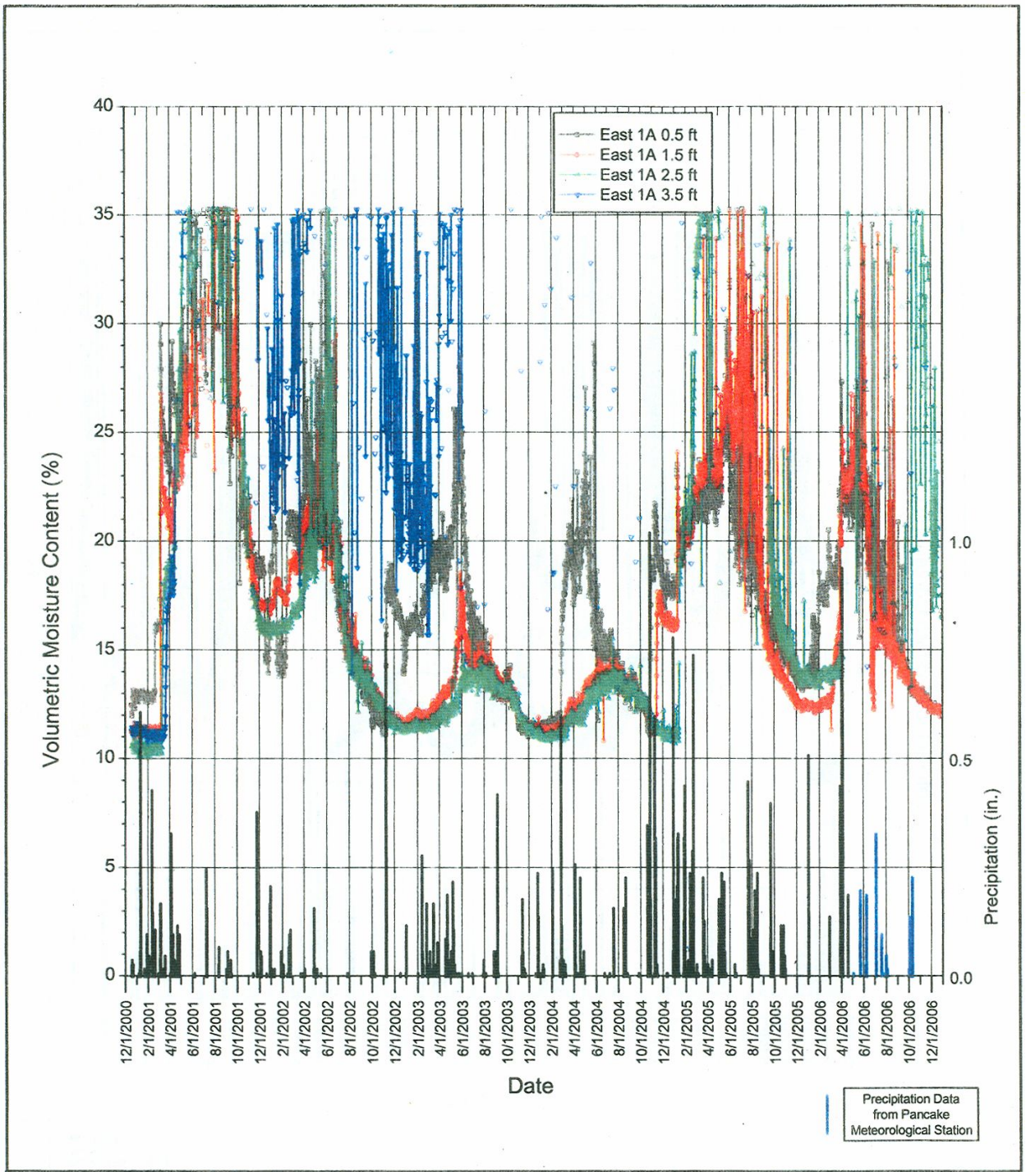

Figure 4–2. Soil Moisture Content, East TDR Nest A

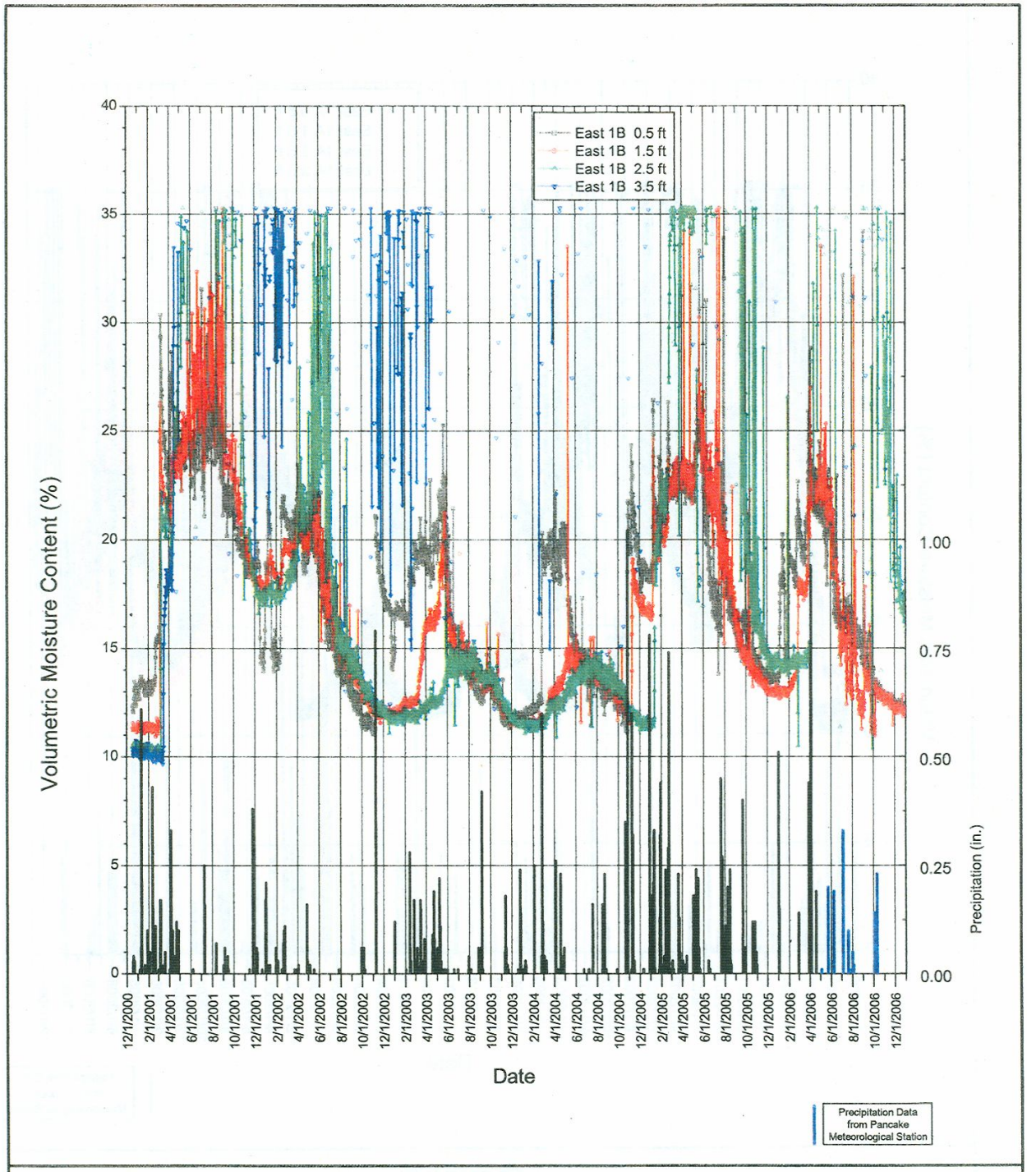

Figure 4–3. Soil Moisture Content, East TDR Nest B

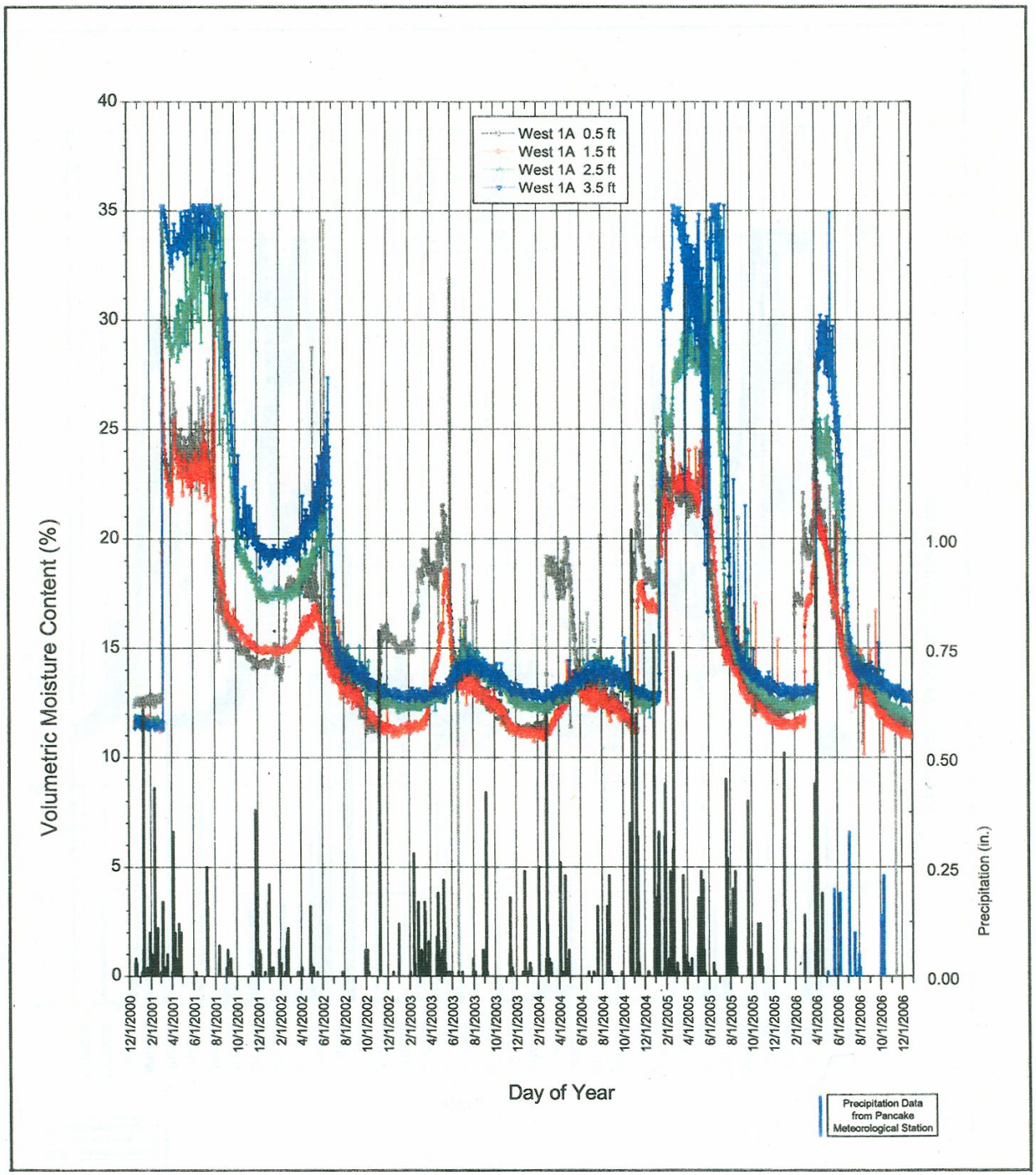

Figure 4–4. Soil Moisture Content, West TDR Nest A

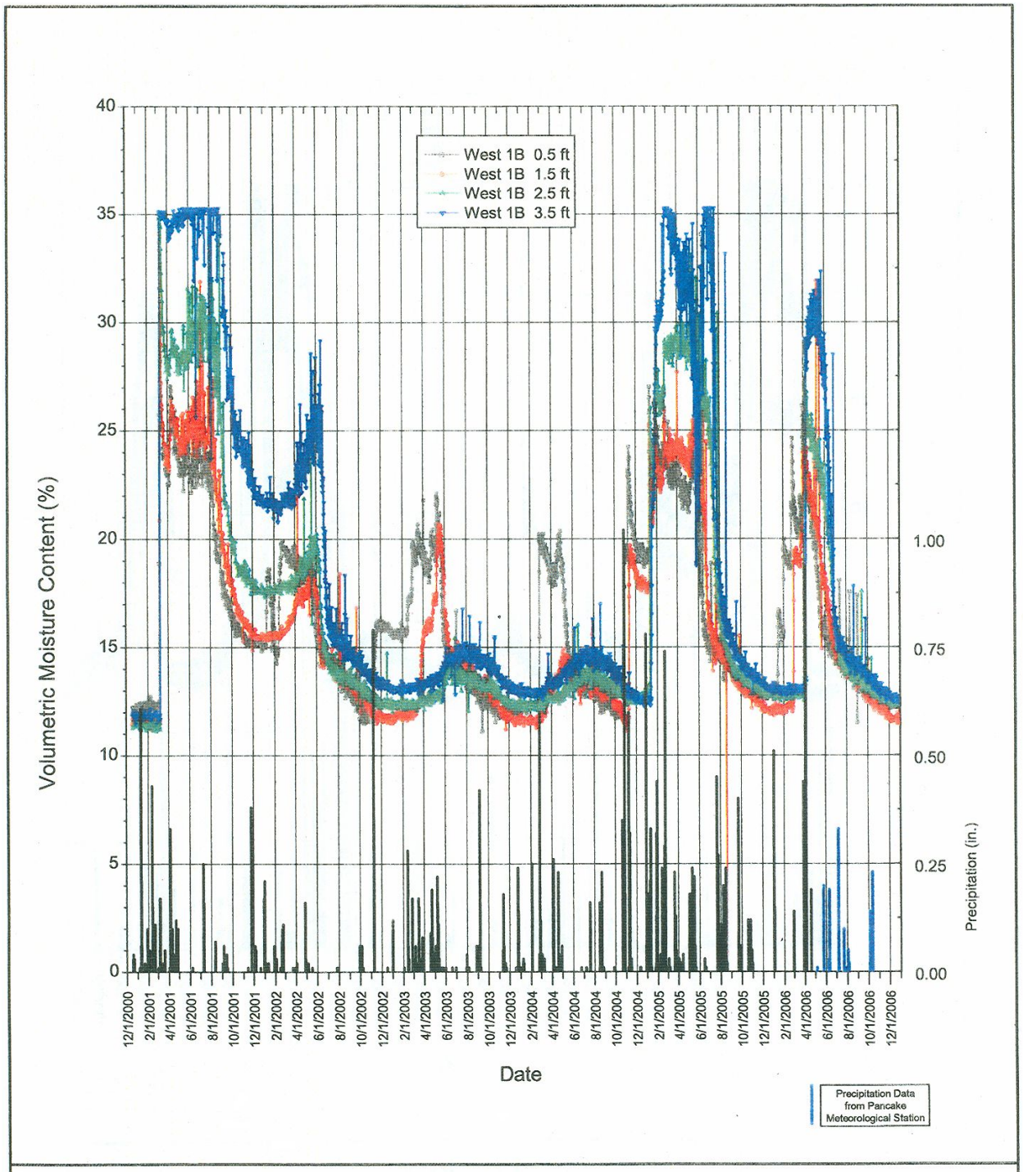

Figure 4–5. Soil Moisture Content, West TDR Nest B

In general, wetting fronts can be seen as a rapid increase in the VMC near the surface followed by increased moisture at greater depths. All the profiles indicate a rapid increase in moisture content at the end of February 2001, when a snowmelt occurred. Vegetation was not established on the cover at this time, showing the effect of infiltration on a non-vegetated cover. Both the east nest and west nest remained wet through July 2001, when cover vegetation became established and the cover began to dry out. TDR data for both nests show that the cover remained saturated at the 1.1 m (3.5 ft) depth. This was anticipated due to the weight of the cover forcing water out of the underlying drilling mud.

In general, beginning in 2002 and through 2004, less intense wetting fronts occurred at both nests during January and February. Infiltration occurred each year through mid June when, due to evapotranspiration from the vegetation and low seasonal precipitation, a rapid drying trend occurred throughout the cover to a depth of 1.1 m (3.5 ft). With the exception of the 1.1-m (3.5-ft) probes in the east nests, by the end of January 2003 and January 2004, moisture content at depth is less than 15 percent and appears stable. Due to several heavy precipitation events early in 2005, both the east and west nests initially show saturated conditions throughout the cover. However, by June 2005, the cover dried out.

Continuing trends were observed through 2006. Heavy precipitation during January and February of 2006 caused saturation of the cover to depth, and the moisture content dropped to less than 15 percent by the end of the year. The one exception is at the 1.1 m (3.5 ft) depth at the east nests, which continue to show saturated soil moisture conditions.

Both TDR nests present similar profiles and indicate that the cover is performing as designed.

4.2.2 Data Trends

4.2.2.1 East TDR Nests

The east TDR nests are located near the drainage channel at the approximate center of the cover. Run-on from precipitation events and water pressed out of the thickest portion of the underlying drilling mud were expected to produce the highest soil moisture content found on the CMP cover at the location where the east TDR nests were placed. Data obtained for both of the east nests indicate this to be the case. TDR data obtained for the 1.1-m (3.5-ft) depth are largely corrupted due to high moisture content (saturated conditions) and a high soil conductivity. The combination of these effects and the long cable length create problems in measuring the reflected signal from the TDR probes. As a result, the data are very noisy at the 1.1-m (3.5-ft) depth for both east nests. For VMC values greater than 25 percent, the TDR data are outside the system operating limits, and the moisture content should be estimated as greater than 25 percent.

Heavy rainfall events in early 2006 caused infiltration to approximately 0.76 m (2.5 ft) before the moisture was removed from the cover by evapotranspiration. Moisture content measurements to approximately the 0.76 m (2.5 ft) depth are less than 15 percent VMC by the end of the year and appear to have stabilized.

Both east TDR nests present similar profiles and indicate that the cover is performing as designed, with saturated conditions persisting at the cover-mud interface.

4.2.2.2 West TDR Nests

The west TDR nests are located on the western flank of the CMP cover and represent the typical conditions to be expected over the majority of the cover.

The data obtained from both west nests are not affected by the signal loss problems observed on the east nests. The data presented are similar to those of the east nests, with the initial wet conditions extending from early March 2001 to approximately September 2001. Drying conditions extend from the cover surface to a depth of 1.1 m (3.5 ft) from October 2001 to approximately October 2002, at which time the cover vegetation was established. Conditions remain dry and stable through the current monitoring period with moisture content measurements less than 15 percent VMC by the end of 2006.

Moisture content measurements indicate extremely wet conditions from January 2006 through May 2006, with infiltration reaching to the 1.1 m (3.5 ft) depth before being removed by evapotranspiration.

Both west nests present similar profiles and indicate the cover is performing as designed, with evapotranspiration effectively removing water from the cover. The moisture content at all depths appears to be approaching steady state.

5.0 Summary, Conclusions, and Recommendations

5.1 Summary

The inspections conducted at the UC-1 CMP revealed that no new cracks or fractures had developed until the fourth quarterly inspection, during which a crack was discovered requiring repair within 90 days. In addition, it was noted during the fourth quarterly inspection that four signs were not legible, and it was recommended to replace these signs. The vegetation on the cover was healthy, and no issues were identified with the monuments or fencing. All monuments and signs at Mud Pits A and E were in excellent condition. No other maintenance or repairs were recommended.

The inspections at UC-3 indicated that the sites were in good condition. During the fourth quarterly inspection, it was noted that six signs needed to be replaced. No other issues or concerns were identified.

Inspections performed at UC-4 Mud Pit C cover during the first and fourth quarters revealed that erosion rills had formed. The erosion rill discovered during the first quarterly inspection was repaired in June, and the erosion rill discovered during the fourth quarterly inspection will be repaired within 90 days of the inspection. In addition, it was noted during the fourth quarterly inspection that two signs needed to be replaced. No issues were identified with the warning signs and monuments at the other four UC-4 locations. No other maintenance or repairs were recommended.

The UC-1 settling trend that has been seen since December 2000 appears to have stabilized, with the trend showing little to no change in the April 2006 to the September 2006 surveys. The degree of settling in both the relocation trench and in the CMP is within the predicted range and shows no unusual subsidence.

The June 2006 vegetation survey indicates that the UC-1 CMP revegetation has been very successful. The vegetation should continue to be monitored to document any changes in the plant community and identify conditions that could potentially require remedial action in order to maintain a viable vegetative cover on the site. It is suggested that future vegetation surveys be conducted once every two years or as needed to help monitor the health of the vegetation.

Precipitation during 2006 was below average, with an annual rainfall total of 7.54 cm (2.97 in.).

Soil moisture content data show that the UC-1 cover is performing as designed, with saturated conditions at the cover-mud interface and evapotranspiration effectively removing water from the cover.

5.2 Conclusions

- The fourth quarterly inspection identified required repairs for a crack on the UC-1 CMP cover, an erosion rill on the UC-4 Mud Pit C cover, and signs at UC-1, UC-3, and UC-4. No other issues or concerns were identified during the quarterly inspections that require action.
- No significant concerns were noted relating to the subsidence surveys on UC-1 and UC-4.

- The vegetation survey indicated that the vegetation on the UC-1 CMP and adjacent areas is healthy and well established.
- Soil moisture monitoring data indicate that the cover is performing as designed with evapotranspiration effectively removing water from the cover.
- It is expected that the soil moisture monitoring compliance criteria will be established in the next reporting period.

5.3 Recommendations

- Reduce the frequency of site inspections from quarterly to annually.
- Reduce the frequency of subsidence surveys from twice per year to annually.
- Continue vegetation surveys once every two years or as needed to help monitor the health of the vegetation.
- Continue TDR data collection and establish compliance criteria.

6.0 References

Barnes, W. 1968. Report of Exploration Progress, Central Nevada, Period August 1, 1967 December 31, 1967. U.S. Geological Survey Technical Letter, Central Nevada 3-2.

DOE/NV, see U.S. Department of Energy, Nevada Operations Office.

FFACO (Federal Facility Agreement and Consent Order), 1996 (as amended). Agreed to by the State of Nevada, the U.S. Department of Energy, and the U.S. Department of Defense.

Healey, D. L. 1968. Gravity Survey of Northern Hot Creek Valley, Nye County, Nevada. U.S. Geological Survey Technical Letter, Central Nevada-18.

NNSA/NV, see U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office.

U.S. Department of Energy, Nevada Operations Office. *2000. Corrective Action Plan for Corrective Action Unit 417: Central Nevada Test Area Surface, Nevada*, DOE/NV--588. Las Vegas, Nevada.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office. *2001. Closure Report for Corrective Action Unit 417: Central Nevada Test Area Surface, Nevada.* DOE/NV--743 REV1. Las Vegas, Nevada.

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Appendix A

Inspection Checklists,
Field Notes and Photographs

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TITLE

Work continued from Page _____

PROJECT NO. CNTA 01/12/06

BOOK NO.

TRIP DESCRIPTION: TRAVEL TO CNTA TO REPLACE FAULTY GOES UC1 SATELLITE TRANSMITTER W/ LOANER.

DEPARTURE FROM LOSEE RALLY POINT: 05:30

ARRIVAL AT CNTA UC1 STATION: 10:30

CONDITIONS: COLD (~40°F), CALM, W/ 1-2" INTERMITTENT SNOWCOVER.

UPDATE: UPON ARRIVAL, LAPTOP OPERATING SYSTEM SUFFERS REGISTRY ERROR. -BEGIN TROUBLESHOOTING. (10:20)

UPDATE: COMPUTER SYSTEM OPERATIONAL - 10:50
GROUND FROZEN SOLID, VAULT ACCESS HAMPERED, BEGIN DIGGING

UPDATE: 11:30 - VAULT UNCOVERED, TRANSMITTER REPLACED, LOCAL UPLINK LOOKS GOOD - AWAITING GPS TIME ACQUISITION
[☆ - LOANER HDR GOES TRANSMITTER RUNNING W/ VERSION 3 CONFIG FILE AS SUPPLIED BY CAMPBELL SCIENTIFIC.]

UPDATE: 11:45 - LOCAL TEST OF HDR UNIT SUCCESSFUL.

UPDATE: 12:30 - VAULT RE-SEALED, EQUIPMENT STOWED, POST-ACTIVITY CHECK COMPLETED

(NOTE: ROOKIE FAILED TO BRING G-PICK, IS SCOLDED, VOWS TO NEVER REPEAT.)

NOTE: BRING ALCOHOL ON NEXT COLD-WEATHER TRIP TO MELT ICE IN LOCK.

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SIGNATURE

Work continued to Page _____

DATE

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 12/7/05	Reason for Last Inspection: Quarterly
Responsible Agency: Bechtel Nevada Environmental Restoration	Project Manager: Jeff Smith

Inspection Date: 4/19/06

Inspector (name, title, organization): Glenn Richardson, Task Manager, BN-Environmental Restoration

Assistant Inspector (name, title, organization): N/A

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. **PREPARATION** (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	✓		
2. Previous inspection reports reviewed.	✓		
a. Were anomalies or trends detected on previous inspections?		✓	
b. Was maintenance performed?	✓		Surface cracks were repaired with native soil in Feb. 2006.
3. Site maintenance and repair records reviewed.	✓		
a. Has site repair resulted in a change from as-built conditions?		✓	
b. Are revised as-builts available that reflect repair changes?			N/A

C. **SITE INSPECTION** (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		✓	
b. Are there any new roads or trails?		✓	
c. Has there been a change in the position of nearby washes?		✓	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		✓	
e. Are there new drainage channels?		✓	
f. Change in surrounding vegetation?		✓	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		✓	
b. Have any signs been damaged or removed? (Number of signs replaced: _____)		✓	Walked around fenced area. Fencing/signs are in good condition.
c. Were gates locked?	✓		

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE MONITORING CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	Crack repairs were made to cover in Feb. 2006.
c. Is there evidence of erosion around the cap (wind or water)?		✓	
d. Is there evidence of animal burrowing?		✓	
e. Have the site markers been disturbed by man or natural processes?		✓	
f. Do natural processes threaten to integrity of any cover or site marker?		✓	
g. Other?			N/A
4. Vegetative cover.			
a. Is perimeter fence or mesh fencing damaged?		✓	
b. Is there evidence of horses or rabbits on site?		✓	
c. Is organic mulch and/or plants adequate to prevent erosion?	✓		
d. Are weedy annual plants present? If yes, are they a problem?		✓	
e. Are seeded plant species found on site?	✓		
f. Is there evidence of plant mortality?		✓	
5. Photo Documentation			
a. Has a photo log been prepared?	✓		
c. Number of photos exposed (5)			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		✓	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		✓	
3. Are existing maintenance/repair actions satisfactory?	✓		
4. Is other maintenance/repair necessary?		✓	
5. Is current status/condition of vegetative cover satisfactory?	✓		

6. Rationale for field conclusions: The fencing, signs, and chicken wire are in a good condition. Crack repairs that were performed in Feb. 2006 are satisfactory.

E. CERTIFICATION

I have conducted an inspection of the UC-1 Cental Mud Pit Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Glenn Richardson Printed Name: Glenn Richardson

Title: Tech M[illegible] Date: [illegible]

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 12/7/05	Reason for Last Inspection: Quarterly
Responsible Agency: Bechtel Nevada Environmental Restoration	Project Manager: Jeff Smith

Inspection Date: 4/19/06

Inspector (name, title, organization): Glenn Richardson, Task Manager, BN-Environmental Restoration

Assistant Inspector (name, title, organization): N/A

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
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4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. **PREPARATION** (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	✓		
2. Previous inspection reports reviewed.	✓		
a. Were anomalies or trends detected on previous inspections?		✓	
b. Was maintenance performed?		✓	
3. Site maintenance and repair records reviewed.	✓		
a. Has site repair resulted in a change from as-built conditions?		✓	N/A
b. Are revised as-builts available that reflect repair changes?			N/A

C. **SITE INSPECTION** (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		✓	
b. Are there any new roads or trails?		✓	
c. Has there been a change in the position of nearby washes?		✓	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		✓	
e. Are there new drainage channels?		✓	
f. Change in surrounding vegetation?		✓	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		✓	
b. Have any signs been damaged or removed? (Number of signs replaced: _____)		✓	
c. Were gates locked?			N/A

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		✓	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		✓	
3. Are existing maintenance/repair actions satisfactory?	✓		
4. Is other maintenance/repair necessary?		✓	
5. Is current status/condition of unit satisfactory?			

6. Rationale for field conclusions: The monuments, signs, and covered areas are in good condition.

E. CERTIFICATION

I have conducted an inspection of UC-3, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Glenn Richardson	Printed Name: Glenn Richardson
Title: Task Manager	Date: 4/19/06

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 12/7/05	Reason for Last Inspection: Quarterly
Responsible Agency: Bechtel Nevada Environmental Restoration	Project Manager: Jeff Smith
Inspection Date: 4/19/06	
Inspector (name, title, organization): Glenn Richardson, Task Manager, BN-Environmental Restoration	
Assistant Inspector (name, title, organization): N/A	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	✓		
2. Previous inspection reports reviewed.	✓		
a. Were anomalies or trends detected on previous inspections?	✓		Soil erosion rills have been identified on previous inspections.
b. Was maintenance performed?	✓		Erosion rill repairs were performed in Nov. 2005.
3. Site maintenance and repair records reviewed.	✓		
a. Has site repair resulted in a change from as-built conditions?		✓	
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		✓	
b. Are there any new roads or trails?		✓	
c. Has there been a change in the position of nearby washes?		✓	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		✓	
e. Are there new drainage channels?	✓		A large significant erosion rill was discovered on the southeast corner of the cap.
f. Change in surrounding vegetation?		✓	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		✓	
b. Have any signs been damaged or removed? (Number of signs replaced: _____)		✓	Signage remains legible, but are beginning to peel due to weathering.
c. Were gates locked?	✓		

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion around the cap (wind or water)?	✓		A large erosion rill was discovered on the southeast corner of Mudpit C cover.
d. Is there evidence of animal burrowing?		✓	
e. Have the site markers been disturbed by man or natural processes?		✓	
f. Is there vegetation on the cover?		✓	This is a non-vegetative cover. No evidence of vegetation.
g. Do natural processes threaten to integrity of any cover or site marker?		✓	
h. Other?			N/A

4. Photo Documentation			
a. Has a photo log been prepared?	✓		
c. Number of photos exposed (4)			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		✓	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		✓	
3. Are existing maintenance/repair actions satisfactory?	✓		
4. Is other maintenance/repair necessary?	✓		Erosion rill on the southeast corner needs repair within 90 days.
5. Is current status/condition of vegetative cover satisfactory?			N/A - UC-4 site has a non-vegetative cover.

6. Rationale for field conclusions:

Fencing, monuments, and signage are in good condition. Signs are beginning to peel due to weathering, but they are still legible to identify the site description and hazard impact. Erosion rill repairs for UC-4 Mudpit C (southeast corner) are required within 90 days.

E. CERTIFICATION

I have conducted an inspection of the UC-4 Mud Pit C Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Inspection Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Glenn Richardson	Printed Name: Glenn Richardson
Title: Task Manager	Date: 4/19/06

TITLE

Work continued from Page N/A

4/19/06

Quarterly CNTA Inspections + Subsidence Surveys

BN Personnel:

TM: Glenn Richardson

TL: Dudley Emer

TL: Ben McGee

BN Surveyors: Kieth Chaffin
Juan Lucero

Equipment: Camera, Satellite Transmitter, Uplink Unit
Satellite Phones

Weather: Sunny, Clear - No Clouds, 50+ degrees, 5-10 mph wind

Surveyors completed surveys for UC-4 on 4/18/06.

Scope: Perform CNTA Inspections, subsidence surveys, and replace "loaner" satellite transmitter unit with a new satellite transmitter unit (purchased in Feb. 2006).

6:45AM - Ended Breakfast / Picked up Lunch / Re-fueled
7:05AM - Left Tonopah in route to CNTA
8:40AM - Arrived at CNTA UC-1

8:45AM
Tailgate: Cold Stress; Slips, Trips, Fall Hazards; Biological Hazards
Buddy System, Communications (Satellite Phone)

8:55AM - Prep for Satellite Transmitter Unit Replacement + Data Download
Surveyors started Subsidence surveys
Began UC-1 Inspections
9:35AM - Completed UC-1 Inspections and took 1 photo (Note: Made a decision to assist with satellite transmitter replacement and take photos afterwards.)
10:20AM - Completed Prep for Data Download
10:27AM - Remotely collected data from satellite uplink
10:32AM - Replaced Loaner Unit with New Transmitter Unit
10:47AM - Downloaded GPS Almanac and Synchronized Time Clock
A Real Time Clock has been established

10:55AM - New Satellite Transmitter Unit is functioning properly.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Made in USA

Work continued to Page

SIGNATURE Glenn Richardson

DATE 4/19/06

11:00 AM - Performed general housekeeping and sealed vault with plastic sheeting and native soil

11:18 AM - Glenn took UC-1 photos after Sat-com area was restored.

11:25 AM - Left UC-1 site heading to UC-4. (Dudley, Ben, + Glenn)

11:37 AM - Approached washout area on main road to UC-4.

11:46 AM - Filled in driveable pathway with rocks and large stones.

11:55 AM - Arrived at UC-4 to perform inspections. Dudley and Ben headed back to Mercury Surveyors currently remain at the UC-1 site to continue subsidence surveys.

12:00 PM - Glenn will conduct inspection and take photos. Glenn will rendezvous with surveyors within 30 min. - 1 hr. If not, surveyors have been instructed to come to UC-4, to maintain buddy system.

12:40 PM - Completed inspections and took photos of UC-4. Noticed a significant erosion rill on the southeast corner of the cover. The erosion rill an immediate follow-up action for repair. Also, noticed evidence of small minor erosion rills forming on the west edge of the cover near the gate entrance. The small erosion rills are minor and do not require an immediate follow-up action. However, keep an eye on the minor rills for any advanced development. Also, noticed that signs are peeling due to weathering.

12:45 PM - Left UC-4 site and returning to UC-1.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Made in USA

Work continued to Page

SIGNATURE Glenn Richardson

DATE 4/19/06

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

1:00 PM Returned to UC-1. Surveyors are continuing with subsidence surveys.

1:35 PM Surveyors completed subsidence surveys at UC-1.

1:40 PM Contacted ER Mgmt to provide an updated status. (Tom, Reed, Brian, + Dave)

1:45 PM Locked gate at UC-1 and left the site heading to UC-3.

1:57 PM Arrived at UC-3 to perform inspections.

2:00 PM Drove by monuments near access road. Monuments are in good condition. Signage is legible and in good condition. There are no issues at this site.

2:20 PM Leaving UC-3 and heading back to Tonopah.

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 4/19/06	Reason for Last Inspection: QUARTERLY
Responsible Agency: NNSA/NSO & BN ER	Project Manager: KEVIN CABBLE
Inspection Date: 6/27/06	
Inspector (name, title, organization): SHAUGHN BURNISON TECH LEAD BECHTEL NEVADA ER	
Assistant Inspector (name, title, organization): GLENN RICHARDSON TASK MGR BECHTEL NEVADA ER	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
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5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?			N/A
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	
b. Have any signs been damaged or removed? (Number of signs replaced: _____)		X	
c. Were gates locked?	X		

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE MONITORING CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?		X	
b. Is there cracking?	X		PREVIOUSLY REPAIRED, NO NEW
c. Is there evidence of erosion around the cap (wind or water)?		X	
d. Is there evidence of animal burrowing?		X	
e. Have the site markers been disturbed by man or natural processes?		X	
f. Do natural processes threaten to integrity of any cover or site marker?		X	
g. Other?			N/A
4. Vegetative cover.			
a. Is perimeter fence or mesh fencing damaged?		X	
b. Is there evidence of horses or rabbits on site?	X		OUTSIDE FENCE ONLY
c. Is organic mulch and/or plants adequate to prevent erosion?	X		
d. Are weedy annual plants present? If yes, are they a problem?		X	
e. Are seeded plant species found on site?	X		
f. Is there evidence of plant mortality?		X	
5. Photo Documentation			
a. Has a photo log been prepared?	X		
c. Number of photos exposed (5) W ~~NW~~ ~~NE~~ E			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	
5. Is current status/condition of vegetative cover satisfactory?	X		

6. Rationale for field conclusions: Thoroughly walked site, fence line, inspected infrastructure & signage. No deficiencies – excellent condition.

E. CERTIFICATION

I have conducted an inspection of the UC-1 Cental Mud Pit Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Shaughn A Burnison Chief Inspector's Signature:	SHAUGHN A. BURNISON Printed Name:
Title: TECH LEAD	Date: 6/27/06

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 4/19/06	Reason for Last Inspection: QUARTERLY
Responsible Agency: NNSA/NSO & BN ER	Project Manager: KEVIN CABBLE
Inspection Date: 6/27/06	
Inspector (name, title, organization): SHAUGHN BURNISON TECH LEAD BN ENV. RESTORATION	
Assistant Inspector (name, title, organization): GLENN RICHARDSON TSK MGR BN ENV. RESTORATION	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
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6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?		X	N/A
b. Are revised as-builts available that reflect repair changes?		X	N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	
b. Have any signs been damaged or removed? (Number of signs replaced: _____)		X	
c. Were gates locked?		X	N/A

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	
5. Is current status/condition of unit satisfactory?		X	
6. Rationale for field conclusions:			

E. CERTIFICATION

I have conducted an inspection of UC-3, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Shaughn A Burnison	Printed Name: SHAUGHN A. BURNISON
Title: TECH LEAD	Date: 6/27/06

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 4/19/06	Reason for Last Inspection: QUARTERLY
Responsible Agency: NNSA / NSO & BN ER	Project Manager: KEVIN CABBLE
Inspection Date: 6/27/06	
Inspector (name, title, organization): SHAUGHN BURNISON TECH LEAD BN ER	
Assistant Inspector (name, title, organization): GLENN RICHARDSON TASK MGR BN ER	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?	X		EROSION GULLY ON SE CORNER
b. Was maintenance performed?	X		REPAIR OF GULLY
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?		X	
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	
b. Have any signs been damaged or removed? (Number of signs replaced: 0)		X	
c. Were gates locked?	X		

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?		X	
b. Is there cracking?		X	
c. Is there evidence of erosion around the cap (wind or water)?		X	REPAIRS HAVE HELD WELL. NO ADDITIONAL EROSION
d. Is there evidence of animal burrowing?		X	
e. Have the site markers been disturbed by man or natural processes?		X	
f. Is there vegetation on the cover?	X		SMALL, YOUNG, BRUSH & RABBIT GRASS SPARSELY DISTRIBUTED ON COVER.
g. Do natural processes threaten to integrity of any cover or site marker?		X	
h. Other?			N/A

4. Photo Documentation			
a. Has a photo log been prepared?	X		
c. Number of photos exposed ( )			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	
5. Is current status/condition of vegetative cover satisfactory?	X		

6. Rationale for field conclusions: WALKED COVER & FENCE. ALL SIGNS (BUT ONE) ARE LEGIBLE AND GOOD CONDITION. FENCE IN GOOD CONDITION. GATE LOCKED. REPAIRS & BERMS INTACT. COVER IN EXCELLENT CONDITION.

E. CERTIFICATION

I have conducted an inspection of the UC-4 Mud Pit C Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Inspection Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Shaughn A. Burnison	Printed Name: SHAUGHN A. BURNISON
Title: TECH LEAD	Date: 6/27/06

CNTA POST-CLOSURE MONITORING INSPECTION - JUNE 2006

PERSONNEL - TM: GLENN RICHARDSON
TL: SHAUGHN BURNISON
GEO-ENG: GREG DOYLE
DAN TOBIASON

EQUIPMENT: DIGITAL CAMERA

WEATHER: HAZY & HUMID, HOT 80s, CALM.

TAILGATE: COMMS, EMER. PROCS, NEAREST HELP, MED FACILITIES (TONOPAH), SNAKES, CRITTERS, SLIPS/TRIPS, WATCH CRACKS, SHARP EDGES

SCOPE: POST-CLOSURE MONITORING INSPECTIONS. WITH PHOTOS.

ACTIVITIES: 10:00 AM ARRIVE UC-1 CENTRAL MUD PIT.
FRAGRANT HUMID AIR; GATE LOCKED, TAILGATE GIVEN.
10:25 AM GREG DOYLE ARRIVES with DAN TOBIASON.
10:30 AM - 11:00 AM WALK COVER, FENCELINE. TAKE 5 PHOTOS.
FM PHOTO PT.... W, NW, N, NE, E
PLANTS & VEGETATION IN EXCELLENT CONDITION. NO DEFICIENCIES NOTED IN COVER, FENCE, SIGNAGE OR OTHER STRUCTURES, MONUMENTS ETC. UC-1 CENTRAL MUD PIT IN EXCELLENT CONDITION. PLEASE SEE INSPECTION CHECKLIST FOR ADDITIONAL INFO.

11:40 AM UC-4 MUDPITS A, B, & C. GATE LOCKED. WALKED COVER. NO CRACKING. EROSION RILL REPAIRS & BERMS IN GOOD CONDITION & HOLDING. PHOTOS TAKEN - EROSION RILL/BERM REPAIR, CTR → WEST, CTR → EAST, SE CORNER → NW. HEALTHY BRUSH ON SLOPES. VERY SMALL, YOUNG BRUSH & RABBIT GRASS GROWING ON COVER. SITE MONUMENTS ON MUDPITS A & C IN GOOD CONDITION. OVERALL SITE IN EXCELLENT CONDITION.

146 TITLE CNTA INSPECTIONS

PROJECT NO. CAU ~~[illegible]~~ 417

BOOK NO.

Work continued from Page 145

ACTIVITIES CONTINUED:

13:05 ARR UC-3 – WALK AREA. MONUMENTS IN GOOD CONDITION (WITH SOME WEATHERING ON THE TOPS OF SOME OF THE OLDER MONUMENTS). PAINT IN GOOD CONDITION & SIGNS LEGIBLE. NO SIGNIFICANT CHANGES NOTED FROM PREVIOUS INSPECTIONS. NO PHOTOS REQUIRED.

13:35 DEPART SITE FOR LAS VEGAS.

INSPECTIONS COMPLETED

6/27/06

ENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Made in USA

Work continued to Page NA

SIGNATURE

DATE 6/27/06

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 06/27/06	Reason for Last Inspection: QUARTERLY
Responsible Agency: NNSA	Project Manager: JOHN JONES
Inspection Date: 09/20/2006	
Inspector (name, title, organization): SHAUGHN BURNISON, FIELD SUPPORT TECH LEAD, NSTEC ENV. RESTORATION	
Assistant Inspector (name, title, organization): GLENN RICHARDSON, TASK MGR, NSTEC ENV. RESTORATION	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?		X	
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	
b. Have any signs been damaged or removed? (Number of signs replaced: 0)		X	
c. Were gates locked?	X		LOCK IS FAULTY - WILL NOT OPEN

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE MONITORING CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?		X	NO NEW SETTLING
b. Is there cracking?		X	NO NEW CRACKS
c. Is there evidence of erosion around the cap (wind or water)?		X	
d. Is there evidence of animal burrowing?	X		A FEW GOPHER OR SMALL RODENT BURROWS WERE NOTED.
e. Have the site markers been disturbed by man or natural processes?		X	
f. Do natural processes threaten to integrity of any cover or site marker?	X		QUICKSET REINFORCEMENT MATERIAL AROUND BRASS MARKERS ON MONUMENTS NEEDS RENEWAL - MOST HAS CRACKED OFF.
g. Other?		X	
4. Vegetative cover.			
a. Is perimeter fence or mesh fencing damaged?		X	
b. Is there evidence of horses or rabbits on site?	X		A SMALL AMOUNT OF RABBIT SCAT WAS NOTED.
c. Is organic mulch and/or plants adequate to prevent erosion?	X		
d. Are weedy annual plants present? If yes, are they a problem?		X	
e. Are seeded plant species found on site?	X		
f. Is there evidence of plant mortality?	X		SEASONAL
5. Photo Documentation			
a. Has a photo log been prepared?	X		

c. Number of photos exposed (5) FR CIR SOUTH LOOKING W, NW, N, NE, E

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?	X		BRASS MARKER QUICKSET REPLACEMENT
5. Is current status/condition of vegetative cover satisfactory?	X		

6. Rationale for field conclusions: WALKED COVER & FENCELINE WITH THE EXCEPTION OF QUICKSET (THINSET) ADHESIVE MATERIAL AROUND SURVEY MARKERS WHICH IS TO BE RENEWED, SITE IS IN EXCELLENT CONDITION.

E. CERTIFICATION

I have conducted an inspection of the UC-1 Cental Mud Pit Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Shaughn A. Burnison	Printed Name: SHAUGHN A. BURNISON
Title: FIELD SUPPORT TECH LEAD	9/20/2006

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 6/27/06	Reason for Last Inspection: QUARTERLY
Responsible Agency: NNSA	Project Manager: JOHN JONES
Inspection Date: 9/20/2006	
Inspector (name, title, organization): SHAUGHN BURNISON, FIELD SUPPORT TECH LEAD, NSTEC ENV. RESTORATION	
Assistant Inspector (name, title, organization): GLENN RICHARDSON, TASK MGR, NSTEC ENVIRONMENTAL RESTORATION	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?		X	
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	
b. Have any signs been damaged or removed? (Number of signs replaced: Ø)		X	
c. Were gates locked?			N/A

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	
5. Is current status/condition of unit satisfactory?	X		

6. Rationale for field conclusions: SITE WALK DOWN - NO ISSUES & CONCERNS.

E. CERTIFICATION

I have conducted an inspection of UC-3, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Shaughn A Burnison	Printed Name: SHAUGHN BURNISON
Title: FIELD SUPPORT TECH LEAD	Date: 9/20/2006

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 6/27/06	Reason for Last Inspection: QUARTERLY
Responsible Agency: NNSA	Project Manager: ~~KEVIN~~ JOHN JONES
Inspection Date: 9/20/06	
Inspector (name, title, organization): SHAUGHN BURNISON, FIELD SUPPORT TECH LEAD, NSTEC ER	
Assistant Inspector (name, title, organization): GLENN RICHARDSON, TASK MGR, NSTEC ER	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
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5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.			
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?			N/A
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	
b. Have any signs been damaged or removed? (Number of signs replaced: 0)		X	
c. Were gates locked?	X		

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?		X	
b. Is there cracking?		X	
c. Is there evidence of erosion around the cap (wind or water)?	X		TWO SMALL RILLS NOTICED, ONE EA ON N SIDE & S SIDE
d. Is there evidence of animal burrowing?		X	
e. Have the site markers been disturbed by man or natural processes?		X	
f. Is there vegetation on the cover?	X		SMALLISH (8") DESERT BRUSH W/ SEASONAL MORTALITY ON COVER. NOT YET ACTIONABLE
g. Do natural processes threaten to integrity of any cover or site marker?		X	
h. Other?		X	
4. Photo Documentation			
a. Has a photo log been prepared?	X		
c. Number of photos exposed (3) CTR WEST, CTR EAST, SE LOOKING WNW			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	
5. Is current status/condition of vegetative cover satisfactory?	X		

6. Rationale for field conclusions: WALKED SITE. FENCING, SIGNS, MONUMENTS ALL IN GOOD CONDITION, WITH SOME NORMAL WEAR. NO ACTIONABLE RILLS. BRUSH ON COVER RELATIVELY SPARSE. GENERALLY GOOD CONDITION WITH NO SIGNIFICANT CONCERNS.

E. CERTIFICATION

I have conducted an inspection of the UC-4 Mud Pit C Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Inspection Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Shaughn A Burnison	Printed Name: SHAUGHN BURNISON
Title: FIELD SUPPORT TECH LEAD	Date: 9/20/2006

CNTA POST CLOSURE INSPECTIONS - SEPTEMBER 2006

PERSONNEL: TM: GLENN RICHARDSON
TL: SHAUGHN BURNISON
GEO ENG.: GREG DOYLE
DAN TOBIASON

EQPT: DIGITAL CAMERA

WEATHER: PTLY CLOUDY, 50s, WINDY w/ GUSTS TO 20 MPH

TAILGATE: PPE, COMMS, EMER. PROCS., NEAREST HELP, MEDICAL (TONOPAH)
SLIPS/TRIPS, SHARP EDGES, WEATHER AWARENESS

SCOPE: POST CLOSURE MONITORING INSPECTIONS w/ PHOTOS

ACTIVITIES: ARRIVED UC-4 @ 10:30 AM REVIEWED FORMER PCM DOCUMENT. WALKED COVER & FENCELINE MUDPIT C, WALKED MONUMENT LINES MUDPITS A & B. MONUMENTS SHOW SOME WEAR ON PAINT & CONCRETE SIGNS LEGIBLE WITH SOME WEAR. GATE & FENCING IN GOOD CONDITION. MUCH HEALTHY SAGEBRUSH THROUGHOUT ENTIRE AREA, IN BLOOM. BRUSH GROWTH ON COVER SMALLISH (≤ 8") & RELATIVELY SPARSE; AND EXHIBITING SEASONAL MORTALITY. LARGE BRUSH ON COVER SLOPES.

- THREE PHOTOS TAKEN: 1) CTR LOOKING WEST 2) CENTER LUG EAST 3) SE CORNER LOOKING WNW. SITE OVERALL IN GOOD CONDITION. BRUSH CLEARING ACTIVITIES MAY BE REQUIRED FOR COVER TOP NEXT SPRING OR SUMMER.

ARRIVED UC-1 @ 11:20 AM. TWO NSTEC SURVEYORS ON-SITE PERFORMING SEMI-ANNUAL SUBSIDENCE SURVEY. GATE LOCK WILL NOT OPEN. ENTRY BY STEPPING OVER GATE. WALKED COVER. WALKED & DROVE FENCELINE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Made in USA

Work continued to Page 148

SIGNATURE Shaughn A Burnison DATE 9/20/2006

Work continued from Page 147

COVER IN EXCELLENT CONDITION. NO NEW SETTLING CRACKS. PREVIOUSLY REPAIRED CRACKS ARE HOLDING WELL. VEGETATION PROLIFIC & ESTABLISHED. SOME SMALL ANIMAL BURROWS NOTICED, BUT FEW IN NUMBER. FENCING & SIGNS IN EXCELLENT CONDITION.

- FIVE PHOTOS TAKEN FROM CENTER SOUTH EDGE PHOTO POINT: LOOKING W, NW, N, NE, & E. OVERALL EXCELLENT CONDITION!
- ACTION ITEMS - THINSET MARKER REINFORCEMENT REPLACEMENT BY SURVEYORS NEXT TIME (MARCH '07) & LOCK REPLACEMENT (WILL NOT OPEN... MAY NEED TO CUT OFF)

ARRIVE UC-3 @ 12:40 PM. WALK SITE, VIEW SIGNS & MONUMENT CONDITION. SITE IN GENERALLY GOOD CONDITION. NO ISSUES OR CONCERNS

INSPECTIONS COMPLETED

S Bu

IENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Made in USA

Work continued to Page NA

SIGNATURE Shawn A. Bu

DATE 9/20/06

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 9/20/2006	Reason for Last Inspection: Quarterly
Responsible Agency: NNSA	Project Manager: Pete Sanders
Inspection Date: 12/05/06	
Inspector (name, title, organization): Glenn Richardson, Task Manager, NSTec ER	
Assistant Inspector (name, title, organization): Dudley Emer, Sr. Scientist, NSTec ER	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
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5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?		X	
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?	X		The TDR nest has approximately 30% vegetative coverage and might need attention in the future. A vegetative survey is planned in the spring of 2007.
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	The aboveground monuments near UC1 are in good condition.
b. Have any signs been damaged or removed? (Number of signs replaced: 4)	X		There were 4 UR signs on the aboveground monuments that are not legible and need replacement.
c. Were gates locked?	X		Gate was locked; however, the lock was jammed while attempting entry into the site and might require replacement in the future.

CAU 417: CNTA UC-1 CENTRAL MUD PIT COVER, POST-CLOSURE MONITORING CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?	X		Evidence of settlement was noticed approx. 20 feet west of the new crack.
b. Is there cracking?	X		A new crack was discovered, approx. 15 feet long and 4-6 inches in depth.
c. Is there evidence of erosion around the cap (wind or water)?		X	
d. Is there evidence of animal burrowing?		X	
e. Have the site markers been disturbed by man or natural processes?		X	
f. Do natural processes threaten to integrity of any cover or site marker?		X	
g. Other?		X	
4. Vegetative cover.			
a. Is perimeter fence or mesh fencing damaged?		X	
b. Is there evidence of horses or rabbits on site?		X	
c. Is organic mulch and/or plants adequate to prevent erosion?	X		
d. Are weedy annual plants present? If yes, are they a problem?		X	
e. Are seeded plant species found on site?	X		
f. Is there evidence of plant mortality?	X		Seasonal
5. Photo Documentation			
a. Has a photo log been prepared?	X		
c. Number of photos exposed (5)			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?	X		The TDR precipitation gauge is non-functional and needs to be refilled with glycol.
5. Is current status/condition of vegetative cover satisfactory?	X		The vegetative coverage at the TDR nest will be monitored in the spring of 2007.

6. Rationale for field conclusions: The surface monuments and overall vegetation on the cover are in good condition. A new crack was identified, approx. 15 ft. long with an approx. depth of 4 to 6 inches. Also, evidence of settlement was noticed approx. 20 ft. west of the new crack. Photo documentation was taken of the new crack. A preventive maintenance check was performed on the TDR unit that requires the precipitation gauge to be refilled with glycol.

E. CERTIFICATION

I have conducted an inspection of the UC-1 Cental Mud Pit Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Glenn Richardson	Printed Name: Glenn Richardson
Title: Task Manager	Date: 12/05/06

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 9/20/2006	Reason for Last Inspection: Quarterly
Responsible Agency: NNSA	Project Manager: Pete Sanders
Inspection Date: 12/05/06	
Inspector (name, title, organization): Glenn Richardson, Task Manager, NSTec ER	
Assistant Inspector (name, title, organization): Dudley Emer, Sr. Scientist, NSTec ER	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?		X	
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	The aboveground monuments are in good condition.
b. Have any signs been damaged or removed? (Number of signs replaced: 6)	X		There are 6 small UR signs on the aboveground monuments that were not legible and need replacement.
c. Were gates locked?			N/A

CAU 417: CNTA UC-3, POST-CLOSURE INSPECTION CHECKLIST

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	
5. Is current status/condition of unit satisfactory?	X		

6. Rationale for field conclusions: The aboveground monuments at UC-3 are in good conditions however; there are 6 use restriction signs (approx. 12"x12") on the aboveground monuments that need replacement. Photo documentation was taken to confirm the need for new signage.

E. CERTIFICATION

I have conducted an inspection of UC-3, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Glenn Richardson	Printed Name: Glenn Richardson
Title: Task Manager	Date: 12/05/06

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection: 9/20/2006	Reason for Last Inspection: Quarterly
Responsible Agency: NNSA	Project Manager: Pete Sanders
Inspection Date: 12/05/06	
Inspector (name, title, organization): Glenn Richardson, Task Manager, NSTec ER	
Assistant Inspector (name, title, organization): Dudley Emer, Sr. Scientist, NSTec ER	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35 mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	X		
2. Previous inspection reports reviewed.	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
3. Site maintenance and repair records reviewed.	X		
a. Has site repair resulted in a change from as-built conditions?			N/A
b. Are revised as-builts available that reflect repair changes?			N/A

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been a change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?	X		A new erosion rill has developed along the east edge of the soil cover.
f. Change in surrounding vegetation?		X	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		X	
b. Have any signs been damaged or removed? (Number of signs replaced: 2)	X		One large UR sign is not legible and needs replacement. One smaller UR sign on the aboveground monuments near UC-4 needs replacement.
c. Were gates locked?	X		

CAU 417: CNTA UC-4 MUD PIT C COVER, POST-CLOSURE INSPECTION CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?		X	
b. Is there cracking?		X	
c. Is there evidence of erosion around the cap (wind or water)?	X		A new erosion rill developed along the east edge of the soil cover.
d. Is there evidence of animal burrowing?		X	
e. Have the site markers been disturbed by man or natural processes?		X	
f. Is there vegetation on the cover?		X	
g. Do natural processes threaten to integrity of any cover or site marker?		X	
h. Other?		X	
4. Photo Documentation			
a. Has a photo log been prepared?	X		
c. Number of photos exposed (7)			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	
5. Is current status/condition of vegetative cover satisfactory?			N/A

6. Rationale for field conclusions: A new erosion rill was discovered along the east edge of the soil cover. Also, one large use restriction sign (approx. 30"x 30") on the southend of the fence and one smaller use restriction sign (approx. 12"x 12") on one of the aboveground monuments near UC-4 are not legible and need replacement.

E. CERTIFICATION

I have conducted an inspection of the UC-4 Mud Pit C Cover, CAU 417, at the Central Nevada Test Area in accordance with the Post-Closure Inspection Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature: Glenn Richardson	Printed Name: Glenn Richardson
Title: Task Manager	Date: 12/05/06

CNTA Post Closure Inspections - Dec. 5, 2006

Personnel: Glenn Richardson - NSTec
Dudley Emer - NSTec
Greg Doyle - NSTec Engineering
Paul Durr - SM Stoller
Melvin Madril - SM Stoller

Equipment: Digital Camera
Lap Top

Weather: Sunny, Mid-40's, Clear

Arrived at
9:15 AM - Performed Tailgate Safety Briefing
- Safety briefing was performed by Stoller personnel via JHA.

9:25 AM - Overview of UC-1 Map and provided UC-1 background information.

9:45 AM - Started UC-1 Inspection
- Noticed lock was jammed. Might need to replace.

10:40 AM - Noticed and identified evidence of new crack. Lateral extent of crack is approx. 15 feet. Crack was identified between survey marker #7 and TDR nest. (facing north)
- Also, noticed evidence of settlement approx. 20 ft. from new crack.

11:00 AM - Manually down loading TDR data. Examined instrumentation and noticed that the precip gauge is non-functional and needs to be refilled with glycol.

Surface monuments are in good condition.
Vegetation looks good.

TDR nest has 30% vegetative coverage. Possibly needs attention in the future.

11:25 AM - Completed UC-1 site Inspection. Transferred the gate keys to SM Stoller.
- Heading to aboveground monuments near UC-1. Inspection performed on signage and condition of aboveground monuments.

Identified 3 signs that ~~are damaged and~~ are not legible and need replacement. Small Size (12x12)

150 TITLE

Work continued from Page _____

PROJECT NO.

BOOK NO.

Aboveground monuments are in good condition.

11:35 AM - Drove by the emplacement hole and also identified the borrow pit that is used for maintenance/backfill of cracks and significant depressions.

- Drove to the 2nd UC-1 aboveground monument site and identified one sign that is not legible and needs replacement.
- Also drove to the groundwater monitoring wells near UC-1. Lock + cable is broken or cut off the well. It should be restored by responsible agency. Responsible agency needs to be notified.

11:55 AM - Heading to UC-4 to perform inspection.

12:10 PM - Arrived at UC-4.

- Erosion rill discovered on east edge of cover.
- 1 sign is not legible and needs replacement. (Size is large - 36 x 36)

12:40 PM - Left UC-4 site. Heading to UC-4 aboveground monument site. Identified 1 sign that is not legible and needs replacement. (Size is small 12x12).

12:45 PM - Heading to Moore Station.

12:51 PM - Heading to UC-3.

12:58 PM - Arrived at UC-3 and performed the inspection. Discovered 6 signs (size. small - 12x12) that are not legible and need replacement.

1:25 PM - Completed inspection w/ SM Stoller.

1:30 PM - Heading back to Mercury via Tonopah

Glen Richardson

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Made in USA

Work continued to Page _____

SIGNATURE Glen Richardson

DATE 12/5/06

PHOTOGRAPH LOG

PHOTOGRAPH	DATE	DESCRIPTION
1	12/07/2005	UC-1 Crack Before Repair
2	02/24/2006	UC-1 Crack After Repair
3	04/19/2006	First Quarterly Inspection, UC-1 From South Edge Looking West
4	04/19/2006	First Quarterly Inspection, UC-1 From South Edge Looking Northwest
5	04/19/2006	First Quarterly Inspection, UC-1 From South Edge Looking North
6	04/19/2006	First Quarterly Inspection, UC-1 From South Edge Looking Northeast
7	04/19/2006	First Quarterly Inspection, UC-1 From South Edge Looking East
8	04/19/2006	First Quarterly Inspection, UC-4 From Center Looking West
9	04/19/2006	First Quarterly Inspection, UC-4 Erosion Rill on Mud Pit C Cover
10	06/09/2006	UC-4 Erosion Rill Before Repair
11	06/09/2006	UC-4 Erosion Rill After Repair
12	06/27/2006	Second Quarterly Inspection, UC-1 From South Edge Looking West
13	06/27/2006	Second Quarterly Inspection, UC-1 From South Edge Looking Northwest
14	06/27/2006	Second Quarterly Inspection, UC-1 From South Edge Looking North
15	06/27/2006	Second Quarterly Inspection, UC-1 From South Edge Looking Northeast
16	06/27/2006	Second Quarterly Inspection, UC-1 From South Edge Looking East
17	06/27/2006	Second Quarterly Inspection, UC-4 From Center Looking West
18	09/20/2006	Third Quarterly Inspection, UC-1 From South Edge Looking West
19	09/20/2006	Third Quarterly Inspection, UC-1 From South Edge Looking Northwest
20	09/20/2006	Third Quarterly Inspection, UC-1 From South Edge Looking North
21	09/20/2006	Third Quarterly Inspection, UC-1 From South Edge Looking Northeast
22	09/20/2006	Third Quarterly Inspection, UC-1 From South Edge Looking East
23	09/20/2006	Third Quarterly Inspection, UC-4 From Center Looking West
24	12/05/2006	Fourth Quarterly Inspection, UC-1 From South Edge Looking West
25	12/05/2006	Fourth Quarterly Inspection, UC-1 From South Edge Looking Northwest
26	12/05/2006	Fourth Quarterly Inspection, UC-1 From South Edge Looking Northeast
27	12/05/2006	Fourth Quarterly Inspection, UC-1 From South Edge Looking East
28	12/05/2006	Fourth Quarterly Inspection, UC-4 From Center Looking West
29	12/05/2006	Fourth Quarterly Inspection, UC-1 Crack
30	12/05/2006	Fourth Quarterly Inspection, UC-4 Erosion Rill

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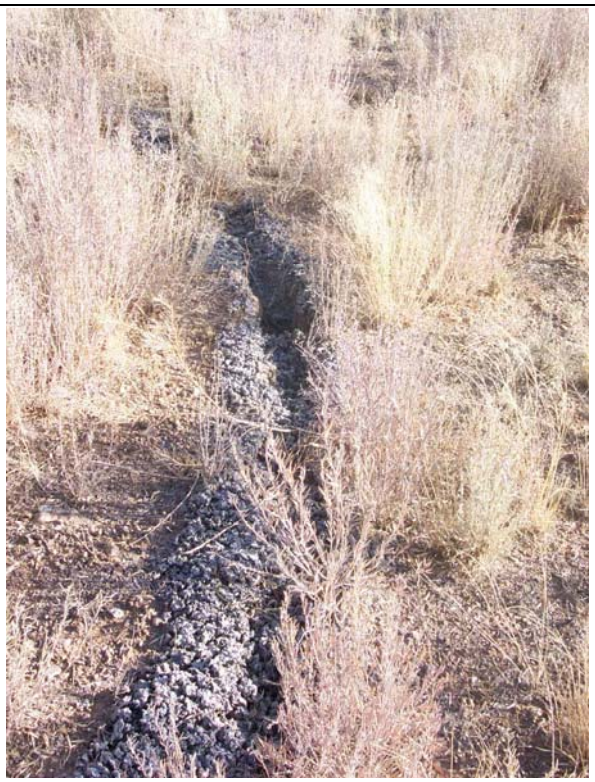


Photograph 1: UC-1 Crack Before Repair, 12/07/2005

Photograph 2: UC-1 Crack After Repair, 02/24/2006

Photograph 3: First Quarterly Inspection, UC-1 From South Edge Looking West, 04/19/2006

Photograph 4: First Quarterly Inspection, UC-1 From South Edge Looking Northwest, 04/19/2006

Photograph 5: First Quarterly Inspection, UC-1 From South Edge Looking North, 04/19/2006

Photograph 6: First Quarterly Inspection, UC-1 From South Edge Looking Northeast, 04/19/2006

Photograph 7: First Quarterly Inspection, UC-1 From South Edge Looking East, 04/19/2006

Photograph 8: First Quarterly Inspection, UC-4 From Center Looking West, 04/19/2006

Photograph 9: First Quarterly Inspection, UC-4 Erosion Rill on Mud Pit C Cover, 04/19/2006

Photograph 10: UC-4 Erosion Rill Before Repair, 06/09/2006

Photograph 11: UC-4 Erosion Rill After Repair, 06/09/2006

Photograph 12: Second Quarterly Inspection, UC-1 From South Edge Looking West, 06/27/2006

Photograph 13: Second Quarterly Inspection, UC-1 From South Edge Looking Northwest, 06/27/2006

Photograph 14: Second Quarterly Inspection, UC-1 From South Edge Looking North, 06/27/2006

Photograph 15: Second Quarterly Inspection, UC-1 From South Edge Looking Northeast, 06/27/2006

Photograph 16: Second Quarterly Inspection, UC-1 From South Edge Looking East, 06/27/2006

Photograph 17: Second Quarterly Inspection, UC-4 From Center Looking West, 06/27/2006

Photograph 18: Third Quarterly Inspection, UC-1 From South Edge Looking West, 09/20/2006

Photograph 19: Third Quarterly Inspection, UC-1 From South Edge Looking Northwest, 09/20/2006

Photograph 20: Third Quarterly Inspection, UC-1 From South Edge Looking North, 09/20/2006

Photograph 21: Third Quarterly Inspection, UC-1 From South Edge Looking Northeast, 09/20/2006

Photograph 22: Third Quarterly Inspection, UC-1 From South Edge Looking East, 09/20/2006

Photograph 23: Third Quarterly Inspection, UC-4 From Center Looking West, 09/20/2006

Photograph 24: Fourth Quarterly Inspection, UC-1 From South Edge Looking West, 12/05/2006

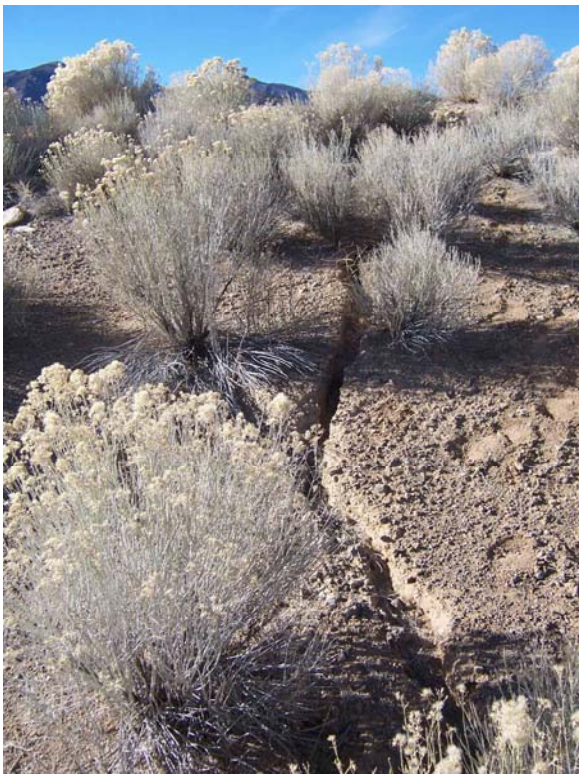
Photograph 25: Fourth Quarterly Inspection, UC-1 From South Edge Looking Northwest, 12/05/2006

Photograph 26: Fourth Quarterly Inspection, UC-1 From South Edge Looking Northeast, 12/05/2006

Photograph 27: Fourth Quarterly Inspection, UC-1 From South Edge Looking East, 12/05/2006

Photograph 28: Fourth Quarterly Inspection, UC-4 From Center Looking West, 12/05/2006

Photograph 29: Fourth Quarterly Inspection, UC-1 Crack, 12/05/2006



Photograph 30: Fourth Quarterly Inspection, UC-4 Erosion Rill, 12/05/2006

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PHOTOGRAPH LOG

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23	09/20/2006	Third Quarterly Inspection, UC-4 From Center Looking West
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30	12/05/2006	Fourth Quarterly Inspection, UC-4 Erosion Rill

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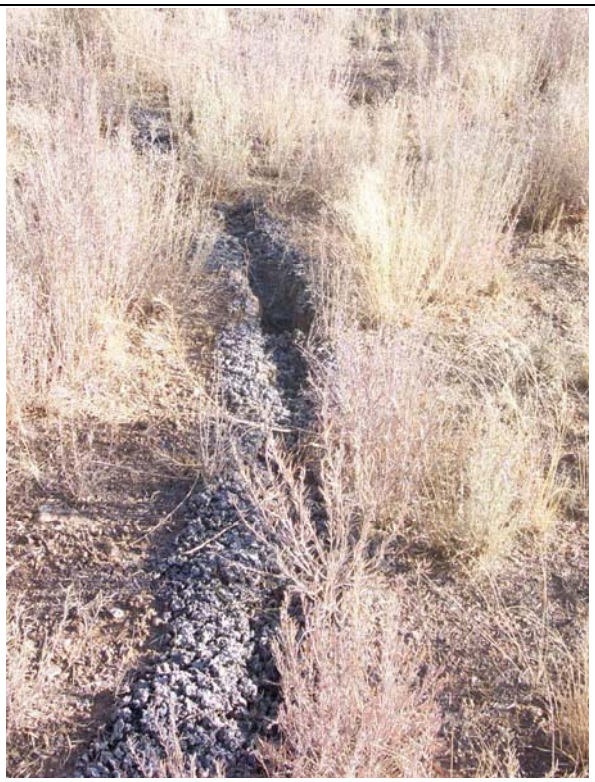

Photograph 1: UC-1 Crack Before Repair, 12/07/2005

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Photograph 3: First Quarterly Inspection, UC-1 From South Edge Looking West, 04/19/2006

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Photograph 5: First Quarterly Inspection, UC-1 From South Edge Looking North, 04/19/2006

Photograph 6: First Quarterly Inspection, UC-1 From South Edge Looking Northeast, 04/19/2006

Photograph 7: First Quarterly Inspection, UC-1 From South Edge Looking East, 04/19/2006

Photograph 8: First Quarterly Inspection, UC-4 From Center Looking West, 04/19/2006

Photograph 9: First Quarterly Inspection, UC-4 Erosion Rill on Mud Pit C Cover, 04/19/2006

Photograph 10: UC-4 Erosion Rill Before Repair, 06/09/2006

Photograph 11: UC-4 Erosion Rill After Repair, 06/09/2006

Photograph 12: Second Quarterly Inspection, UC-1 From South Edge Looking West, 06/27/2006

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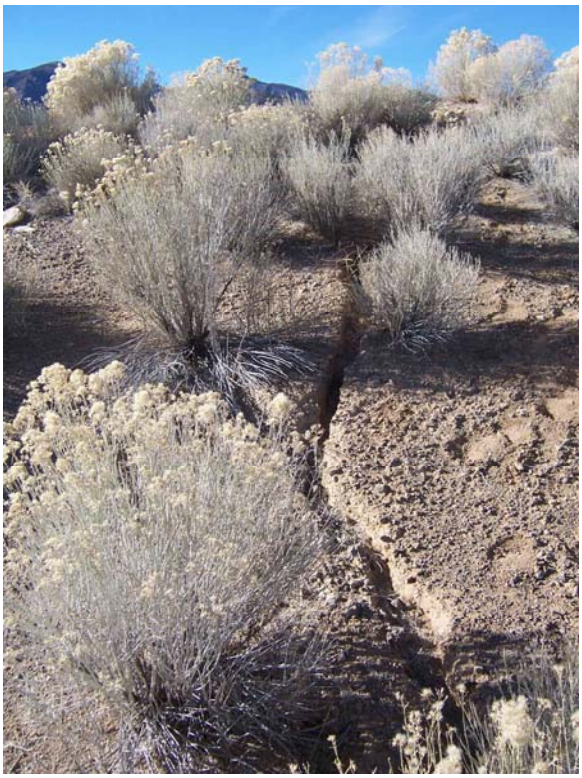

Photograph 30: Fourth Quarterly Inspection, UC-4 Erosion Rill, 12/05/2006

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Appendix B

Subsidence Survey Plats

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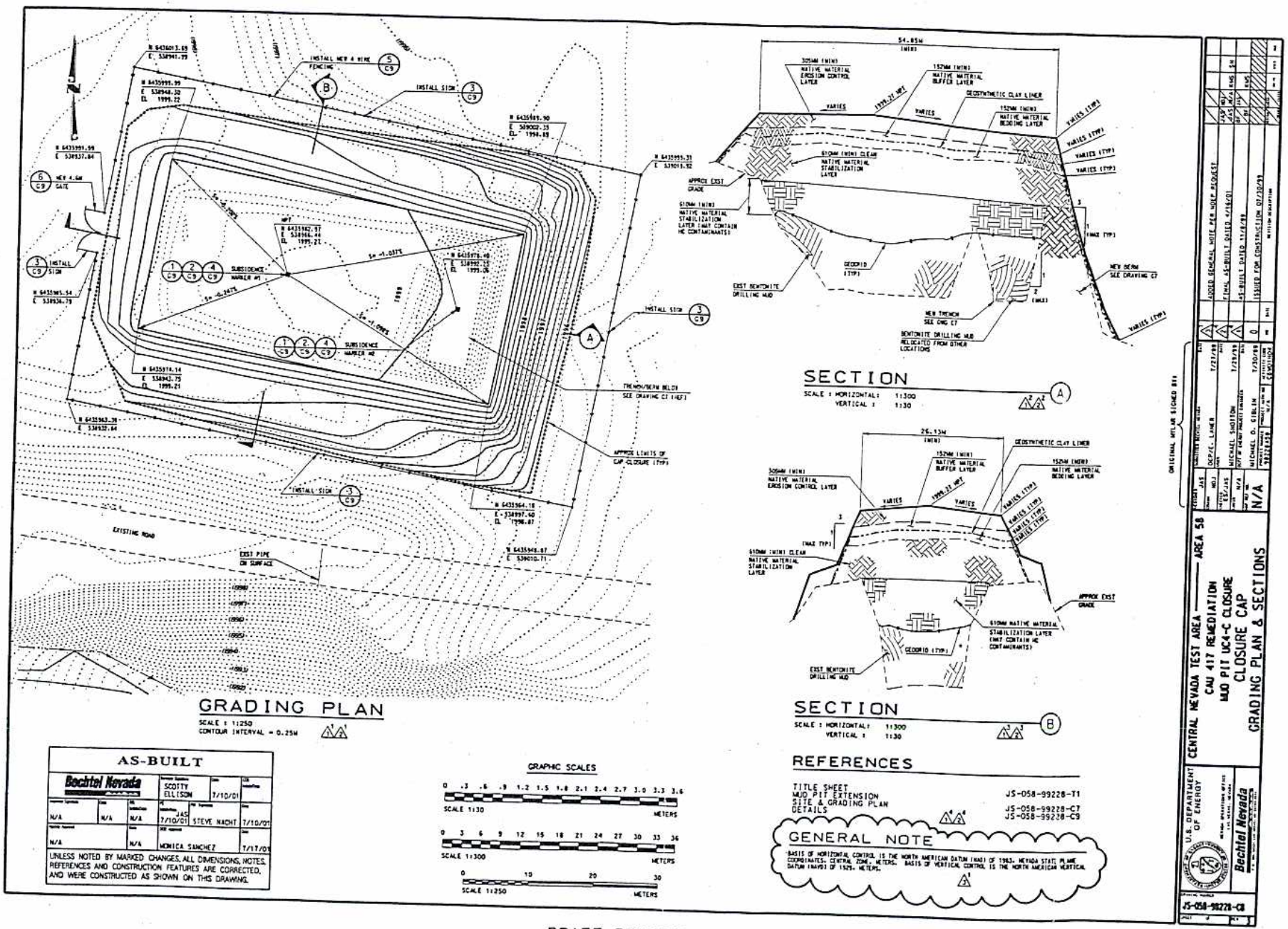

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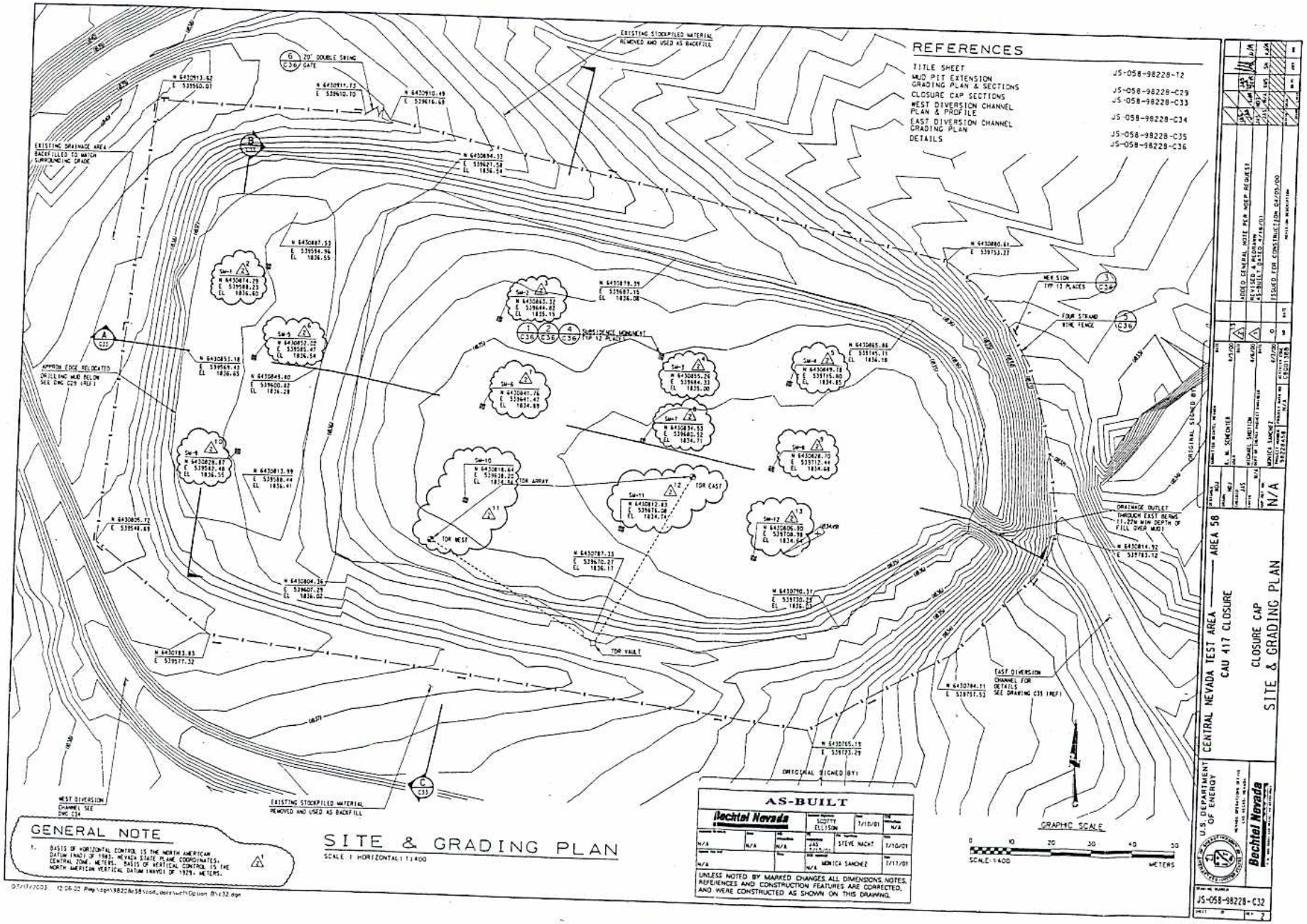

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Appendix C

Vegetation Monitoring Report

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Revegetation Success Monitoring

Central Nevada Test Area
Corrective Action Unit 417

Field Work Completed on
June 12, 2006

Report Prepared
by
Dave Anderson
Ecological Services

September 2006

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4.1.3 Plant Diversity C-7
4.2 ADJACENT AREA RESULTS C-7
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1.0 INTRODUCTION

Corrective Action Unit 417 is located at Central Nevada Test Area (CNTA) in the Hot Creek Valley of central Nevada. Hydrocarbon-impacted drilling mud and miscellaneous materials were cleaned up at several Corrective Action Sites in 2000. A soil cover was constructed over the UC-1 Central Mud Pit (CMP), and a fence was installed around its perimeter. The area fenced was approximately 2.0 hectares. Adjacent disturbances outside the fence to the south and west and a small area across the diversion channel to the southwest totaled about 1.5 hectares. In the fall of 2000, after cleanup activities were completed, the UC-1 CMP and adjacent disturbed areas were seeded with a mix of native plant species. The following spring, approximately 5,000 transplants were planted on the UC-1 CMP.

An evaluation of the success of the revegetation effort has been conducted annually since October 2001. The latest monitoring occurred on June 12, 2006. Vascular plant cover and plant density are estimated for areas revegetated in 2000 as well as for the native plant community adjacent to the site.

2.0 OBJECTIVES

The objective of this report is to document the reestablishment of native plant community on the UC-1 CMP and on the adjacent areas that were disturbed during construction activities. Plant cover and plant density on the revegetated sites are compared to the amount of cover and density on adjacent native plant communities to evaluate success of revegetation and determine if the site is returning to predisturbance conditions.

3.0 METHODS

Ten permanent transects are located on the CMP inside the fence. They are numbered consecutively from one to ten beginning on the west side. Each transect is approximately 50 meters long with a north-south orientation and spaced at approximately 20 meters. In addition, there are five transects located within the perimeter areas that were revegetated. Two 50-meter transects are located directly south of the fenced area, one 80-meter transect is parallel to the west fence, and two 40-meter transects are located across the channel to the south. Three permanent transects are in the native plant community directly north of the main access road across from the main gate of the CMP; data collected at these transects serve as a standard for evaluating revegetation success.

Plant cover is estimated using a cover point projection device. Plant density (the number of individual plants per square meter [m^2]) is estimated by placing a meter-square quadrant at given intervals along each permanently-marked transect. The number of individual plants found within the boundaries of each quadrant is counted and recorded. The data are then averaged to determine plant density per m^2.

Plant diversity is an indication of the species richness of the area and is derived from the density data. Plant diversity is calculated by determining the average number of unique plant species encountered along each transect.

4.0 RESULTS

4.1 UC-1 CMP Results

4.1.1 Plant Cover

Plant cover results are reported for the period 2003 through 2006 in Table 1. Sampling was completed in 2001 and 2002; however, data from these years are not comparable to the data collected from 2003 to 2006. In 2006, total plant cover increased by approximately 2 percent from 2003 and was only slightly lower than the highest percentage recorded in 2003. Shrub cover has remained at above 20 percent since the site was revegetated. From 2003 to 2004, shrub cover decreased from 26 percent to 21 percent, which was the beginning of a period of below average precipitation. In 2005 and 2006, shrub cover has been approximately 23 percent. Perennial grass cover increased from 3.4 percent to 4.7 percent from 2005 to 2006, a 38-percent increase. Grasses have shown a significant increase since 2004 due to above normal precipitation and improved growing conditions.

The amount of bare ground decreased in 2006, and the amount of litter increased. The amount of litter was high through 2003, primarily due to the straw mulch used during reseeding process. The straw mulch has since decomposed, and the amount of litter declined from 2003 to 2005. The increase in the amount of litter in 2006 may be the result of the recent increase in plant growth.

TABLE 1. PLANT COVER (%) ON UC-1 CMP AND REFERENCE AREA

	June 2003	June 2004	June 2005	June 2006	Reference Area	Standard
Shrubs	26.1	21.3	22.7	23.3	31.0	21.7
Grasses	2.3	1.3	3.4	4.7	3.3	2.3
Forbs/Annuals	0.0	0.6	0.4	0.0	0.0	0.0
Total Plant Cover	**28.4**	**23.2**	**26.5**	**28.0**	**34.3**	**24.0**
Bare Ground	30.0	46.9	47.4	40.9	46.7	--
Litter	42.0	30.0	26.1	31.2	19.0	--

4.1.2 Plant Density

Plant density results are reported for the period 2003 through 2006 in Table 2. The total plant density of perennial plants on the CMP decreased to14.3 plants per m^2 in 2006. The density of grasses in 2006 was comparable to 2005. The overall decline in plant density was a result of the decrease in the number of shrubs. Douglas' rabbitbrush declined by 28 percent. Other shrubs changed by less than 10 percent from 2005, which may be attributable to sampling error. Unlike the previous three years, no annual forbs were encountered in 2006.

TABLE 2. PLANT DENSITY (PLANTS PER M^2) ON UC-1 CMP AND REFERENCE AREA

		June 2003	June 2004	June 2005	June 2006	Reference Area	Standard
Shrubs	Big Sagebrush	6.6	4.0	2.6	2.4	2.3	--
	Fourwing Saltbush	5.3	5.5	3.0	3.3	0.0	--
	Douglas' Rabbitbrush	5.8	4.9	4.9	3.5	0.9	--
	Rubber Rabbitbrush	8.2	4.7	3.2	2.9	0.0	--
Total Shrubs		**25.9**	**19.1**	**13.7**	**12.0**	**3.2**	**2.2**
Grasses	Indian Ricegrass	3.1	2.3	1.7	1.8	0.1	--
	Threeawn	0.0	0.0	0.0	0.0	0.0	--
	Squirreltail	0.7	0.4	0.5	0.4	1.5	--
	Needle and Thread	0.0	0.0	0.0	0.0	0.0	--
	Galleta	0.0	0.0	0.0	0.1	2.3	--
Total Grasses		**3.8**	**2.7**	**2.1**	**2.3**	**4.0**	**2.8**
Total Forbs/Unseeded		**0.2**	**0.3**	**0.4**	**0.0**	**0.0**	**0.0**
Total Plant Density		**29.9**	**22.1**	**16.2**	**14.3**	**7.2**	**5.0**

Note: Scientific names of plants are listed in Attachment 1.

4.1.3 Plant Diversity

Plant diversity results are reported for the period 2003 through 2006 in Table 3. Plant diversity increased in 2006 from 2005. There was a slight increase in the number of shrubby species as well as grasses. No annual plants were encountered on the site in 2006.

TABLE 3. DIVERSITY OF PERENNIAL PLANT SPECIES ON UC-1 CMP AND REFERENCE AREA

	June 2003	June 2004	June 2005	June 2006	Reference Area
Average Number of Species per Quadrant	5.0	3.9	3.6	4.1	3.2
Shrubs	3.7	3.1	2.9	3.1	1.6
Grasses	1.3	0.8	0.7	1.0	1.6
Forbs/Unseeded	0.1	0.2	0.4	0.0	0.0

4.2 Adjacent Area Results

4.2.1 Plant Cover

Plant cover results for the perimeter of the CMP are reported for the period 2003 through 2006 in Table 4. Plant cover was at 20 percent in 2003, decreased to 17 percent in 2004 following a

period of low precipitation, and increased to its previous high of 20 percent in 2005. The vegetation outside the fenced area has been susceptible to browsing animals since reseeding occurred, and plant cover has been between 6 and 8 percent lower than on the fenced CMP. In 2006, the total average plant cover of the three perimeter areas was 25.6 percent, which is 8.5 percent lower than the total plant cover on the CMP. The percentage of grass cover was the same as in 2005, but the percentage of shrub cover nearly doubled from 2005 to 2006.

The amount of bare ground declined significantly in 2006, and litter increased proportionally. The amount of litter in 2006 is comparable to the amount of litter experienced after reseeding when the straw mulch was still present. The increase in 2006 is most likely in response to the increased plant growth since 2004.

TABLE 4. PLANT COVER (%) ON AREAS ADJACENT TO UC-1 CMP

	June 2003	June 2004	June 2005	June 2006	Reference Area	Standard
Shrubs	19.0	15.3	12.9	23.4	31.0	21.7
Grasses	1.0	0.5	0.8	0.8	3.3	2.3
Forbs/Annuals	0.0	0.9	6.2	1.4	0.0	0.0
Total Plant Cover	**20.0**	**16.7**	**20.0**	**25.6**	**34.3**	**24.0**
Bare Ground	39.0	57.6	60.0	36.0	46.7	--
Litter	41.0	28.7	20.0	38.4	19.0	--

4.2.2 Plant Density

Plant density results for the perimeter of the CMP are reported for the period 2003 through 2006 in Table 5. Total plant density was lower in 2006 than in 2005; however, it was higher in 2006 than in 2003 and 2004.

Shrub density on the perimeter areas has been continuously decreasing from 2003. Shrub density decreased by 27 percent from 2003 to 2004, by 17 percent from 2004 to 2005, and by 13 percent from 2005 to 2006. Fourwing saltbush and rubber rabbitbrush decreased by 17 percent and 33 percent, respectively, from 2005 to 2006. The density of big sagebrush increased slightly, and the density of Douglas' rabbitbrush remained the same.

Grass density has increased from 2003 to 2005; however, it decreased by 44 percent from 2005 to 2006, to nearly the density of 2003. Indian ricegrass density increased more than four times from 2004 to 2005, and has the highest density for this species since revegetation occurred.

Annuals decreased from 54.7 plants per m^2 in 2005 to 16.2 plants per m^2 in 2006. Overall plant density decreased from 2005 to 2006, but is still higher than in 2003 and 2004.

TABLE 5. PLANT DENSITY (PLANTS PER M^2) ON AREAS ADJACENT TO UC-1 CMP

		June 2003	June 2004	June 2005	June 2006	Reference Area	Standard
Shrubs	Big Sagebrush	0.4	0.3	0.4	0.8	2.3	--
	Fourwing Saltbush	9.5	7.2	6.0	4.3	0.0	--
	Douglas' Rabbitbrush	0.1	0.2	0.2	0.2	0.9	--
	Rubber Rabbitbrush	1.9	0.9	0.6	0.9	0.0	--
Total Shrubs		**11.9**	**8.6**	**7.2**	**6.2**	**3.2**	**2.2**
Grasses	Indian Ricegrass	0.5	0.3	1.3	0.3	0.1	--
	Threeawn	0.0	0.0	0.0	0.0	0.0	--
	Squirreltail	1.5	2.1	2.1	1.6	1.5	--
	Needle and Thread	0.0	0.0	0.0	0.0	0.0	--
	Galleta	0.0	0.0	0.0	0.0	2.3	--
Total Grasses		**2.0**	**2.4**	**3.4**	**1.9**	**4.0**	**2.8**
Total Forbs/Unseeded		**2.7**	**4.0**	**54.7**	**16.2**	**0.0**	**0.0**
Total Plant Density		**16.6**	**15.0**	**65.3**	**24.3**	**7.2**	**5.0**

Note: Scientific names of plants are listed in Attachment 1.

4.2.3 Plant Diversity

In 2006, a slight increase in the number of shrub and grass species resulted in an average number of different species per m^2 equivalent to numbers recorded in 2003. The number of annual species declined from 2005 to 2006 by approximately 30 percent. Spring precipitation was sporadic and insufficient for good annual production.

TABLE 6. PLANT DIVERSITY OF PERENNIAL PLANT SPECIES ON AREAS ADJACENT TO UC-1 CMP

	June 2003	June 2004	June 2005	June 2006	Reference Area
Average Number of Species per Quadrant	2.6	1.9	2.1	2.6	3.2
Shrubs	1.9	1.5	1.4	1.8	1.6
Grasses	0.7	0.5	0.7	0.8	1.6
Forbs/Unseeded	0.5	1.0	2.2	1.4	0.0

5.0 REVEGETATION SUCCESS

Revegetation is successful when a predetermined percentage of perennial plant cover and density are achieved. These predetermined values are usually a percentage of the plant cover and density on the adjacent, undisturbed plant community. Such standards were not established for CNTA. To evaluate reclamation success at CNTA, plant cover and density were measured on the native plant community directly north of the CMP using the same sampling techniques as were used to determine plant cover and density for the revegetated sites. Using 70 percent of these cover and density estimates, which is typically used in the reclamation industry, a reclamation success standard for plant cover is established at 24.0 percent, and the standard for plant density is established at 5.0 perennial plants per m^2.

Based on these standards, successful revegetation has been achieved on the CMP. Plant cover exceeds the standard by 2 percent, and plant density is approximately three times the standard. Shrub cover on the CMP exceeds the standard of 21.7 percent, and grass cover is approximately double the standard. Shrub density continues to be much higher than on the reference area. Shrub density on the CMP was approximately six times the standard. The density of grasses, however, was slightly less than the standard.

Reclamation success was also achieved for the disturbances around the perimeter of the CMP but only when summed over shrubs and grasses. Both shrub cover and density exceeded standards, but grass cover and density were below the standard. Shrub cover on the perimeter disturbances was approximately equal to the CMP and slightly higher than the standard of 21.7 percent. Grass cover was estimated to be 0.8 percent on the perimeter disturbances, which is lower than the standard of 2.3 percent. Even though grass cover decreased on the perimeter disturbances, overall plant cover was the highest since the site was revegetated.

Figure 1. Typical revegetated area with mix of native plants such as fourwing saltbrush, rubber rabbitbrush, Douglas' rabbitbrush, big sagebrush, Indian ricegrass, and squirreltail grass. A robust plant of palmer's penstemon has extablished naturally on the site (just left of center).

Figure 2. Native plant community is dominated by big sagebrush, Douglas' rabbitbrush, galleta grass, and squirreltail grass.

Perennial plant density on the perimeter disturbances was 8.1 plants per m^2, exceeding the standard of 5.0 plants per m^2. Shrub density exceeded the standard by a factor of three. However, there were only 1.9 grasses per m^2 compared to the standard of 2.8 grasses per m^2. Annual plants were present on the perimeter disturbances, but there were no annuals found on the reference area.

The use of sound reclamation techniques, abundant precipitation the first year after revegetation, and above normal precipitation since 2004 have contributed to the overall success of the revegetation of CNTA. The site was properly prepared for seeding by ripping compacted soils, using a seed of native plant species adapted to the area in the seed mix, and using a combination of seeding and transplants to ensure vegetation establishment. Near normal and above normal precipitation during the winter and spring following reseeding initiated seed germination and facilitated plant establishment. Optimum growing conditions the first two years proved to be very important because two years of below normal precipitation followed, which resulted in a decline in plant cover in 2004. The increase in plant cover since 2005 is an indication of the good vigor of the plant community on the CMP.

Perennial plant cover on the perimeter disturbances increased significantly in 2006 to near the values on the CMP. Plant cover decreased steadily from 2003 to 2005. During this period, precipitation was below average in the region, and the native vegetation had shown little annual growth. The unprotected, young plants had shown good growth in 2001 and 2002, and became the target of heavy grazing in the following years. Many shrubs were reduced to small stubs, and some grasses had been grazed beyond recovery. These heavily utilized plants offered little to overall vegetative cover. Success standards were not met during any of these years. With increased precipitation and more favorable growing conditions since 2005, the native plant communities have been more productive, and the pressure on the newly established plants on the perimeter disturbances has declined. These plants, primarily shrubs, have responded, and possibly over time, native grasses will become established and contribute more to overall plant cover and density.

6.0 RECLAMATION TECHNIQUES

The CMP was fenced after revegetation efforts were completed to protect young seedlings and transplants from the pressure of grazing animals native to the area. The effect of fencing has been positive. Until 2006, both cover and density were higher on the CMP, which was fenced, than on the adjacent, unfenced perimeter disturbances (Figures 3 and 4). In 2006, the difference between these values for the CMP and for the adjacent, unfenced perimeter decreased. In 2005, plant cover on the perimeter disturbances was 53 percent of plant cover on the CMP. That percentage increased to 86 percent in 2006. Plant density (Figure 4) continues to lag behind. Plant densities on the perimeter disturbances have ranged from 48 to 66 percent of the plant densities on the CMP the last four years. The high of 66 percent was experienced in 2005, but dropped to 57 percent in 2006.

The major difference between the two areas is in plant diversity (Tables 3 and 6). On the CMP, there has been an average of four different perennial plant species per m^2 for the past four years. On the perimeter disturbances, diversity has ranged from 1.9 to 2.6 species per m^2. There was a 24-percent increase in diversity from 2005 to 2006, but overall plant diversity on the perimeter disturbances is less than two-thirds of the diversity on the CMP.

A viable plant community has established on both the CMP and the perimeter disturbances (Figures 5-11). It is obvious at this point in time; however, that the installation of the fence around the CMP has resulted in an increase in perennial plant cover, plant density, and species diversity.

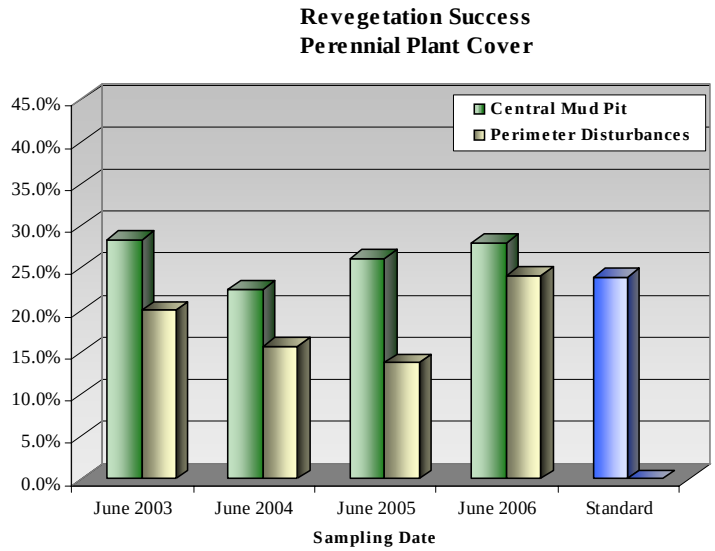

Figure 3. Perennial plant cover on the closure cover and perimeter disturbances over the last four years.

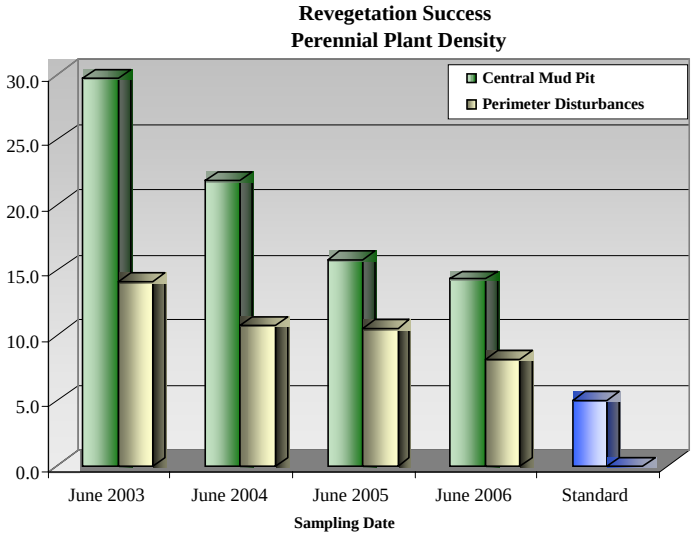

Figure 4. Perennial plant density on the closure cover and perimeter disturbances over the last four years.

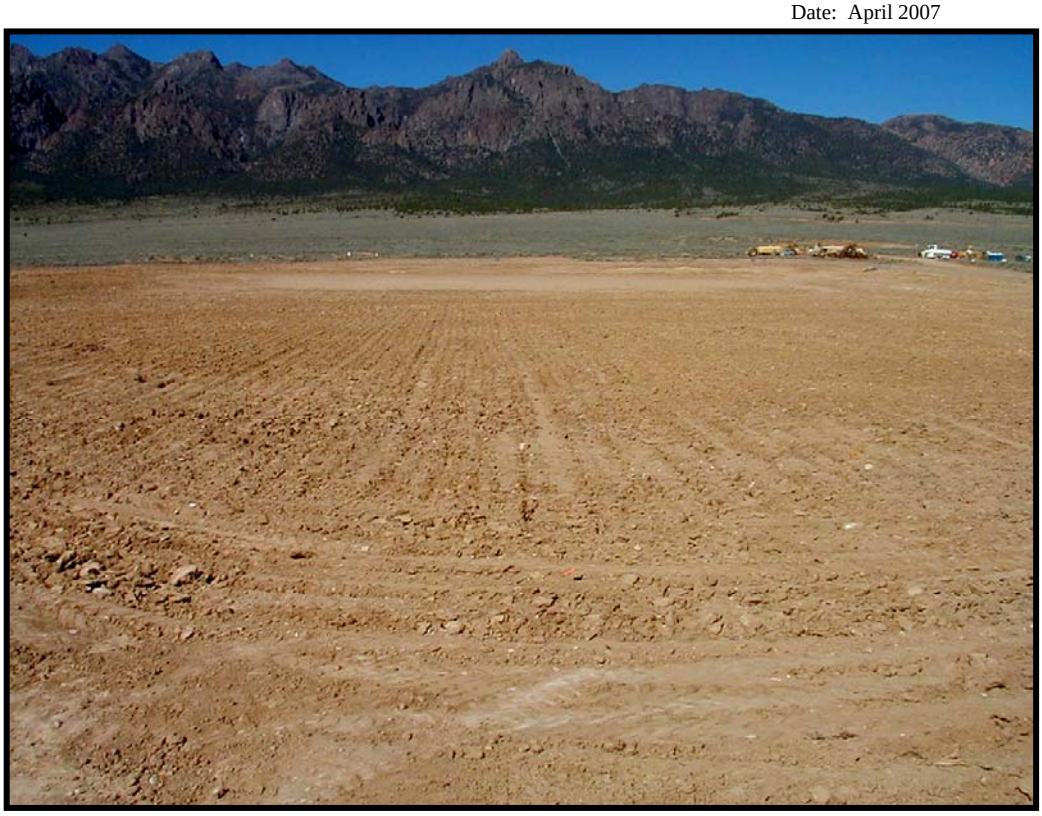

Figure 5. CNTA UC-1 CMP prior to revegetation, Fall 2000

Figure 6. CNTA UC-1 CMP, Fall 2001

Figure 7. CNTA UC-1 CMP, Fall 2002

Figure 8. CNTA UC-1 CMP, June 2003

Figure 9. CNTA UC-1 CMP, June 2004

Figure 10. CNTA UC-1 CMP, June 2005

Figure 11. CNTA UC-1 CMP, June 2006

ATTACHMENT 1

Common and scientific names of plant species encountered at CNTA or included in original seed mix.

	Scientific Name	Common Name
Shrubs	*Artemisia tridentata*	Big sagebrush
	Atriplex canescens	Fourwing saltbush
	Chrysothamnus viscidiflorus	Douglas' rabbitbrush
	Ericameria nauseosa	Rubber rabbitbrush
Grasses	*Achnatherum hymenoides*	Indian ricegrass
	Aristida purpurea	Threeawn
	Elymus elymoides	Squirreltail
	Hesperostipa comata	Needle & Thread
	Pleuraphis jamesii	Galleta
Annuals	*Astragalus* species	Milkvetch species
	Bromus tectorum	Cheatgrass
	Crypantha circumscissa	Matted cryptantha
	Cryptantha species	Cryptantha species
	Descurainia Sophia	Flixweed tansymustard
	Eriastrum eremicum	Desert woolstar
	Gilia species	Gilia species
	Halogeton glomeratus	Halogeton
	Mentzelia albicaulis	White blazingstar
	Salsola tragus	Prickly Russian thistle

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