Nevada
Environmental
Restoration
Project

DOE/NV--1158

National Nuclear Security Administration

# Post-Closure Inspection and Monitoring Report for Corrective Action Unit 110: Area 3 WMD U-3ax/bl Crater, Nevada Test Site, Nevada

## For the Period July 2005-June 2006

Controlled Copy No.:_____

Revision: 0

August 2006

Environmental Restoration
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U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office

## DISCLAIMER

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## FOR THE PERIOD JULY 2005-JUNE 2006

**U.S. Department of Energy**
**National Nuclear Security Administration**
**Nevada Site Office**
**Las Vegas, Nevada**

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## FOR THE PERIOD JULY 2005-JUNE 2006

Approved by: Kevin Cabble Date: 8/10/06

Kevin J. Cabble
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Federal Project Director
Environmental Restoration Project

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# TABLE OF CONTENTS

# TABLE OF CONTENTS (continued)

## FIGURES



## TABLES



## APPENDICES

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| BJY | Buster Jangle Y |
| CAU | Corrective Action Unit |
| cm | centimeter(s) |
| CFR | Code of Federal Regulations |
| DOE | U.S. Department of Energy |
| DOE/NV | U.S. Department of Energy, Nevada Operations Office |
| EPA | U.S. Environmental Protection Agency |
| FFACO | *Federal Facility Agreement and Consent Order* |
| ft | foot (feet) |
| in. | inch(es) |
| m | meter(s) |
| NDEP | Nevada Division of Environmental Protection |
| NNSA/NV | U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office |
| NNSA/NSO | U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office |
| NTS | Nevada Test Site |
| PCIMR | Post-Closure Inspection and Monitoring Report |
| RCRA | *Resource Conservation and Recovery Act* |
| RWMS | Radioactive Waste Management Site |
| SM | subsidence monument(s) |
| TDR | Time Domain Reflectometry |
| UR | Use Restriction |
| VMC | Volumetric Moisture Content |
| WMD | Waste Management Division |

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# EXECUTIVE SUMMARY

This Post-Closure Inspection and Monitoring Report (PCIMR) provides the results of inspections and monitoring for Corrective Action Unit (CAU) 110, Area 3 WMD [Waste Management Division] U-3ax/bl Crater. This PCIMR includes an analysis and summary of the site inspections, repairs and maintenance, meteorological information, and soil moisture monitoring data obtained at CAU 110, for the annual period July 2005 through June 2006.

Site inspections of the cover were performed quarterly to identify any significant changes to the site requiring action. The overall condition of the cover, cover vegetation, perimeter fence, and UR warning signs was good. Settling was observed that exceeded the action level as specified in Section VII.B.7 of the Hazardous Waste Permit Number NEV HW009 (Nevada Division of Environmental Protection, 2000). This permit states that cracks or settling greater than 15 centimeters (6 inches) deep that extend 1.0 meter (m) (3 feet [ft]) or more on the cover will be evaluated and repaired within 60 days of detection.

Along the east edge of the cover (repaired previously in August 2003, December 2003, May 2004, October 2004), an area of settling was observed during the December 2005 inspection to again be above the action level, and required repair. This area and two other areas of settling on the cover that were first observed during the December 2005 inspection were repaired in February 2006.

The semiannual subsidence surveys were done in September 2005 and March 2006. No significant subsidence was observed in the survey data. Monument 5 shows the greatest amount of subsidence (-0.015 m [-0.05 ft] compared to the baseline survey of 2000). This amount is negligible and near the resolution of the survey instruments; it does not indicate that subsidence is occurring on the cover.

Soil moisture results obtained to date indicate that the CAU 110 cover is performing as expected. Time Domain Reflectometry (TDR) data indicated an increase in soil moisture (1 to 3 percent VMC change) at a depth of 1.8 m (6 ft.) due to the exceptionally heavy precipitation from the January and February 2005 precipitation events. The moisture profile returned to baseline conditions by October 2005. At 2.4 m (8 ft) below the cover surface, TDR data show soil moisture content remained between 10 and 13 percent VMC.

Considering the heavy precipitation experienced in this and the previous reporting period, a compliance level will be established when the system reaches a steady state and equilibrium has been established.

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# 1.0 INTRODUCTION

## 1.1 SCOPE AND OBJECTIVES

Corrective Action Unit (CAU) 110, Area 3 WMD [Waste Management Division] U-3ax/bl Crater, is located in Area 3 of the Nevada Test Site (NTS) in Nye County, Nevada. This Post-Closure Inspection and Monitoring Report (PCIMR) provides an analysis and summary of site inspections, repair and maintenance activities, subsidence surveys, vegetation monitoring, meteorological information, and soil moisture monitoring data obtained at CAU 110 for the period July 2005 through June 2006. This PCIMR has been prepared in accordance with the *Federal Facility Agreement and Consent Order* (FFACO) of 1996.

Inspections of CAU 110 are conducted quarterly to determine and document the physical condition of the Area 3 WMD U-3ax/bl Crater cover and any unusual conditions that could impact the proper operation of the waste unit cover.

The objective of the soil moisture monitoring program is to monitor the stability of soil moisture conditions within the upper 2.4 meters (m) (8 feet [ft]) of the cover and detect changes that may indicate moisture movement exceeding the designed performance expectations of the cover.

## 1.2 BACKGROUND

The Area 3 WMD U-3ax/bl Crater is a historic radioactive disposal unit located within the Area 3 Radioactive Waste Management Site (RWMS) on the NTS (Figure 1). The unit, which was formed by excavating the area between two subsidence craters (U-3ax and U-3bl), was operationally closed in 1987 under the *Resource Conservation and Recovery Act* (RCRA) as a hazardous waste landfill.

The Area 3 WMD U-3ax/bl Crater was identified as an historic RCRA site and was closed in accordance with the RCRA Part B Permit issued by the Nevada Division of Environmental Protection (NDEP), Permit Number NEV HW009 (NDEP, 2000). This permit specified that the unit would be closed under Title 40 Code of Federal Regulations (CFR) Part 265 (U.S. Environmental Protection Agency [EPA], 1996) closure requirements for interim status facilities. Additional closure requirements included U.S. Department of Energy (DOE) Order 5820.2A (DOE, 1988) and DOE Order 435.1 (DOE, 1999).

## 1.3 GEOLOGIC SETTING

Area 3 is located in Yucca Flats, a topographically closed valley on the eastern side of the NTS (LLNL, 1982). Yucca Flats is an internal draining, north-south trending valley and is bounded on the north by Quartzite Ridge; on the east by Halfpint Range; on the south by Yucca Lake, Mine Mountain, CP Hills, and Massachusetts Mountain; and on the west by Rainier Mesa, Eleana Range, and Shoshone Mountain.

Surficial sediments in Area 3 consist of Quaternary and Tertiary valley-fill alluvium derived from the surrounding mountains, which are composed of Paleozoic carbonates and clastics and tertiary volcanics. These Quaternary/Tertiary alluvial strata occur within fault-bounded troughs above the underlying Tertiary volcanic section. The average thickness of this alluvium material

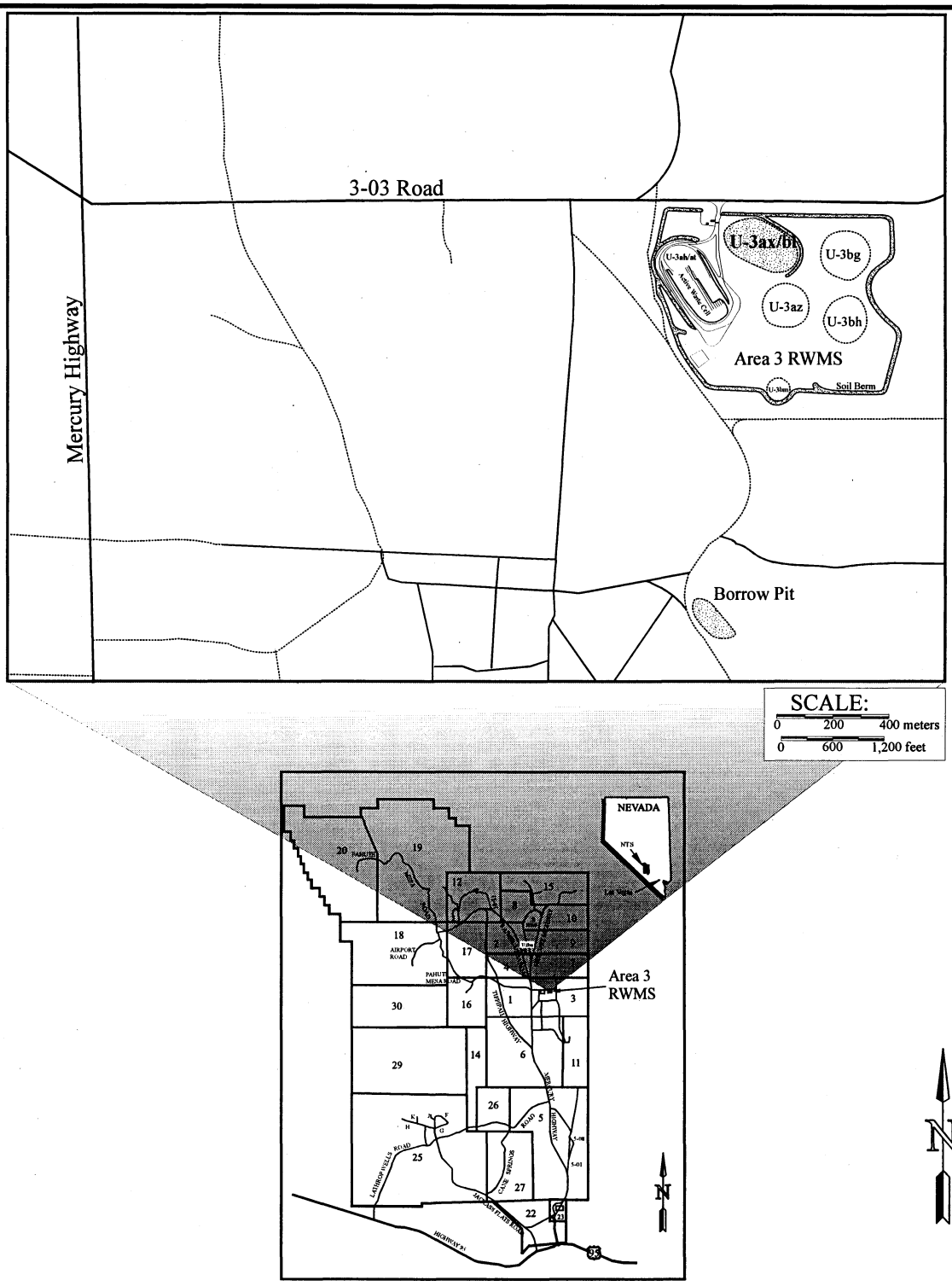


**FIGURE 1**
**LOCATION OF CAU 110: AREA 3 WMD U-3AX/BL CRATER**

is approximately 980 feet (ft), although in some places it is as thick as 6,560 ft. The alluvium is made up of gravel and poorly sorted sands with intermittent silt beds (LLNL, 1982).

The Yucca Flats watershed is a structurally closed basin encompassing an area of approximately 780 square kilometers (300 square miles). The structural geomorphology of Yucca Flats is typical of the Basin and Range Physiographic Province and lies in one of the most arid regions of the country. Located in the Ash Meadow Groundwater Basin, groundwater generally flows southwest and discharges at the large springs in Ash Meadows, about 25 mi southwest of Mercury, Nevada (Winograd and Thordarson, 1975). Water balance calculations for Area 3 indicate that it is continuously in a state of moisture deficit.

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# 2.0 POST-CLOSURE MONITORING REQUIREMENTS

## 2.1 BACKGROUND

Post-closure monitoring requirements for CAU 110 are described in the Closure Report for CAU 110 (U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office [NNSA/NV], 2001).

## 2.2 SITE INSPECTIONS

Inspections are performed quarterly, and consist of visual observations to inspect the condition of the cover and to document the status of "Use Restriction" (UR) warning signs and site fencing. Each site inspection is documented on a site inspection form, and copies of these are included in Appendix A of this report.

The post-closure inspection consists of the following:

- The perimeter of the cover fencing is walked by the inspector, and the condition of the fencing, UR warning signs, entrance gate, and lock is documented.
- The seven survey subsidence markers located on the cover are inspected. In addition, the elevations of all seven survey markers are surveyed twice a year and compared to baseline elevations collected in 2000 to determine if the cover has subsided.
- During each inspection, any changes in the condition of the cover, warning signs, or fenced area are documented. Specific changes noted on the current condition of the cover include, but are not limited to, trash/debris within the fenced compound, animal burrows/nesting activity, or erosion of the cover.
- Cracks or areas of settling less than 15 centimeters (cm) (6 inches [in.]) deep on the cover are documented and scheduled for repair on an annual basis. Larger cracks or areas of settling are immediately evaluated and repaired within 60 days.
- All repair work must preserve the original cover "as built" design. If the cover repair requires modification of the cover design, the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) will present a formal design modification request to NDEP prior to making the design modification.

## 2.3 SOIL MOISTURE MONITORING

The CAU 110 cover is designed to limit infiltration of precipitation into the disposal unit through evapotranspiration by vegetation on the cover. The cover performance is monitored using Time Domain Reflectometry (TDR) soil water content sensors that are buried at 0.3-m (1-ft) depth intervals up to 2.4 m (8 ft) within the waste cover to provide water content profile data. TDR probes are installed at a distance of 50.3 m (165 ft) from the southern edge of the cover. An array of eight probes (a stack) is repeated at four locations across the cover (Figures 2 and 3). The soil water content profile data are used to determine whether the cover is functioning as designed. Soil moisture content data from the TDR moisture probes are recorded daily and stored on a datalogger. The data are downloaded remotely over a radio/telephone link.

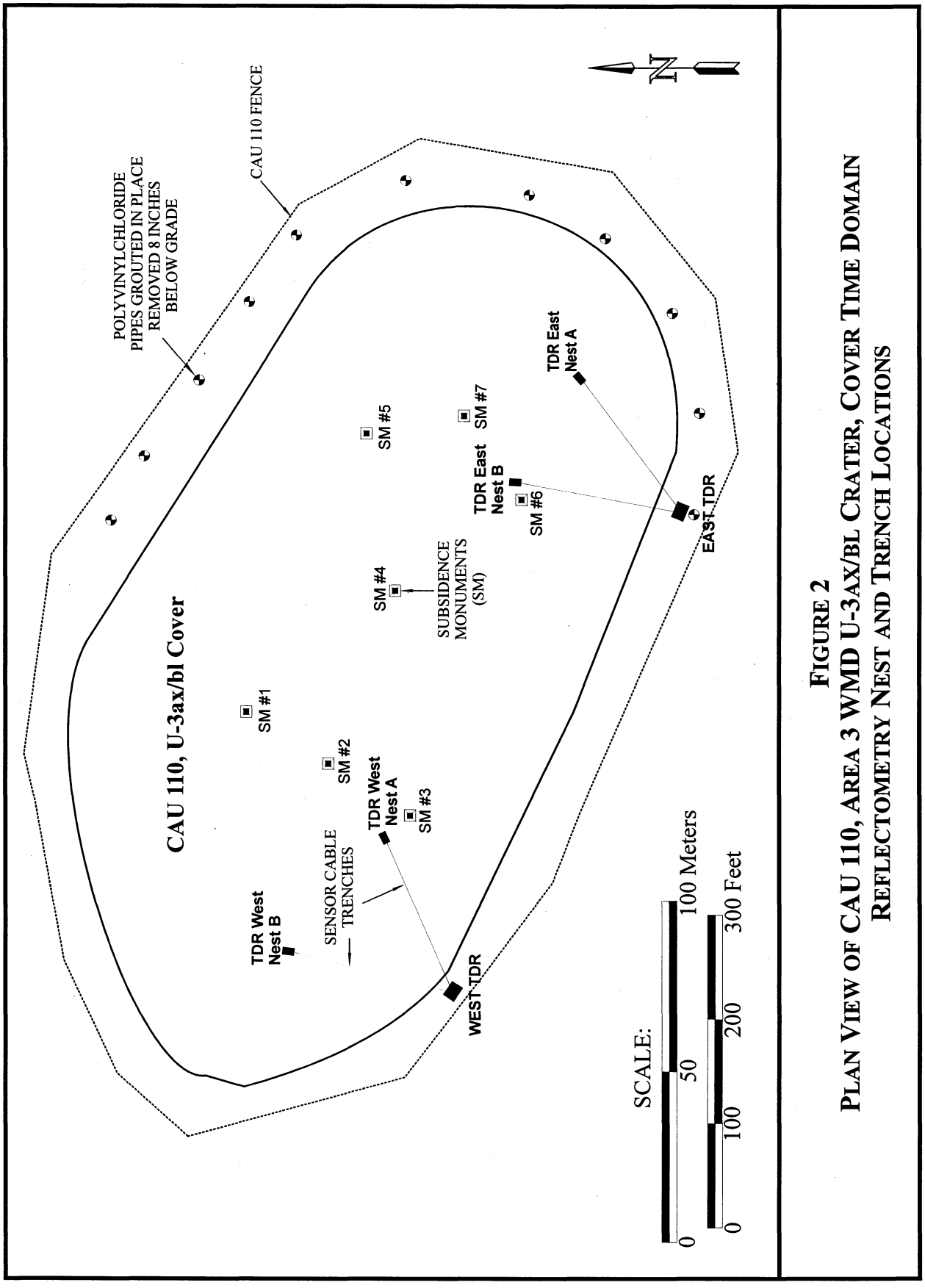


**FIGURE 2**
**PLAN VIEW OF CAU 110, AREA 3 WMD U-3AX/BL CRATER, COVER TIME DOMAIN REFLECTOMETRY NEST AND TRENCH LOCATIONS**

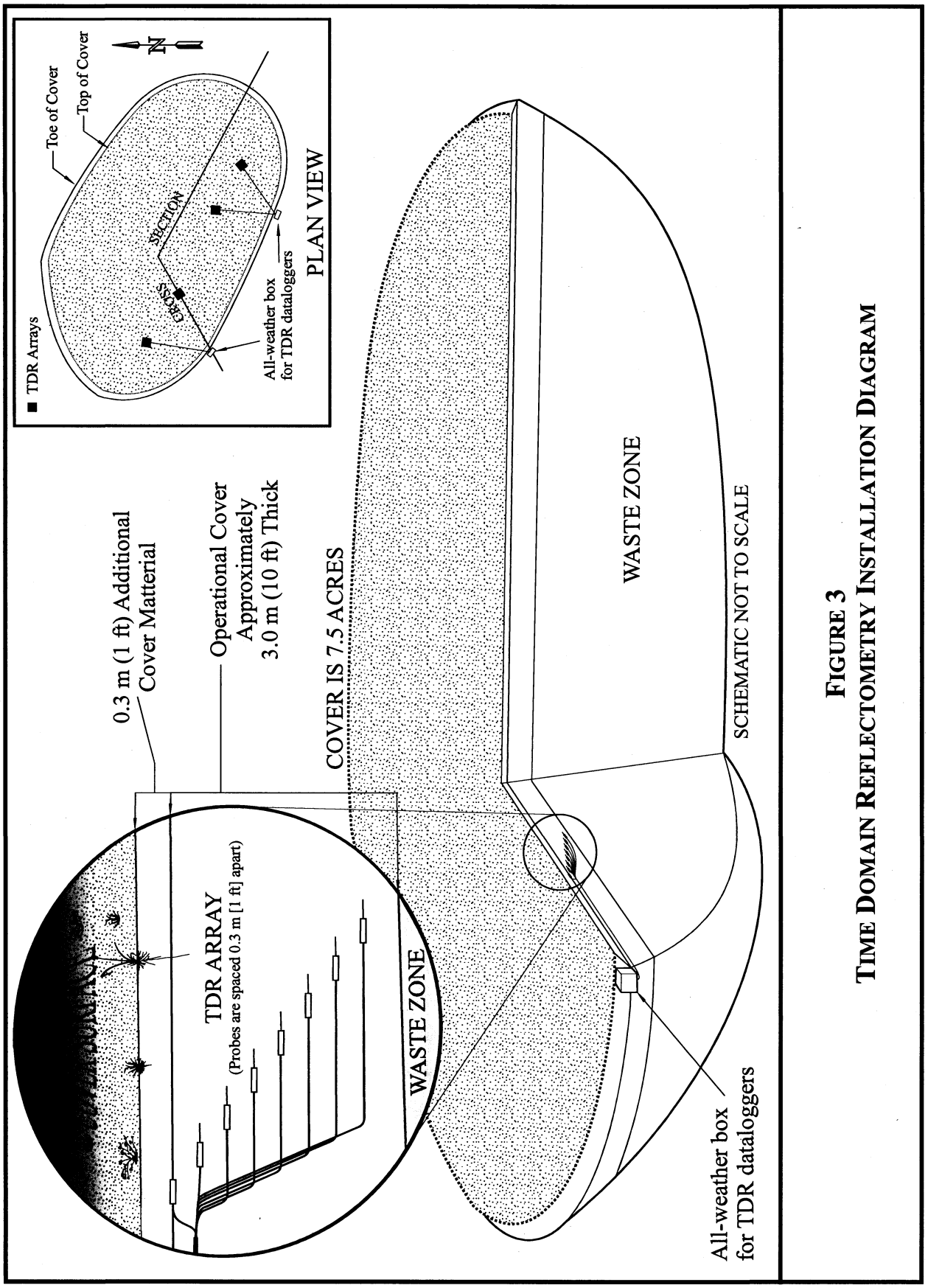


**FIGURE 3**
**TIME DOMAIN REFLECTOMETRY INSTALLATION DIAGRAM**

## 2.4 COMPLIANCE CRITERIA

The CAU 110 cover boundary is defined by the fence installed around the cover, which is approximately 3.0 hectares (7.5 acres) in area. The point of compliance is at the deepest TDR soil moisture probe (2.4 m [8 ft] below the cover surface). Compliance will be set based on soil moisture content; however, the specific criteria will not be established until enough data have been collected during average site conditions to establish a realistic compliance level. Once the soil moisture content within the cover reaches equilibrium under normal or above-average precipitation conditions, soil moisture compliance values will be agreed upon with NDEP. During this monitoring period, the response of the cover under above-average precipitation conditions was observed and compared to predicted performance. Once the cover reaches equilibrium, which is expected to occur during the next reporting period, a compliance level can be set.

The following compliance criteria have been established:

1. Notify NDEP of noncompliance within 14 days of determining that the cover is not operating according to the established compliance criteria.
2. Compile a list of non-critical maintenance activities (cracks or settling imperfections equal to or less than 15 cm [6 in.] deep on the cover), and address them in the following fiscal year.
3. Evaluate and repair cracks or settling features greater than 15 cm (6 in.) deep which extend 1 m (3 ft) or more on the cover within 60 days of detection.

## 2.5 REPORTING REQUIREMENTS

All inspection and maintenance activities conducted during the year will be documented and submitted to NDEP. The annual PCIMR will be provided on or before August 31 of each year. The proposed duration of post-closure inspections is five years. After five years of post-closure inspections and monitoring, NNSA/NSO may submit a request to NDEP to reevaluate the monitoring program and/or schedule.

The annual PCIMR will include the following information:

- Brief summary of each inspection
- Inspection checklists, field notes, and site photographs
- Subsidence survey results
- Monthly precipitation records for the Buster Jangle Y (BJY) meteorological station
- Periodic reports on the health of cover vegetation
- Soil moisture content profiles for the reported monitoring period
- Maintenance and repair documentation (if any)
- Specific recommendations for nonstandard maintenance or changes in post-closure monitoring

# 3.0 SITE INSPECTIONS, SURVEYS, AND MAINTENANCE

## 3.1 SITE INSPECTION RESULTS

Site inspections are conducted in March, June, September, and December. The inspections are completed to evaluate and document the performance and maintenance needs of CAU 110 in accordance with the requirements of Title 40 CFR §265.15, the RCRA Part B Permit (NDEP, 2000), and the CAU 110 Closure Report (NNSA/NV, 2001).

Site inspection documentation includes copies of the inspection checklists, field logbook notes, and site photographs. Copies of the inspection checklists, associated field notes, and site photographs for September 2005, December 2005, March 2006, and June 2006 are included in Appendix A.

### 3.1.1 September 27, 2005, Inspection

- Minor cracks were observed around the previously repaired areas, but they did not exceed the settling compliance criterion.
- The condition of warning signs, fencing, TDR stations, and cover vegetation was good.

Conclusions/Recommendations:

- Continue inspections as scheduled.

### 3.1.2 December 12, 2005, Inspection

- Gate lock does not open.
- Three signs of subsidence were found. They are a 1 x 1.5 x 8-ft area found 10-ft to 12-ft north of the east TDR, a 2-in. x 18-in. x 8-ft area found on the east side where previous subsidence has been monitored, and a crack 10-ft to 12-ft long and 1-in. wide that has been previously monitored.
- The condition of warning signs and fencing was good.

Conclusions/Recommendations:

- Continue inspections as scheduled.
- Change out the old gate lock for a new one.
- Backfill all areas of subsidence before the next inspection.

### 3.1.3 March 23, 2006, Inspection

- The previously repaired areas were in good condition with no indication of cracking or settling.
- Several animal burrows were noted around the perimeter of the cover.
- The condition of warning signs, fencing, TDRs, and cover vegetation was good.

Conclusions/Recommendations:

- Continue inspections as scheduled.

- Monitor repaired areas for evidence of further settling.

### 3.1.4 June 20, 2006, Inspection

- Previously repaired subsidence areas are holding well.
- No significant cracks or subsidence noted on the cover.
- A few ground squirrels were noted; however, most burrows appear to be unoccupied, including one inactive ant colony.
- The condition of warning signs, fencing, subsidence monuments (SMs), and cover vegetation was good.

Conclusions/Recommendations:

- Continue inspections as scheduled.

## 3.2 SUBSIDENCE SURVEY

Seven SMs were installed on the cover to provide elevation control and to determine if subsidence of the cover occurs. The SM location map is provided in Appendix C. The initial baseline subsidence survey was done on December 14, 2000. Subsequent surveys are done twice a year and are compared to the December 2000 baseline survey results. During this monitoring period, the subsidence surveys were done on September 28, 2005, and March 07, 2006.

The subsidence survey results are tabulated in Table 1. No significant subsidence is observed in the survey data. Monument 5 shows the greatest decrease in elevation (-0.015 m [-0.05 ft]) compared to the baseline survey in 2000. Calculated subsidence values are negligible and near the resolution of the survey instruments, and do not indicate that subsidence is occurring on the cover.

## 3.3 VEGETATION SURVEY

The CAU 110 cover was initially planted with native seed on December 4 and 5, 2000. Revegetation surveys have been conducted every spring since the site was seeded, to assess the success of the seeding effort. The May 2006 vegetation survey report and methodology are included in Appendix D. The status of the vegetation on the CAU 110 cover was evaluated by estimating the amount of vegetative cover and density of plant species.

### 3.3.1 Vegetated Cover

Plant Cover

The area covered by vegetation was 0.6 percent lower this year than it was last year. Perennial plant cover continues to increase on the closure cover and made up 100 percent of the total vegetative cover in 2006. In 2005, about 3.4 percent of total plant cover was from annuals. In 2006, a year of average precipitation, annuals make up 0 percent of the total cover. No living cover was present on the unseeded areas between the fence and the closure cover, compared to last year with 23 percent of annual plant cover. The average percent cover estimates over the last five years are presented in Table 2.

**TABLE 1. AREA 3 WMD U-3AX/BL CRATER SUBSIDENCE MONUMENT ELEVATIONS AND SUBSIDENCE RESULTS**

| DATE | Elevation at Top of Monument[1] Subsidence (ft) | | | | | | |
|---|---|---|---|---|---|---|---|
| | SM #1 | SM #2 | SM #3 | SM #4 | SM #5 | SM #6 | SM #7 |
| December 2000 Baseline | 4,021.84 | 4,021.28 | 4,019.83 | 4,020.99 | 4,021.87 | 4,019.25 | 4,020.52 |
| | - | - | - | - | - | - | - |
| July 2001 | 4,021.83 | 4,021.28 | 4,019.83 | 4,020.98 | 4,021.86 | 4,019.24 | 4,020.51 |
| | -0.01 | 0.00 | 0.00 | -0.01 | -0.01 | -0.01 | -0.01 |
| January 2002 | 4,021.84 | 4,021.28 | 4,019.83 | 4,020.98 | 4,021.86 | 4,019.24 | 4,020.51 |
| | 0.00 | 0.00 | 0.00 | -0.01 | -0.01 | -0.01 | -0.01 |
| September 2002 | 4,021.83 | 4,021.27 | 4,019.83 | 4,020.98 | 4,021.86 | 4,019.24 | 4,020.50 |
| | -0.01 | -0.01 | 0.00 | -0.01 | -0.01 | -0.01 | -0.02 |
| January 2003 | 4,021.83 | 4,021.27 | 4,019.83 | 4,020.98 | 4,021.86 | 4,019.24 | 4,020.50 |
| | -0.01 | -0.01 | 0.00 | -0.01 | -0.01 | -0.01 | -0.02 |
| July 2003 | 4,021.83 | 4,021.27 | 4,019.83 | 4,020.97 | 4,021.85 | 4,019.24 | 4,020.50 |
| | -0.01 | -0.01 | 0.00 | -0.02 | -0.02 | -0.01 | -0.02 |
| March 2004 | 4,021.82 | 4,021.26 | 4,019.82 | 4,020.97 | 4,021.83 | 4,019.22 | 4,020.49 |
| | -0.02 | -0.02 | -0.01 | -0.02 | -0.04 | -0.03 | -0.03 |
| September 2004 | 4,021.82 | 4,021.26 | 4,019.82 | 4,020.96 | 4,021.83 | 4,019.23 | 4,020.49 |
| | -0.02 | -0.02 | -0.01 | -0.03 | -0.04 | -0.02 | -0.03 |
| March 2005 | 4,021.82 | 4,021.26 | 4,019.82 | 4,020.96 | 4,021.82 | 4,019.22 | 4,020.49 |
| | -0.02 | -0.02 | -0.01 | -0.03 | -0.05 | -0.03 | -0.03 |
| September 2005 | 4,021.82 | 4,021.26 | 4,019.82 | 4,020.97 | 4,021.82 | 4,019.23 | 4,020.49 |
| | -0.02 | -0.02 | -0.01 | -0.02 | -0.05 | -0.02 | -0.03 |
| March 2006 | 4,021.82 | 4,021.26 | 4,019.82 | 4,020.96 | 4,021.82 | 4,019.23 | 4,020.49 |
| | -0.02 | -0.02 | -0.01 | -0.03 | -0.05 | -0.02 | -0.03 |

[1] Elevations based on North American Vertical Datum of 1929 in feet.

Plant Density

In 2006, the annual density of plant coverage was the lowest since 2002, with 3.6 plants per square meter, a density only slightly higher than that of unseeded areas. The perennial plant density for 2006 is the lowest it has been in the last four years. Despite the low-density numbers, the plant cover has increased, indicating that the existing plants are increasing in size. The species with the most significant decrease was Russian thistle. However, both buckwheat and halogeton populations have decreased to nearly nothing. The most dominant species found on

the cover was the shadescale. Where shadescale was less dominant, winterfat, Nevada ephedra, and Indian ricegrass were present.

**TABLE 2. CAU 110 AVERAGE PERCENT COVER ESTIMATES**

| | 2001 (percent) | 2002 (percent) | 2003 (percent) | 2004 (percent) | 2005 (percent) | 2006 (percent) |
|---|---|---|---|---|---|---|
| Total Vegetative Cover | 7.8 | 6.4 | 3.2 | 12.8 | 20.2 | 19.6 |
| Perennial Cover | 2.6 | 6.4 | 2.4 | 9.6 | 16.8 | 19.6 |
| Annual Cover | 5.2 | 0.0 | 0.8 | 3.2 | 3.4 | 0 |
| Mulch/Litter | 43.6 | 24.1 | 28.0 | 14.6 | 26.2 | 23.2 |
| Bare | Not Recorded | Not Recorded | 30.4 | 38.4 | 5.4 | 57.2 |
| Alluvium / Gravel | Not Recorded | Not Recorded | 38.4 | 34.2 | 48.2 | |

### 3.3.2 Conclusions and Recommendations

Total plant cover decreased from 20.2 percent in 2005 to 19.6 percent in 2006. This is an indication that native plant species on the cover have successfully survived the drought conditions that followed reseeding in 2000 and have returned to equilibrium after the increased precipitation of the previous year. The 0.6 percent decrease in plant cover this year is attributed to the absence of annual plant cover, but the 2.8 percent increase in perennial plant cover compensated for the loss.

Based on revegetation efforts in similar regions, a goal of 12 percent plant cover after 5 years was established. This does not represent the final plant cover expected on the cover, but an intermediate stage. The 5-year goal was met and exceeded last year, and is continuing to hold through this year as well. Actual total plant cover is 19.6 percent; all of it is attributed to perennial native plants. Eventually, plant cover should approach 25 percent, based on the results of cover estimates for similar plant communities on the NTS.

The plant community on the cover is well established. The density of perennial plant species has remained fairly consistent over the last four years. There is no indication that remedial revegetation is necessary. Vegetation monitoring in future years should focus on annual weedy species, specifically halogeton, cheatgrass, and Russian thistle. If these species increase in density and cover, and appear to have a detrimental effect on the perennial plant species, as evidenced by decreases in perennial plant cover and/or density, some remedial action may be necessary to protect the composition and stability of the vegetative cover.

The CAU 110 cover vegetation should continue to be monitored annually to evaluate plant cover, density, and diversity.

## 3.4 MAINTENANCE AND REPAIR

Site maintenance and cover repairs were made in February 2006 as a result of observations made during site inspections.

### 3.4.1 February 6-7, 2006, Repairs

During the December 12, 2005, inspection, three areas of settling on the cover (one area 10-ft north of the east TDR, one on the east side, and one in the northeast) exceeded the settling compliance criterion. The area along the east side of the cover had been repaired on several previous occasions. The three areas were repaired over the period of February 6-7, 2006. A portable, gas-powered tamper was used to compact the cracks in the cover. The first two areas were backfilled with clean, native soil using wheelbarrows and shovels, and then compacted using the tamper. Because the crack system on the third area was much larger and deeper than anticipated, work on the third area was ceased for the first day. After an engineer reviewed and approved proceeding with work, the third area work commenced again on the second day. This area was repaired following the same procedure as for the other cracks. Field notes for this repair are included in Appendix A.

### 3.4.2 April 18-20, 2006, Mammal Trapping

Because of the large number of small animal burrows found on the cover and fence line during the March 23, 2006, site inspection, trapping and relocating small mammals on the cover was undertaken. This activity began the week of April 18-20, 2006, during which a total of 160 deer mice and kangaroo rats were trapped and relocated from the cover.

### 3.4.3 April 25-27, 2006, Mammal Trapping

The second week of mammal trapping was April 25-27, 2006. During this second round of trapping, 148 deer mice, antelope squirrels, and kangaroo rats were trapped and relocated from the cover.

### 3.4.4 May 2-4, 2006, Mammal Trapping

The third and last week of mammal trapping was May 2-4, 2006. During this third round of trapping, 93 deer mice, long-tail pocket mice, and kangaroo rats were trapped and relocated from the cover.

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# 4.0 SOIL MOISTURE MONITORING

The CAU 110 cover is designed to limit infiltration into the disposal unit through evapotranspiration from vegetation established on the cover for that purpose. The cover performance is monitored using TDR to provide a profile of the water content within the cover. The soil water content data will establish whether the cover is performing as designed and is in compliance with the closure plan and any compliance criteria established in the future. The point of compliance is the depth of the deepest TDR soil moisture probe (2.4 m [8 ft]).

Compliance will be based on soil moisture content; however, the area was under drought conditions since monitoring began in 2001 and continued through 2003. The drought conditions were followed by two years of exceptionally high rainfall (26.49 cm. [10.43 in.] and 23.32 cm [9.18 in.]) which produced measurable infiltration events. The first half of 2006 appears to indicate a return to average conditions (16.41 cm [6.46 in.]) which will allow the cover to continue to equilibrate to steady state conditions at which time the soil moisture content trigger values will be set.

The soil moisture content is obtained using two Campbell Scientific TDR-100 dataloggers housed in instrumentation shelters located along the periphery of the cover (Figure 2). TDR probes are Campbell Scientific CS610s using RG8 coaxial cable. The probes are installed at a distance of 50.3 m (165 ft) from the edge of the cover, and buried in the cover at depths of 0.3 to 2.4 m (1 to 8 ft) below the cover surface, one probe every 0.3 m (1 ft). Arrays of eight probes (a nest) are positioned at four locations across the cover (Figure 3). Soil moisture content data from the TDR moisture probes are collected once per day and stored on a datalogger. A radio link connects both the eastern and western TDR dataloggers to a telephone line at the Area 3 RWMS office, and the data are downloaded over this remote link.

Calibration of the TDR probes was documented in Appendix I of the CAU 110 Closure Report (NNSA/NV, 2001). The TDR probes were calibrated with a "dry-down" method using native soils 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 noted that due to the long cable lengths and high soil conductivities, the TDR reflection end points were extremely flat under saturated and near-saturated conditions, resulting in unreliable data in these regions. Therefore, the TDR calibration was fit only up to 30 percent Volumetric Moisture Content (VMC).

A linear regression of the calibration data over the range of 5- to 30-percent VMC yielded the following calibration equation:

$$\% \text{ VMC} = 10.3737 \times (L/L) - 17.137$$

Where L/L is the trace length/probe length as recorded by the datalogger.

## 4.1 PRECIPITATION DATA

Precipitation data were collected from the Air Resources Laboratory, Special Operations and Resources Division's CLINET Station BJY, located at 37° 03' 46" N, 116° 03' 09" W, in Area 3 of the NTS, approximately 4.8 kilometers (3 miles) northwest of CAU 110. Precipitation records

obtained from this station are used to report the official rainfall for CAU 110. Precipitation records for this station for the period July 2005 through June 2006 are found in Appendix E. The precipitation data are presented in Figure 4.

The total precipitation recorded for the current monitoring period from July 2005 through June 2006 was 15.98 cm (6.29 in.). The average annual precipitation over the period 1960 through 2005 at the BJY Station is 16.41 cm (6.46 in.). Yearly rainfall has remained high with 26.49 cm (10.43 in.) recorded in the 2004 calendar year and 23.32 cm. (9.18 in.) in 2005. Rainfall for the period January 2006 through June 2006 is currently 1.14 cm. (0.45 in.), with a historic average over the same period of 1.5 cm. (0.59 in.), indicating a possible return to normal conditions.

## 4.2 SOIL MOISTURE MONITORING RESULTS

### 4.2.1 Results

Graphs of the TDR-derived soil moisture content, combined with the daily precipitation from the BJY meteorological station, are presented in Figures 5 - 8. Data collection began on January 25, 2001, just prior to the start of supplemental irrigation.

The soil moisture graphs, Figures 5 through 8, show several responses: the initial conditions, the irrigation wetting event and infiltration, the trend to steady-state conditions and then wetted conditions due to the heavy precipitation that began in late 2004. The initial conditions at the beginning of the data collection reflect the disturbed soil's intrinsic moisture conditions. The installation of the TDR probes is described in detail in the CAU 110 Closure Report (NNSA/NV, 2001). Health and safety considerations required that hazards caused by dust be minimized during the TDR probe installation; the trenching and compaction of each of the soil lifts required some water to be added to the soils prior to handling. The amount of water added to the soil, while kept to a minimum, was variable and resulted in a vertical moisture content profile that was not necessarily monotonic with depth as would be expected with a natural profile. Consequently, some depths appear wetter than others and are expected to remain so until the system fully equilibrates.

### 4.2.2 Data Trends

Summer temperatures and germination of the seeds, along with the increase in evapotranspiration, have produced long-term trends, which can be seen in the data from about October 2001 to the present. An annual cycle of increasing soil moisture content at all depths can be observed peaking in August and decreasing to a minimum in January. This seasonal cyclic behavior lags behind the temperature and is most likely a combination of effects caused by the increased thermal gradient, water vapor transport from depth, and the lack of transpiration of plants during the hot summer months.

The TDR data indicate that the soil moisture content in the CAU 110 cover had been approaching steady-state under the prior drought conditions. The heavy precipitation in January and February 2005 (10.9 cm [4.3 in.]) created saturated surface conditions with some infiltration noted to approximately 1.8 m (6 ft.) in both the East and west TDR nests. The moisture content profiles on both the East Nest A and West Nest B stations indicate an increase of approximately 1.5- percent VMC at 1.8 m. (6 ft.) depth, with drying to baseline conditions by October 2005.

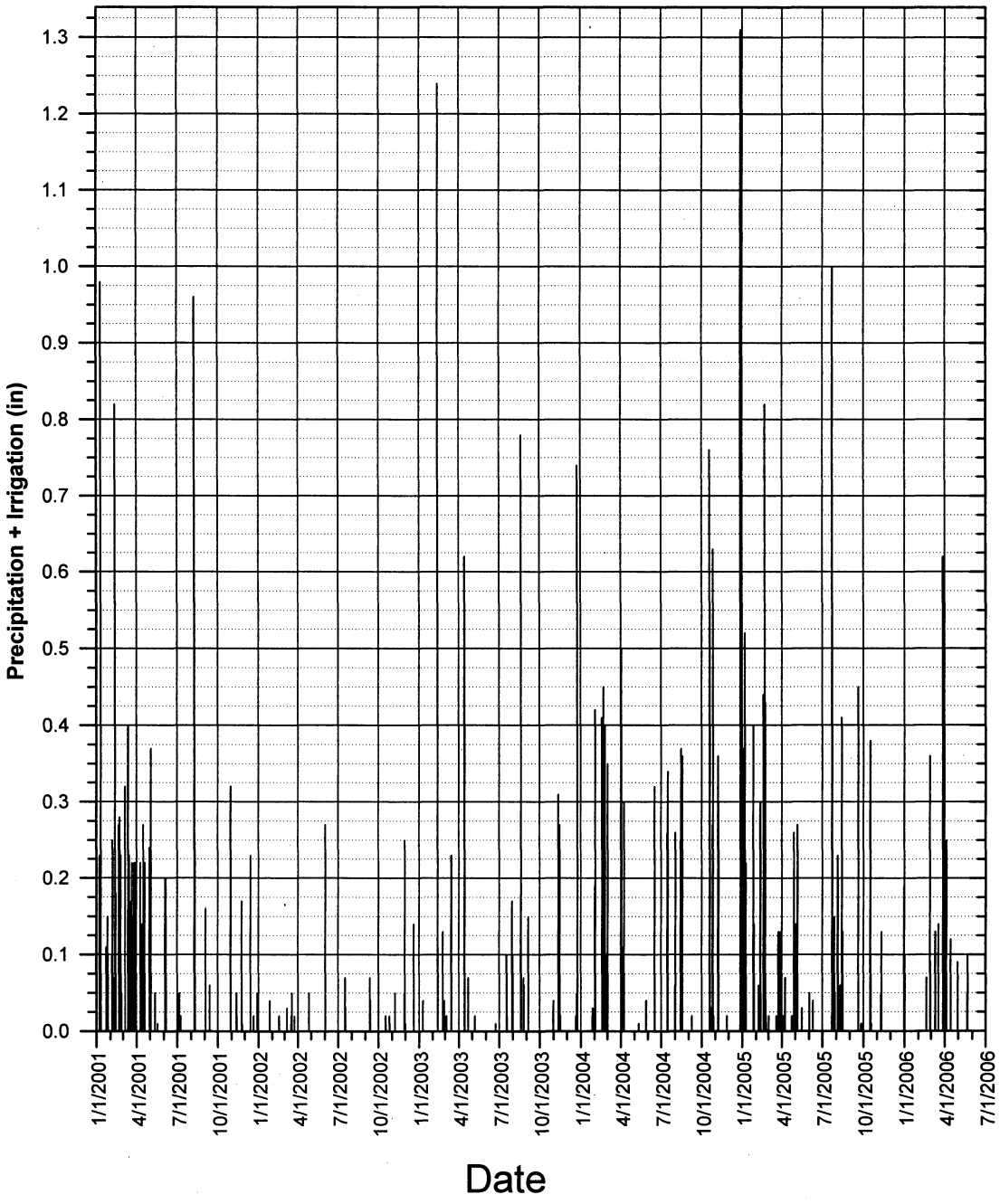


**FIGURE 4**
**PRECIPITATION DATA FOR METEOROLOGICAL STATION BUSTER JANGLE Y**

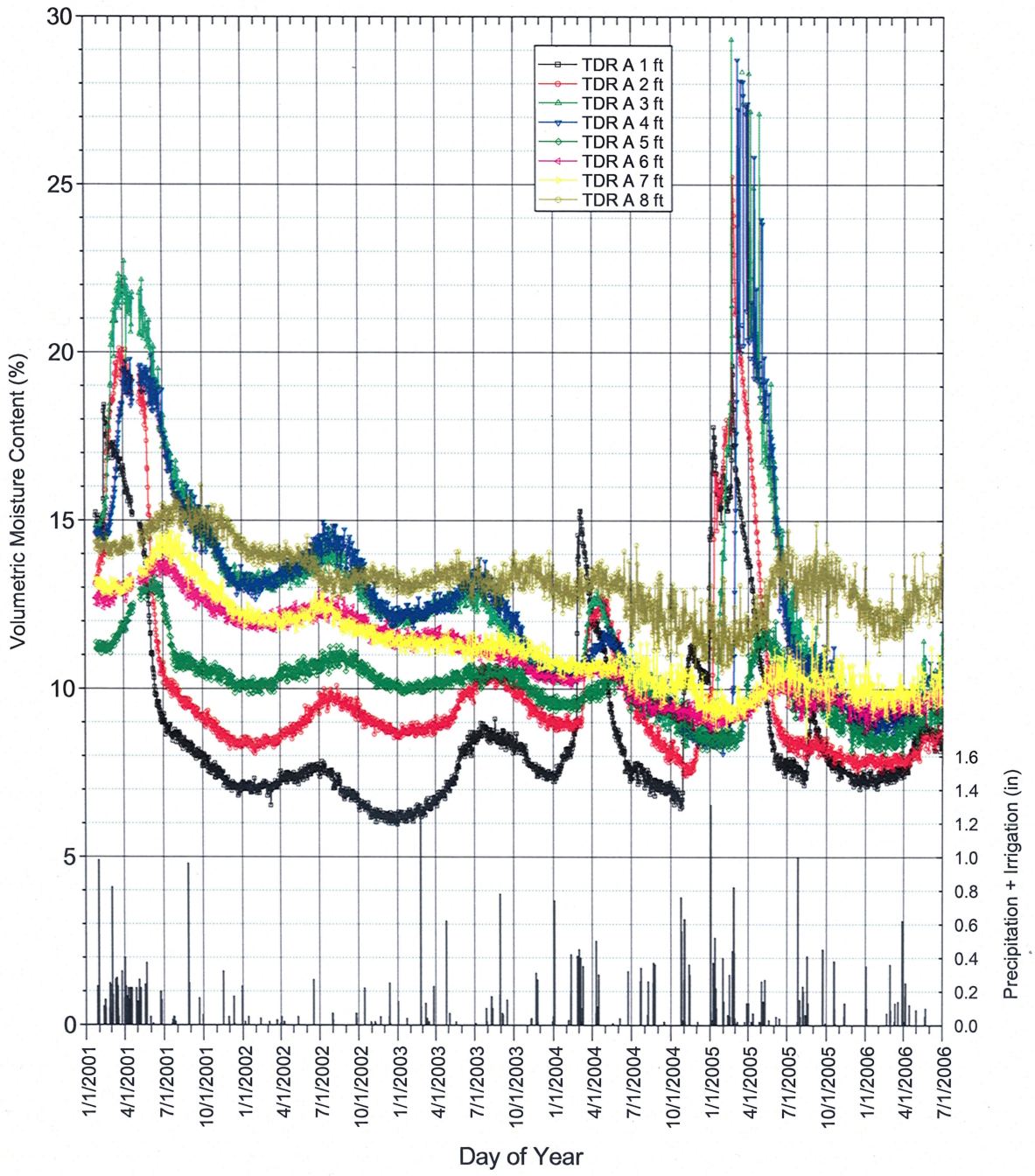


**FIGURE 5**
**EAST TDR NEST A SOIL MOISTURE CONTENT**

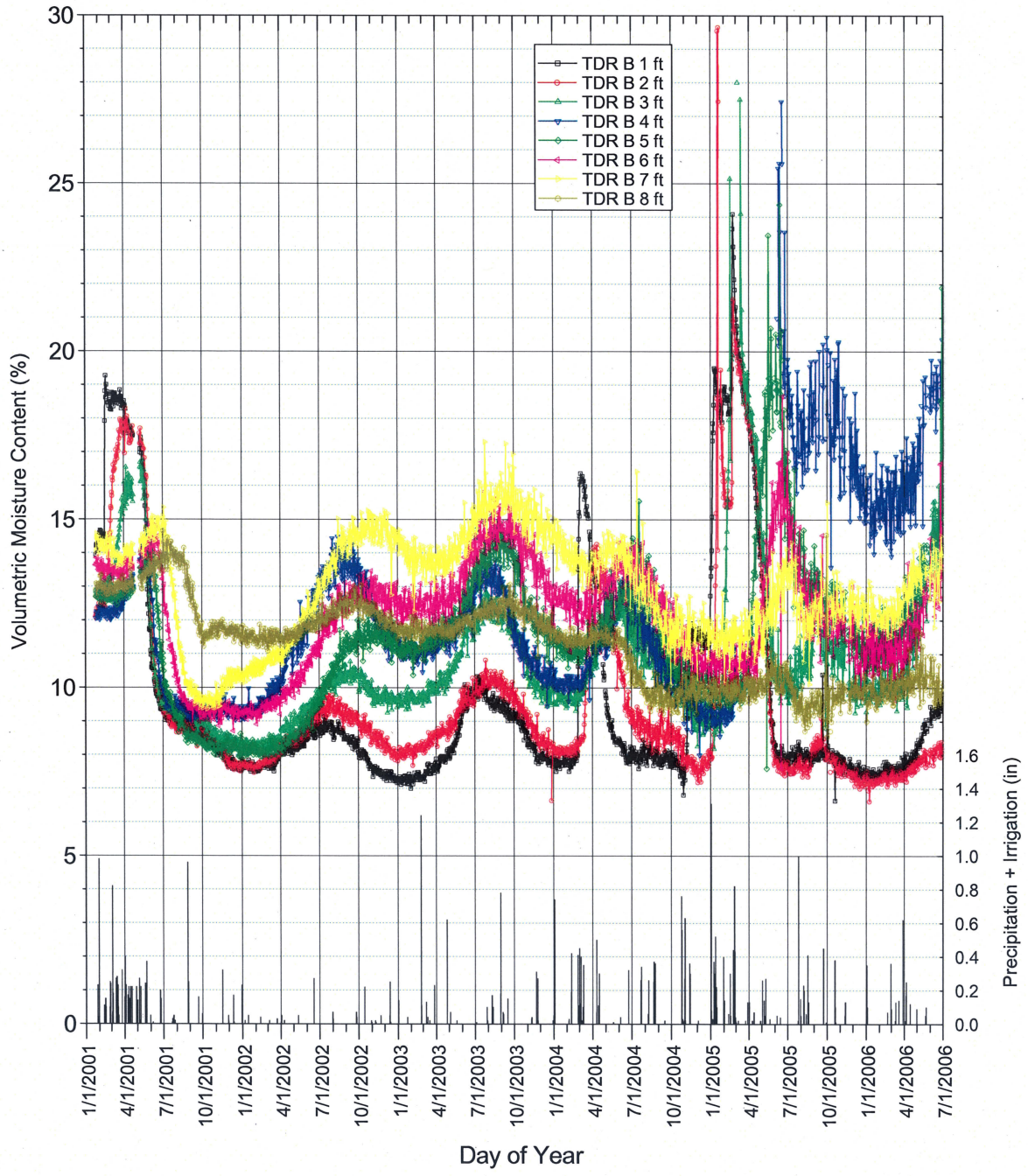


**FIGURE 6**
**EAST TDR NEST B SOIL MOISTURE CONTENT**

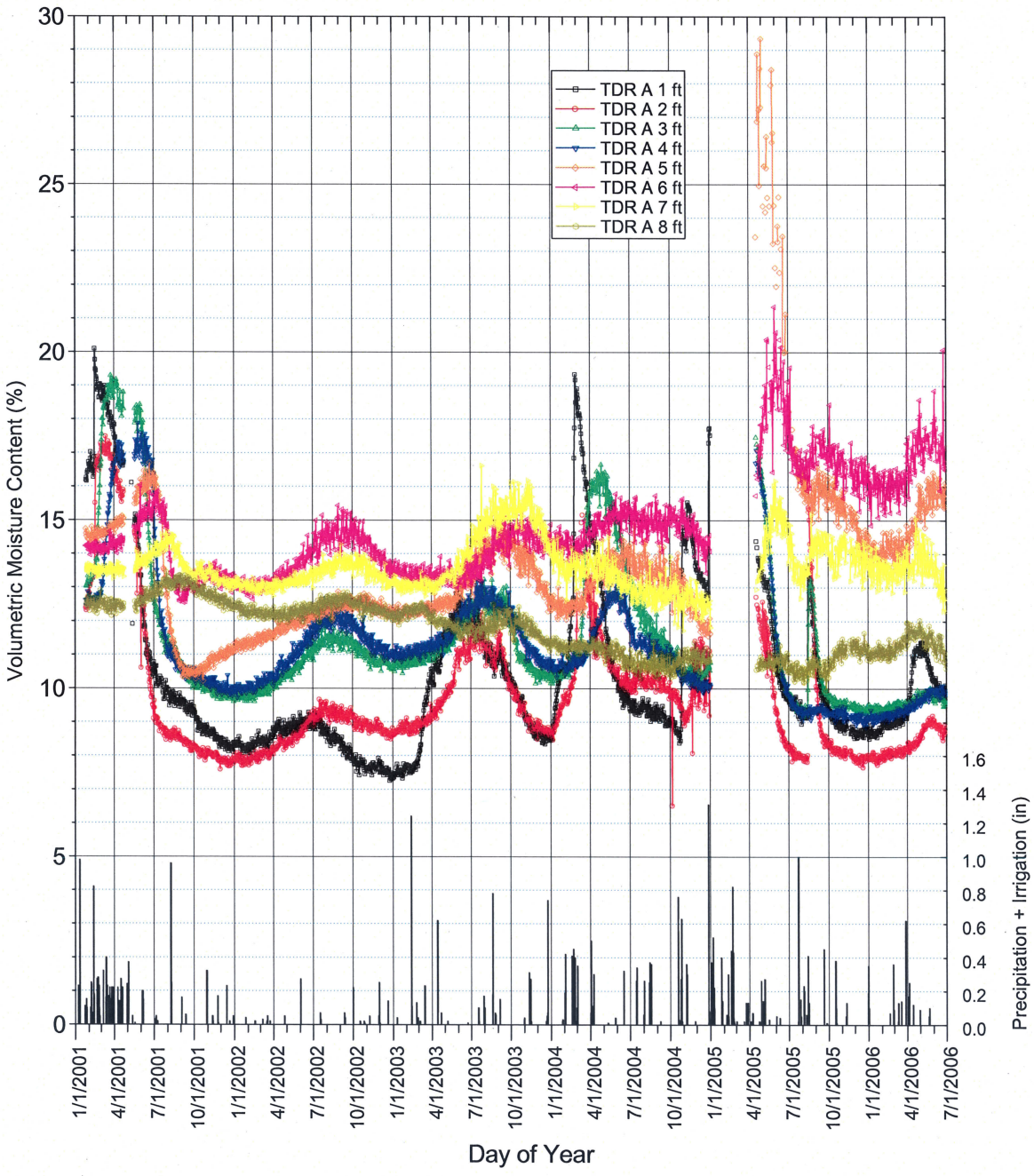


**FIGURE 7**
**WEST TDR NEST A SOIL MOISTURE CONTENT**

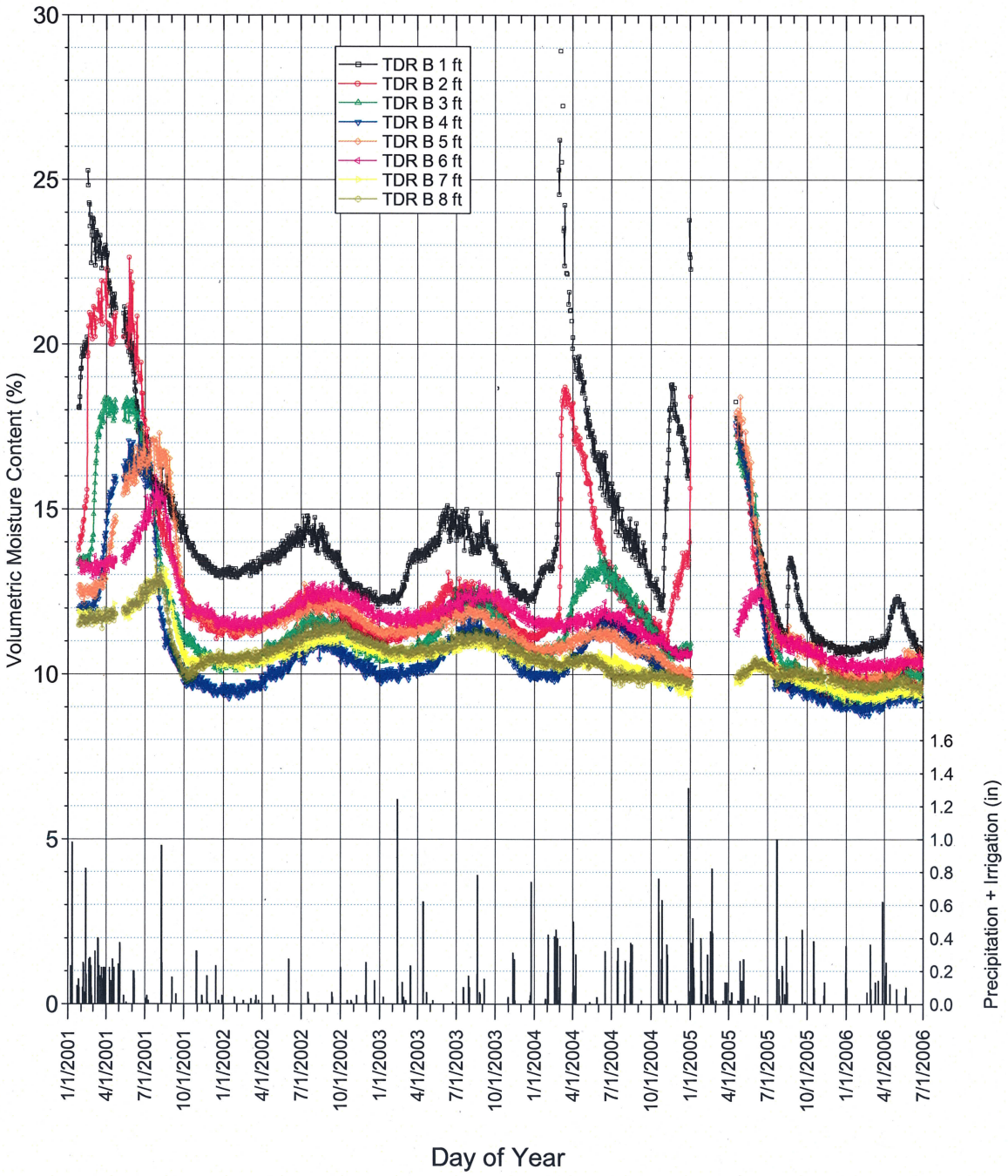


**FIGURE 8**
**WEST TDR NEST B SOIL MOISTURE CONTENT**

The East Nest B and West Nest A profiles indicate a shift in retained moisture content of approximately six percent VMC at the 1.2m (4 ft.) depth on the East Nest B station and a similar shift of two and three percent VMC at the 1.5 m (5 ft.) and 1.8 m (6 ft) depth in the West Nest A data set. The moisture contents above and below these depths returned to baseline conditions by October 2005. It's not clear if this shift represents a problem with the TDR probes at these depths, leakage from an animal burrow, or poor evapotranspiration due to low vegetative cover above these nests. An inspection will be performed to try to determine the cause.

Soil moisture content values on the TDR nests at depth remained generally between 10- to 14-percent VMC, while the moisture content on near-surface probes increased significantly due to the heavy precipitation observed over the reporting period. Recovery from these precipitation and infiltration events occurred by August 2005 with a return to dry baseline conditions by October 2005 indicating the cover is performing as designed.

# 5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## 5.1 SUMMARY

- Inspections of the CAU 110 cover were performed to identify any significant changes to the unit requiring action. Cracking and settling requiring action were observed in December, 2005, at previous problematic subsidence areas, and repairs were performed in February 2006.
- Subsidence surveys in September 2005 and March 2006 indicated a maximum decrease in elevation at SM 5 of -0.015 m (-0.05 ft), which is near the limit of resolution of the survey instruments. No substantial overall cover subsidence was observed.
- Soil moisture content has returned to dry baseline conditions following the exceptionally heavy precipitation events during January and February 2005.
- The plant community on the cover is well established. Plant cover is 0.6 percent lower this year than it was last year. Plant density is at the lowest point since the site was seeded, but all were perennial plant species; annual plants were not observed this year.
- Soil moisture contents for the TDR nests at depth are generally between 10- and 14-percent VMC. Increases in moisture content of up to three percent VMC extended to 1.8 m (6 ft) on some TDR nests, and then showed drying to baseline conditions by the end of October 2005.
- All posted warning signs and site fencing are in good repair.

## 5.2 CONCLUSIONS

- Significant subsidence to the cover has not occurred.
- Plant cover has decreased to 19.6 percent from 20.2 percent, but it is still well above the goal of 12 percent. There is no indication that remedial revegetation is necessary.
- Soil moisture results obtained to date indicate that the CAU 110 cover is functioning as designed.

## 5.3 RECOMMENDATIONS

- Continue to monitor the vegetated cover annually to evaluate plant cover, density, and diversity.
- Continue to monitor cover during scheduled inspections for further evidence of settling and need for repair as required.
- Perform inspections on TDR nests to determine cause of the shift in moisture content on the three TDR probes.
- Considering the heavy precipitation experienced in this and the previous reporting period, a compliance level will be established when the system reaches a steady state and equilibrium has been established

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# 6.0 REFERENCES

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

FFACO, see *Federal Facility Agreement and Consent Order*.

*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.

LLNL, see Lawrence Livermore National Laboratory.

Lawrence Livermore National Laboratory. 1982. "The Geology of Yucca Flat." In *Energy and Technology Review*, April. Livermore, CA.

NDEP, see Nevada Division of Environmental Protection.

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

Nevada Division of Environmental Protection. 2000. *Permit For a Hazardous Waste Facility, Permit Number NEV HW009*; Section VII.B.7, Carson City, NV.

U.S. Department of Energy, Nevada Operations Office. 1988. "Radioactive Waste Management," DOE Order 5820.2A, U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy, Nevada Operations Office. 1999. "Radioactive Waste Management," DOE Order 435.1, U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office (DOE/NV). 2001. *Closure Report for Corrective Action Unit 110: Area 3 RWMS U-3ax/bl Crater Disposal Unit, Nevada Test Site, Nevada*, DOE/NV--733, Revision 1. August 2001. Las Vegas, NV.

U.S. Environmental Protection Agency. 1996. Title 40 Code of Federal Regulations 265.90, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities Ground Water Monitoring, Washington, D.C.

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# APPENDIX A

# INSPECTION CHECKLISTS, FIELD NOTES, AND PHOTOGRAPHS

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# CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| | | |
|---|---|---|
| Inspection Date and Time: 9/27/05 10:10 | | Reason for Inspection: Quarterly |
| Date of Last Post-Closure Inspection: 6/21/05 | | Reason for Last Post-Closure Inspection: Quarterly |
| Responsible Agency: Bechtel Nevada Environmental Restoration | | |
| Address: Nevada Test Site, Mercury, Nevada | | |
| Responsible Agency Official: Jeffrey L. Smith, Project Manager | | |
| Chief Inspector: Mike Floyd | Title: Technical Lead | Organization: Environmental Restoration |
| Assistant Inspector: Glenn Richardson | Title: Task Manager | Organization: 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.
2. 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, and annotated site maps.
3. 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.
4. A standard set of color photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photograph log entry will be made for each photograph taken.
5. Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes; however, they must be legible and in sufficient detail to enable review by succeeding inspectors and the responsible agency.
6. This unit will be inspected quarterly 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 photograph log attached, and recommendations and conclusions.

| **B. PREPARATION** (To be competed prior to site visit) | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Has the Post-Closure Permit been reviewed? | ✓ | | |
| 2. Have the design basis documents been reviewed? | ✓ | | |
| 3. Have the site as-built plans and site base map been reviewed? | ✓ | | |
| 4. Have the previous inspection reports been reviewed? | ✓ | | |
| a. Were anomalies or trends detected on previous inspections? | | ✓ | |
| b. Was maintenance performed? | | ✓ | |
| 5. Have the site maintenance and repair records been reviewed? | ✓ | | |
| a. Has site repair resulted in a change from as-built conditions? | | ✓ | |
| b. Are revised as-built plans available that reflect repair changes? | | ✓ | N/A |

**C. SITE INSPECTION PREPARATION**

Assemble the following, as needed, to conduct inspections:

a. Camera, film, and batteries
b. Keys to locks
c. Clipboard
d. Tape measure
e. Radio, pager, etc.
f. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
g. Other miscellaneous support equipment

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| D. SITE INSPECTION | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Adjacent off-site features: | | | |
| a. Have there been any changes in the use of the adjacent area? | | ✓ | |
| b. Are there any new roads or trails? | | ✓ | |
| c. Has there been any 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? | ✓ | ✓ | New drainage channels were discovered along the south side of the vegetated cover. |
| f. Has there been a change in the surrounding vegetation? | | ✓ | |
| 2. Access roads, fences, gates, and signs: | | | |
| a. Is there a break in the fence? | | ✓ | |
| b. Have any posts been damaged or their anchoring weakened? | | ✓ | |
| c. Does the gate show evidence of tampering or damage? | | ✓ | |
| d. Was the gate locked? | ✓ | | |
| e. Is there any evidence of human intrusion onto the cover? | | ✓ | |
| f. Is there any evidence of large animal intrusion onto the cover? | | ✓ | |
| g. Have any signs been damaged or removed? (Number of signs replaced: ___) | | ✓ | |
| h. Other? | | ✓ | |
| 3. Monuments and other permanent features: | | | |
| a. Have survey markers, boundary monuments, or monitoring stations been disturbed? | | ✓ | |
| b. Do natural processes threaten the integrity of any survey marker, boundary monument or monitoring station? | | ✓ | |
| c. Is there excessive vegetation around the survey markers, boundary monuments, or monitoring stations? | | ✓ | |
| d. Other? | | ✓ | |
| 4. Waste unit cover: | | | |
| a. Is there evidence of settling? | | ✓ | |
| b. Is there evidence of cracking? | | ✓ | |
| c. Is there evidence of erosion (wind or water)? | | ✓ | |
| d. Is there evidence of animal burrowing? | | ✓ | |
| e. Is there a change in the vegetation growing on the cover not consistent with the naturally-occurring vegetation growing outside the unit? | | ✓ | |
| g. Other (including trash, debris, etc within fenced area)? | | ✓ | |

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

5. Photograph Instructions:

A total of 8 photographs are required to be taken during each inspection of CAU 110. Additional photographs may also be taken. The required photographs shall be taken as follows:

- Four (4) from the center of the unit, one in each compass direction (i.e., N, S, E, W) and
- Four (4) of the unit from outside the fence, one in each compass direction.

| 6. Photograph Documentation: | YES | NO | EXPLANATION |
|---|---|---|---|
| a. Have all photographs required by the photograph instructions been taken? | ✓ | | |
| b. Has a photograph log been prepared? (Number of photographs taken: 8) | ✓ | | |
| c. Other? | | ✓ | |

**E. FIELD CONCLUSIONS**

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

5. Field conclusions/recommendations: The quarterly inspection in September showed no change in the site condition since the last subsidence repair. New drainage channels were noticed along the south side of the vegetated cover.

**F. CERTIFICATION**

I have conduction an inspection of CAU 110, Area 3 WMD U-3ax/bl Crater, in accordance with the procedures of the Post-Closure Permit (including the Post-Closure Plan) as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

| | |
|---|---|
| Chief Inspector's Signature: C.L. Floyd | Date: 9/27/05 |
| Printed Name: Mike Floyd | Title: Sr. Tech. |

RCRA INSPECTIONS.

~~CALL 110~~ MSF:

PERSONNEL: TL Mike Floyd
JM Glenn Richardson

NO EQUIP.

WEATHER 70's Partly Cloudy

SCOPE: QUARTERLY INSPECTIONS of CAU's 91, 92, 110, 112

SAFETY: STOP TWO fall, heat, Biohazards, Driving Safety, Buddy System, Communications.

CAU 110:

10:10 ARRIVE ON LOCATION Check in w/ A-3, INSPECT fence Line, All Signs + fence found to be in good condition. WALK AREA of CAU 110 and found THAT there were NO Changes in SUBSIDENCE AREAS NOTED ON PREVIOUS INSPECTIONS. 8 PHOTOS TAKEN, VEGITATION in EXCELLENT CONDITION, GATE LOCKED. TDR STATIONS IN GOOD CONDITION.

CAU 91: ARRIVE ON LOCATION 1400 hrs All SIGNS, FENCE GATE, MONUMENT, MONITORING WELL WERE FOUND To Be in good CONDITION. GATE WAS LOCKED UPON ARRIVAL 10 PHOTOS TAKEN.



| SIGNATURE M. J. H | | | DATE 9/27/05 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

# CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| | |
|---|---|
| Inspection Date and Time: 12/12/08 10:04AM | Reason for Inspection: Quarterly |
| Date of Last Post-Closure Inspection: | Reason for Last Post-Closure Inspection: Quarterly |
| Responsible Agency: Bechtel Nevada Environmental Restoration | |
| Address: Nevada Test Site, Mercury, Nevada | |
| Responsible Agency Official: Jeffrey L. Smith, Project Manager | |

| | | |
|---|---|---|
| Chief Inspector: Mike Floyd | Title: Field OPS | Organization: Environmental Restoration |
| Assistant Inspector: Glenn Richardson | Title: T-M | Organization: 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.
2. 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, and annotated site maps.
3. 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.
4. A standard set of color photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photograph log entry will be made for each photograph taken.
5. Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes; however, they must be legible and in sufficient detail to enable review by succeeding inspectors and the responsible agency.
6. This unit will be inspected quarterly 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 photograph log attached, and recommendations and conclusions.

| **B. PREPARATION** (To be competed prior to site visit) | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Has the Post-Closure Permit been reviewed? | ✓ | | |
| 2. Have the design basis documents been reviewed? | ✓ | | |
| 3. Have the site as-built plans and site base map been reviewed? | ✓ | | |
| 4. Have the previous inspection reports been reviewed? | ✓ | | |
| a. Were anomalies or trends detected on previous inspections? | | ✓ | |
| b. Was maintenance performed? | | ✓ | |
| 5. Have the site maintenance and repair records been reviewed? | ✓ | | |
| a. Has site repair resulted in a change from as-built conditions? | | ✓ | |
| b. Are revised as-built plans available that reflect repair changes? | ✓ | | |

**C. SITE INSPECTION PREPARATION**

Assemble the following, as needed, to conduct inspections:

a. Camera, film, and batteries
b. Keys to locks
c. Clipboard
d. Tape measure
e. Radio, pager, etc.
f. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
g. Other miscellaneous support equipment

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| D. SITE INSPECTION | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Adjacent off-site features: | | | |
| a. Have there been any changes in the use of the adjacent area? | | ✓ | |
| b. Are there any new roads or trails? | | ✓ | |
| c. Has there been any 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. Has there been a change in the surrounding vegetation? | | ✓ | |
| 2. Access roads, fences, gates, and signs: | | | |
| a. Is there a break in the fence? | | ✓ | |
| b. Have any posts been damaged or their anchoring weakened? | | ✓ | |
| c. Does the gate show evidence of tampering or damage? | | ✓ | |
| d. Was the gate locked? | ✓ | | |
| e. Is there any evidence of human intrusion onto the cover? | | ✓ | |
| f. Is there any evidence of large animal intrusion onto the cover? | | ✓ | |
| g. Have any signs been damaged or removed? (Number of signs replaced: ___) | | ✓ | |
| h. Other? | | N/A | |
| 3. Monuments and other permanent features: | | | |
| a. Have survey markers, boundary monuments, or monitoring stations been disturbed? | | ✓ | |
| b. Do natural processes threaten the integrity of any survey marker, boundary monument or monitoring station? | | ✓ | |
| c. Is there excessive vegetation around the survey markers, boundary monuments, or monitoring stations? | | ✓ | |
| d. Other? | | N/A | |
| 4. Waste unit cover: | | | |
| a. Is there evidence of settling? | C | | SEE NOTES COMMENTS |
| b. Is there evidence of cracking? | C | | |
| c. Is there evidence of erosion (wind or water)? | | ✓ | |
| d. Is there evidence of animal burrowing? | | ✓ | |
| e. Is there a change in the vegetation growing on the cover not consistent with the naturally-occurring vegetation growing outside the unit? | | ✓ | |
| g. Other (including trash, debris, etc within fenced area)? | | ✓ | |

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

5. Photograph Instructions:

A total of 8 photographs are required to be taken during each inspection of CAU 110. Additional photographs may also be taken. The required photographs shall be taken as follows:

- Four (4) from the center of the unit, one in each compass direction (i.e., N, S, E, W) and
- Four (4) of the unit from outside the fence, one in each compass direction.

| 6. Photograph Documentation: | YES | NO | EXPLANATION |
|---|---|---|---|
| a. Have all photographs required by the photograph instructions been taken? | ✓ | | |
| b. Has a photograph log been prepared? (Number of photographs taken: ___) | ✓ | | |
| c. Other? | | N/A ✓ | |

**E. FIELD CONCLUSIONS**

| | | | |
|---|---|---|---|
| 1. Is there an imminent hazard to the integrity of the unit? (Immediate report required) | | ✓ | |
| Person/Agency to whom report was made: | | | |
| 2. Are more frequent inspections required? | | ✓ | |
| 3. Are existing maintenance/repair actions satisfactory? | ✓ | | |
| 4. Is other maintenance/repair necessary? | ✓ | | See NOTES Below |

5. Field conclusions/recommendations: WITHIN THE 2 REPAIR AREAS THERE ARE further signs of CRACKING/SETTLING AGAIN. AT THE EAST TDR, 20' NORTH THERE IS A NEW AREA of CRACKING/SETTLING. BACKFILL IN AREAS, CONTINUE Scheduled INSPECTIONS

**F. CERTIFICATION**

I have conduction an inspection of CAU 110, Area 3 WMD U-3ax/bl Crater, in accordance with the procedures of the Post-Closure Permit (including the Post-Closure Plan) as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

| | |
|---|---|
| Chief Inspector's Signature: | Date: 12/12/01 |
| Printed Name: Mike FLOYD | Title: 12/14/01 |

ork continued from Page ____ 12/12/05

RCRA INSPECTIONS.

MSF
CAU 90 BITTCUTTER (BITUTTER)

SCOPE: PERFORM RCRA INSPECTIONS ON CAU(S) 90, 91, 110, 92, 112.

SAFETY: DRIVING SAFETY, UXO, PPE, SLIP, TRIP, FALL, BUDDY SYSTEM, EMERGENCY PROCEDURES

EQUIP: NONE

WEATHER - CLEAR, CALM, HI 50's

0900 - ARRIVE AT CAU 92 - (BITCUTTER). SITE WAS FOUND TO BE IN GOOD CONDITION. FENCE(S), GATE(S) (LOCKED) SIGNS, AND COVER WERE IN GOOD CONDITION, NO FURTHER INSPECTIONS OR ACTION, ~~SMITH AGENT~~ MSF CONTINUE REGULAR INSPECTIONS.

0930 - ARRIVE AT CAU 91 (U3fi). THIS SITE WAS FOUND TO BE IN GOOD CONDITION, ALL SIGNS FENCES AND GATE WERE LOCKED AND IN GOOD CONDITION CONTINUE REGULAR INSPECTIONS.

PERSONNEL, Mike Lloyd - TL
Glenn Richardson - TM

VISITORS - TED ZAFERATOS - STATE OF NV.



Work continued to Page 96

| SIGNATURE | | | DATE |
|---|---|---|---|
| M. L. R. | | | 12/12/05 |
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |
| | | | |

**TITLE** Work continued from Page 95 — 12/12/05

**PROJECT NO.**

**BOOK NO.**

RCRA INSPECTIONS CONT.

CALL(S) 90, 91, 92, 110, 112

1000- ARRIVE AT CALL 110 (CELL 3 and 4). Need to Change Gate Locks (Does not open), ARRIVED to find Gate Locked, Fence in good Condition, Signs in good Condition, There were 3 areas of Subsidence were found.

1. 10-12' North of the EAST TDR Station There is a 1'w x 1½', x 8' Long area of Subsidence.
2. AT the EAST END ~~There~~ side THERE IS AN Extension OF SUBSIDENCE that has Been monitored in the past. 2'wx 18"D x 6' Long
3. On the North East Subsidence area that has Been monitored has opened up again 1½'x ?" D. x 10-12' Long.

Recommend Backfilling All areas to Surface Grade. By the next Inspections.

1100- ARRIVE AT CALL 92. Gate Locked, Fence & Signs Were found to be in good condition, Some grass in Wave Barrell. Weed Removal looks good. OVERALL Site Condition was found in good Condition.



Work continued to Page 97

| SIGNATURE | | | DATE 12/12/05 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

2/6/06

CAU110 : AxB1

Personnel,
FC: Brian Konrad
Laborers: Jeno Gonzales, Joseph Smith.
Engineer: Greg Doyle
Visitors: - None
Equipment:
Dumpsy Jack
Wheelbarrow
Shovel
Weather: 43° cool, Sunny & Clear.

Scope: Repair Subsidence cracks.

Tailgate Safety Briefing:
Rad Postings, Uneven ground, Slips trips falls
subsidence Areas. UXO, Level D PPE.

9:00- Arrived @ Area 3 Ax/B1.
8:20- Crew Arrived onsite.
8:30 waiting for RCT to arrive at Area 3.
8:50 - RCT arrived onsite.
Awaiting to be put on POD for
Area 3.
Recieved verification from Cheryl Pfister that
we are on POD for today.



| SIGNATURE | | | DATE 2/2/06. |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

0.10- Walked down site with crew identified 3 areas needing repair.
0.15- Crew began repairing 1st Area.
10.00. Area around 1st site has been compacted with no further subsidence. Begining to Fill subsided Area with native material.

1010- Completed first Area.
Mobilizing Equipment & supplies to 2nd location.

1030 Finished filling & compacting 2nd Area. Small area adjacent to 2nd area noticed while walking site. TM notified of new area. was instructed by TM to fill area and TM will notify client.
- Began placing fill in new subsidence.
1035 When Compacting around new area. Large Subsidence opened up, size of basketball and very deep. Stoped activities in Area. & cordoned off area. Notified TM, FOM, FS, & DPM of situation.

1045 Conference call with H&S, FOM & FS about new subsidence. Work halted on cover all personnel taken off of cover. Awaiting Further Direction.


Work continued to Page 117

| SIGNATURE | | | DATE 2/15/06 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

11:00 Leaving Area & waiting @ trailer.
11:15 Crew taking lunch early since we are on hold.
12:00 Crew returned still on hold. Awaiting Engineering to evaluate new subsidence.
1300 ~~Engin~~ DK 2/6/06 - Crew released for day.
Engineering scheduled to be onsite around 1400 to 1430.
1444 Engineer arrived @ trailer.
1450 Began walking down site w/ Engineer. To look @ new subsidence.
1502. Engineer recommends using current methods to repair new subsidence.
1510 left site



Work continued to Page

| SIGNATURE | | | DATE 2/6/06 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

CAU110: Ax/B1 2/7/06

Personnel
FC: Brian Konrad
SUP. Billy Tompleton
Laborers: Kelly Stillwell, Michael LaGrow
Engineer: Greg Boyle. Dan Tobiason.
Wiremen: Jolie Pando & Ralph Denise.
Visitors: Dave Madsen & Mario Vasquez.

Equipment.
Shovel, wheel barrow, Jumping Jack, GPR.

Weather: cool, sunny & clear.

Scope: Repair Subsidence Cracks in Ax/B1 cover.

Tailgate: Slips Trips Falls, be aware of subsidences developing during use of Jumping Jack, Emergency procedures,

8:05: Arrived on site.
8:15: Crew arrived onsite. began review of work package & PTHR.
8:20 talked w/ Doug Clark and was informed Activities are on the POD for Area 3. Crew should be Arriving Shortly to open gates.


Work continued to Page 119

| SIGNATURE | | | DATE 2/7/06. |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

9.00 - Signed in @ trailer and headed to site
9.20 Informed by FOM to hold work activities
9.40 Wiremen will be coming to site to GPR around subsidence to try and verify void spaces.
9.45 left Ax/B1 and headed for trailer.
10.00 - Dan Tobiason & Grey Doyle arrived onsite.
10.20 Dan & Grey left site.
1143 Dave Madsen & Mario Vasquez Ralph Denise, & Jake Pando Arrived onsite.
1226 Wiremen began GPR of Subsidence Area
1300 Wiremen left site,
- Determination of H&S & FOM to continue to repair lost area minimizing The ~~01/27/06 USING~~ Use of the Jumping Jack.

1305 - Dave & Mario left site.
1315 - Laborers came back to site to begin repair of final area.
1342 Placing clean Fill over subsidence crack.
1355 Began compacting clean fill with Jumping Jack.



| SIGNATURE | | | DATE 2/7/06 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

**120** PROJECT NO.

BOOK NO.

**TITLE**

Work continued from Page 119

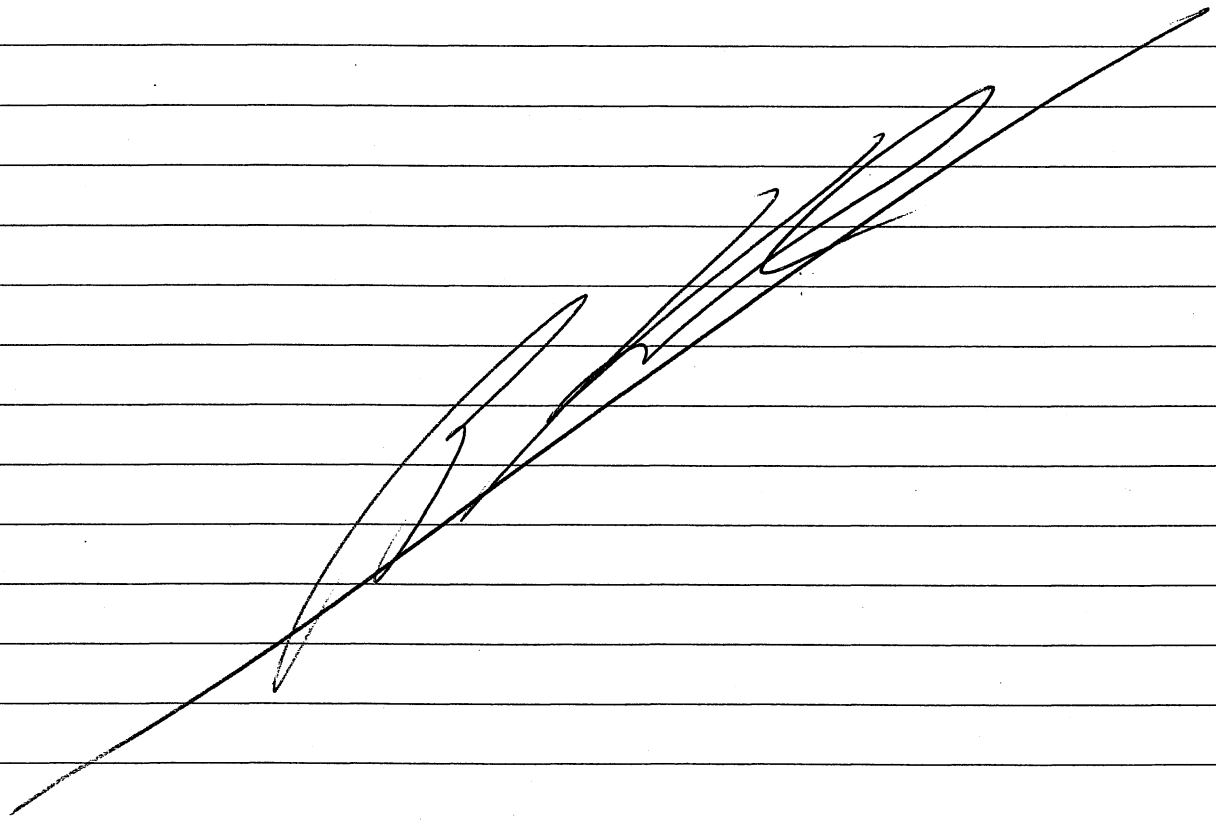
1420 - Completed compaction of Area. Awaiting Engineering to arrive to inspect work.

1430 - Engineers arrived onsite. Began to inspect Areas that have been prepared. All repaired areas have been accepted by Engineering as Complete.

1450 - Engineering left site.

1455 - Craft left site and V out at trailer.

1500 Site secured and left.





Work continued to Page

| SIGNATURE | | | DATE 2/7/06 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

# CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| | | |
|---|---|---|
| Inspection Date and Time: 3/23/06 9:30 AM | | Reason for Inspection: Quarterly |
| Date of Last Post-Closure Inspection: 12/12/05 | | Reason for Last Post-Closure Inspection: Quarterly |
| Responsible Agency: Bechtel Nevada Environmental Restoration | | |
| Address: Nevada Test Site, Mercury, Nevada | | |
| Responsible Agency Official: Jeffrey L. Smith, Project Manager | | |
| Chief Inspector: Glenn Richardson | Title: Task Manager | Organization: Environmental Restoration |
| Assistant Inspector: Brian Konrad | Title: Deputy Field Ops Manager | Organization: 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.
2. 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, and annotated site maps.
3. 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.
4. A standard set of color photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photograph log entry will be made for each photograph taken.
5. Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes; however, they must be legible and in sufficient detail to enable review by succeeding inspectors and the responsible agency.
6. This unit will be inspected quarterly 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 photograph log attached, and recommendations and conclusions.

| **B. PREPARATION** (To be competed prior to site visit) | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Has the Post-Closure Permit been reviewed? | ✓ | | |
| 2. Have the design basis documents been reviewed? | ✓ | | |
| 3. Have the site as-built plans and site base map been reviewed? | ✓ | | |
| 4. Have the previous inspection reports been reviewed? | ✓ | | |
| a. Were anomalies or trends detected on previous inspections? | ✓ | | Subsidence features were identified on previous inspections. |
| b. Was maintenance performed? | ✓ | | Subsidence repairs were completed within 60 days. |
| 5. Have the site maintenance and repair records been reviewed? | ✓ | | |
| a. Has site repair resulted in a change from as-built conditions? | | ✓ | |
| b. Are revised as-built plans available that reflect repair changes? | | ✓ | N/A |

**C. SITE INSPECTION PREPARATION**

Assemble the following, as needed, to conduct inspections:

a. Camera, film, and batteries
b. Keys to locks
c. Clipboard
d. Tape measure
e. Radio, pager, etc.
f. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
g. Other miscellaneous support equipment

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| D. SITE INSPECTION | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Adjacent off-site features: | | | |
| a. Have there been any changes in the use of the adjacent area? | | ✓ | |
| b. Are there any new roads or trails? | | ✓ | |
| c. Has there been any 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. Has there been a change in the surrounding vegetation? | | ✓ | |
| 2. Access roads, fences, gates, and signs: | | | |
| a. Is there a break in the fence? | | ✓ | |
| b. Have any posts been damaged or their anchoring weakened? | | ✓ | |
| c. Does the gate show evidence of tampering or damage? | | ✓ | |
| d. Was the gate locked? | ✓ | | |
| e. Is there any evidence of human intrusion onto the cover? | | ✓ | |
| f. Is there any evidence of large animal intrusion onto the cover? | | ✓ | |
| g. Have any signs been damaged or removed? (Number of signs replaced: 0) | | ✓ | |
| h. Other? | | ✓ | |
| 3. Monuments and other permanent features: | | | |
| a. Have survey markers, boundary monuments, or monitoring stations been disturbed? | | ✓ | |
| b. Do natural processes threaten the integrity of any survey marker, boundary monument or monitoring station? | | ✓ | |
| c. Is there excessive vegetation around the survey markers, boundary monuments, or monitoring stations? | | ✓ | |
| d. Other? | | ✓ | |
| 4. Waste unit cover: | | | |
| a. Is there evidence of settling? | | ✓ | |
| b. Is there evidence of cracking? | | ✓ | |
| c. Is there evidence of erosion (wind or water)? | | ✓ | |
| d. Is there evidence of animal burrowing? | ✓ | | small minor animal burrows noticed. |
| e. Is there a change in the vegetation growing on the cover not consistent with the naturally-occurring vegetation growing outside the unit? | | ✓ | |
| g. Other (including trash, debris, etc within fenced area)? | | ✓ | |

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

5. Photograph Instructions:

A total of 8 photographs are required to be taken during each inspection of CAU 110. Additional photographs may also be taken. The required photographs shall be taken as follows:

- Four (4) from the center of the unit, one in each compass direction (i.e., N, S, E, W) and
- Four (4) of the unit from outside the fence, one in each compass direction.

| 6. Photograph Documentation: | YES | NO | EXPLANATION |
|---|---|---|---|
| a. Have all photographs required by the photograph instructions been taken? | ✓ | | |
| b. Has a photograph log been prepared? (Number of photographs taken: 8) | ✓ | | |
| c. Other? | | ✓ | |

**E. FIELD CONCLUSIONS**

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

5. Field conclusions/recommendations:

There was no evidence of new subsidence features on the cover since the last subsidence repair on Feb. 23, 2006. There was minor evidence of small animal burrowing. The signs, fencing, and vegetation cover were in good condition.

**F. CERTIFICATION**

I have conduction an inspection of CAU 110, Area 3 WMD U-3ax/bl Crater, in accordance with the procedures of the Post-Closure Permit (including the Post-Closure Plan) as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

| | |
|---|---|
| Chief Inspector's Signature: Glenn Richardson | Date: 3/23/06 |
| Printed Name: Glenn Richardson | Title: Task Manager |

Work continued from Page ____ 3/23/06

RCRA Inspection

Personell:
TM: Glenn Richardson
TL: Brian Konrad

No Equip

Weather: Mid 50's, Clear, no wind

Scope: Quarterly Inspection (CAU 110, 112, 92)
& Annual Inspection - Final CAU 333.

9:25 - Arrived at A3 site checked in at site trailer Began inspection of Ax/BL CAU 110.
Photos 1 - Center Facing N
" 2 " " E
3 " " S
4 " " W
5 N edge facing S.
Several small animal Burrows observed around perimeter of tower.
Subsidence previously repair on N side holding no further sign of subsidence
Photo 6 E edge facing W
Vegitation in good condition



Work continued to Page 130

| SIGNATURE | | | DATE 3/23/06 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

**130 TITLE**

PROJECT NO.

Work continued from Page 129

BOOK NO.

9:56. Subsidence repair on E side of cover holding no sign of new subsidence.
TDR in good condition
Subsidence of South side of cover repair holding, no further sign of subsidence
Photo 7 South Edge Facing N.
Photo 8 West Edge facing E.
10:05 left site.

10:20 Arrived at CA491
- All signs, Fencing, Gate, Monuments in good conditions. Gate was locked.

Photo 1 Center Facing N
2 " " E
3 " " S
4 " " W
5 South Side Facing N
6 North Side facing S
7 Outside Facing N.
8 " " E
9 " " S
10 " " W

1031 left site



Work continued to Page 131

| SIGNATURE | | | DATE 3/23/06 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

# CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| | | |
|---|---|---|
| Inspection Date and Time: 6/20/06 ~~0945~~ 1500 | | Reason for Inspection: Quarterly |
| Date of Last Post-Closure Inspection: | | Reason for Last Post-Closure Inspection: Quarterly |
| Responsible Agency: Bechtel Nevada Environmental Restoration | | |
| Address: Nevada Test Site, Mercury, Nevada | | |
| Responsible Agency Official: Jeffrey L. Smith, Project Manager | | |
| Chief Inspector: SHAUGHN BURNISON | Title: TECH LEAD | Organization: Environmental Restoration |
| Assistant Inspector: GLENN RICHARDSON | Title: TASK MGR | Organization: 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.
2. 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, and annotated site maps.
3. 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.
4. A standard set of color photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photograph log entry will be made for each photograph taken.
5. Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes; however, they must be legible and in sufficient detail to enable review by succeeding inspectors and the responsible agency.
6. This unit will be inspected quarterly 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 photograph log attached, and recommendations and conclusions.

| **B. PREPARATION** (To be competed prior to site visit) | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Has the Post-Closure Permit been reviewed? | X | | |
| 2. Have the design basis documents been reviewed? | X | | |
| 3. Have the site as-built plans and site base map been reviewed? | X | | |
| 4. Have the previous inspection reports been reviewed? | X | | |
| a. Were anomalies or trends detected on previous inspections? | | X | |
| b. Was maintenance performed? | | X | |
| 5. Have the site maintenance and repair records been reviewed? | X | | |
| a. Has site repair resulted in a change from as-built conditions? | | X | |
| b. Are revised as-built plans available that reflect repair changes? | | | N/A |

**C. SITE INSPECTION PREPARATION**

Assemble the following, as needed, to conduct inspections:

a. Camera, film, and batteries
b. Keys to locks
c. Clipboard
d. Tape measure
e. Radio, pager, etc.
f. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
g. Other miscellaneous support equipment

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

| D. SITE INSPECTION arr: 9:45 | YES | NO | EXPLANATION |
|---|---|---|---|
| 1. Adjacent off-site features: | | | |
| a. Have there been any changes in the use of the adjacent area? | X | | Adjacent landfill AH/AT now closed & idle. |
| b. Are there any new roads or trails? | | X | |
| c. Has there been any 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. Has there been a change in the surrounding vegetation? | | X | |
| 2. Access roads, fences, gates, and signs: | | | |
| a. Is there a break in the fence? | | X | |
| b. Have any posts been damaged or their anchoring weakened? | | X | |
| c. Does the gate show evidence of tampering or damage? | | X | |
| d. Was the gate locked? | X | | |
| e. Is there any evidence of human intrusion onto the cover? | | X | |
| f. Is there any evidence of large animal intrusion onto the cover? | | X | |
| g. Have any signs been damaged or removed? (Number of signs replaced: ___) | | X | |
| h. Other? | | | N/A |
| 3. Monuments and other permanent features: | | | |
| a. Have survey markers, boundary monuments, or monitoring stations been disturbed? | | X | |
| b. Do natural processes threaten the integrity of any survey marker, boundary monument or monitoring station? | | X | |
| c. Is there excessive vegetation around the survey markers, boundary monuments, or monitoring stations? | | X | |
| d. Other? | | | N/A |
| 4. Waste unit cover: | | | |
| a. Is there evidence of settling? | | X | Nothing Significant, Repairs Holding |
| b. Is there evidence of cracking? | | X | " " " " |
| c. Is there evidence of erosion (wind or water)? | | X | |
| d. Is there evidence of animal burrowing? | X | | Ground squirrels & Burrows were noted |
| e. Is there a change in the vegetation growing on the cover not consistent with the naturally-occurring vegetation growing outside the unit? | | X | |
| g. Other (including trash, debris, etc within fenced area)? | | X | |

## CAU 110: AREA 3 WMD U-3ax/bl CRATER, POST-CLOSURE INSPECTION CHECKLIST

5. Photograph Instructions:

A total of 8 photographs are required to be taken during each inspection of CAU 110. Additional photographs may also be taken. The required photographs shall be taken as follows:

- Four (4) from the center of the unit, one in each compass direction (i.e., N, S, E, W) and
- Four (4) of the unit from outside the fence, one in each compass direction.

| 6. Photograph Documentation: | YES | NO | EXPLANATION |
|---|---|---|---|
| a. Have all photographs required by the photograph instructions been taken? | X | | |
| b. Has a photograph log been prepared? (Number of photographs taken: 8 ) | X | | |
| c. Other? | | | N/A |

**E. FIELD CONCLUSIONS**

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

5. Field conclusions/recommendations: IN SPITE OF RECORD CATCH DURING TRAPPING, 3 OR 4 GROUND SQUIRRELS WERE OBSERVED ON THE COVER. REPAIRS MADE EARLIER IN THE YEAR ON SUBSIDENCE AREAS ARE HOLDING WELL. NO ISSUES WITH SIGNS OR FENCING. EXCELLENT CONDITION OVERALL.

**F. CERTIFICATION**

I have conduction an inspection of CAU 110, Area 3 WMD U-3ax/bl Crater, in accordance with the procedures of the Post-Closure Permit (including the Post-Closure Plan) as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

| | | | |
|---|---|---|---|
| Chief Inspector's Signature: | Shaughn A Burnison | Date: | 6/20/2006 |
| Printed Name: | SHAUGHN A. BURNISON | Title: | FIELD TECHNICAL LEAD |

**142 TITLE** RCRA INSPECTIONS 6/20/2006 **PROJECT NO.**

Work continued from Page NA **BOOK NO.**

RCRA INSPECTIONS — CAUs 90, 92, 110, 112

PERSONNEL: GLENN RICHARDSON BN-ER TASK MGR

SHAUGHN BURNISON BN-ER TECH LEAD

ALISSA SILVAS BN-ER TECH LEAD / TASK MGR

VISITORS: TED ZAFERATOS NDEP

~~KEVIN CABBLE~~ ~~NNSA~~

EQUIPMENT: DIGITAL CAMERA

WEATHER: CLEAR, SUNNY, 90's. HAZY HORIZON. LIGHT BREEZE (S) 10 MPH

TAILGATE: SLIPS/TRIPS, CAU 112 ANIMALS & SNAKES, HEAT STRESS, SHARP EDGES & BURRS, SUBSIDENCE ON AX/BL, DRIVING SAFETY, FIRE/DRIED VEGETATION, COMMUNICATIONS, MEDICAL FACILITIES, EMERGENCY PROCEDURES, OCC CALL-IN, AX/BL URMA AWARENESS,

SCOPE OF WORK: QUARTERLY OR SEMI-ANNUAL INSPECTIONS AT 4 CAUs (see above)

ACTIVITIES: 08:37: DEPART MERCURY FOR AREA 2

9:15 ARRIVE CAU 90 BITCUTTER — WALK SITE — OPEN GATES & VIEW COVERS & MONUMENT SLABS. SOME (SEVERAL) KANGAROO RAT BURROWS ON SOUTH SIDE OF SOUTH UNIT. APPEAR RECENT & ACTIVE. SOME COLLAPSED INACTIVE BURROWS IN NORTH UNIT. ALL BURROWS BACKFILLED WITH BOOTS. ALL SIGNS UP. FENCES IN GOOD CONDITION. GATES LOCKED & OPERABLE. BRASS MARKERS READABLE & AFIXED. SIGNS READABLE BUT SOON TO BE OUT-OF-DATE (BECHTEL NEVADA & PHONE # WORDING).

DEPART SITE 9:35. PHOTOS TAKEN (SEE CHECKLISTS)

9:45 ARRIVE CAU 110 AX/BL — ACCESS DEPENDENT ON AREA 5 RWMS STAFF. WAIT FOR STAFF MEMBER TO SHOW TO ALLOW ACCESS. REMINDER PAGED.

10:10 NO WORD ON ACCESS. DEPART FOR CAU 92 IN AREA 6. NO INSPECTION OF CAU 110 AT THIS TIME.



Work continued to Page 143

| SIGNATURE Shaughn A Burnison | | | DATE 6/20/2006 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

ACTIVITIES CONTINUED: 10:20 ARRIVE CAU 92 AREA 6 DECON POND - DRIVE PERIMETER. NOTICE VEGETATION GROWING ON MARGIN ON 3 SIDES, NONE ON THE COVER PROPER. UNLOCKED GATE, WALKED INTERIOR, WAVE BARRIER IN GOOD CONDITION. SIGNS UP & IN GOOD CONDITION, BUT WORDING WILL BE OUT-OF-DATE SOON. NO CRACKING ON COVER. SITE OVERALL IN EXCELLENT CONDITION. HERBICIDE APPLICATION RECOMMENDED TO CONTROL VEGETATION BEFORE IT SPREADS. LOCKED GATE — DEP FOR CAU 112. PHOTOS TAKEN (SEE CHECKLISTS)

11:05 ARRIVE CAU 112 AREA 23 HAZARDOUS WASTE TRENCHES GATE & EXTERIOR FENCE & SIGNAGE IN EXCELLENT CONDITION. UNLOCKED GATE, ENTERED, & DRIVE MARGIN OF LANDFILL. RIPRAP IN GOOD SHAPE. NO SIGNIFICANT VEGETATION NOTED — A SMALL PLANT HERE & THERE. MONUMENTS OK, MONITOR WELL COVERS IN PLACE. NO SIGNS DOWN. EXITED, LOCKED GATE, DEPARTED SIGHT NO PHOTOS.

15:00 ARRIVE CAU 110 AX/BL GATE & FENCE & SIGNAGE IN EXCELLENT CONDITION. ENTERED SITE & WALKED COVER. VEGETATION VERY HEALTHY. ONE INACTIVE ANT COLONY NOTED. SEVERAL GROUND SQUIRRELS SCURRIED AWAY AS WE WALKED ON COVER IN SPITE OF RECORD "TRAP & RELOCATE" CATCH EARLIER IN THE SPRING. MOST BURROWS APPEARED UNOCCUPIED, HOWEVER. IT IS NOTED THAT THE ADJACENT LANDFILL FACILITY — AH/AT — IS NOW IDLE & CLOSED. PREVIOUSLY REPAIRED AREAS (FOR SETTLING) ARE HOLDING WELL. NO SIGNIFICANT NEW CRACKS OR SUBSIDING AREAS NOTED. EXCELLENT CONDITION OVERALL. NO RECOMMENDATIONS OR MAINTENANCE REQUIRED.

INSPECTIONS COMPLETE





Work continued to Page N/A

| SIGNATURE | | | DATE 6/20/06 |
|---|---|---|---|
| DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE |

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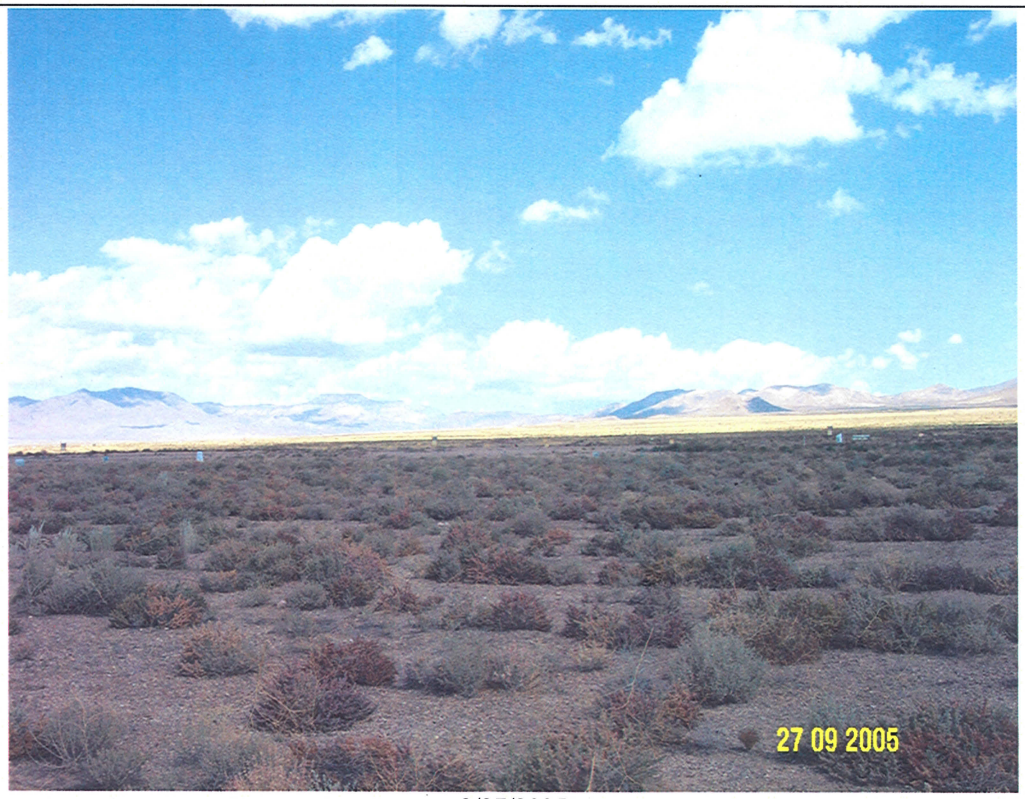
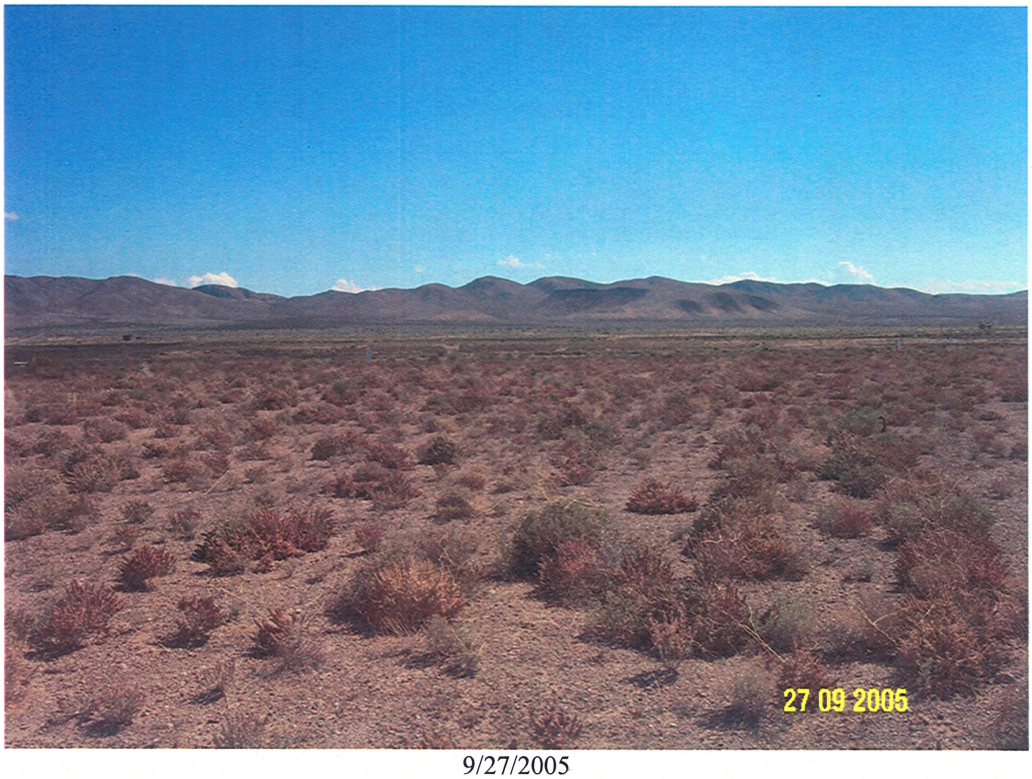
# PHOTOGRAPH LOG

| PHOTOGRAPH NUMBER | DATE | DESCRIPTION |
|---|---|---|
| 1 | 09/27/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking north. |
| 2 | 09/27/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking east. |
| 3 | 09/27/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking south. |
| 4 | 09/27/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking west. |
| 5 | 09/27/2005 | View from north edge Area 3 WMD U-3ax/bl Crater cover looking south. |
| 6 | 09/27/2005 | View from east edge Area 3 WMD U-3ax/bl Crater cover looking west. |
| 7 | 09/27/2005 | View from south edge Area 3 WMD U-3ax/bl Crater cover looking north. |
| 8 | 09/27/2005 | View from west edge Area 3 WMD U-3ax/bl Crater cover looking east. |
| 1 | 12/12/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking north. |
| 2 | 12/12/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking east. |
| 3 | 12/12/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking south. |
| 4 | 12/12/2005 | View from center Area 3 WMD U-3ax/bl Crater cover looking west. |
| 5 | 12/12/2005 | View from north edge Area 3 WMD U-3ax/bl Crater cover looking south. |
| 6 | 12/12/2005 | View from east edge Area 3 WMD U-3ax/bl Crater cover looking west. |
| 7 | 12/12/2005 | View from south edge Area 3 WMD U-3ax/bl Crater cover looking north. |
| 8 | 12/12/2005 | View from west edge Area 3 WMD U-3ax/bl Crater cover looking east. |
| 9 | 12/12/2005 | Subsidence crack along eastside of the cover. |
| 10 | 12/12/2005 | Circular subsidence crack on the cover. |
| 11 | 12/12/2005 | Reoccurring subsidence crack on the cover. |
| 12 | 12/12/2005 | Small animal burrow on subsidence crack. |
| 13 | 12/12/2005 | Small animal burrow on the cover. |
| 14 | 12/12/2005 | Small animal burrow behind west TDR. |
| 1 | 03/23/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking north. |
| 2 | 03/23/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking east. |
| 3 | 03/23/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking south. |
| 4 | 03/23/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking west. |
| 5 | 03/23/2006 | View from north edge Area 3 WMD U-3ax/bl Crater cover looking south. |
| 6 | 03/23/2006 | View from east edge Area 3 WMD U-3ax/bl Crater cover looking west. |
| 7 | 03/23/2006 | View from south edge Area 3 WMD U-3ax/bl Crater cover looking north. |
| 8 | 03/23/2006 | View from west edge Area 3 WMD U-3ax/bl Crater cover looking east. |

| PHOTOGRAPH LOG | | |
|---|---|---|
| **PHOTOGRAPH NUMBER** | **DATE** | **DESCRIPTION** |
| 1 | 06/20/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking north. |
| 2 | 06/20/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking east. |
| 3 | 06/20/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking south. |
| 4 | 06/20/2006 | View from center Area 3 WMD U-3ax/bl Crater cover looking west. |
| 5 | 06/20/2006 | View from north edge Area 3 WMD U-3ax/bl Crater cover looking south. |
| 6 | 06/20/2006 | View from east edge Area 3 WMD U-3ax/bl Crater cover looking west. |
| 7 | 06/20/2006 | View from south edge Area 3 WMD U-3ax/bl Crater cover looking north. |
| 8 | 06/20/2006 | View from west edge Area 3 WMD U-3ax/bl Crater cover looking east. |




9/27/2005
1. View from center U-3ax/bl cover looking north.




9/27/2005
2. View from center U-3ax/bl cover looking east.


9/27/2005
3. View from center U-3ax/bl cover looking south.


9/27/2005
4. View from center U-3ax/bl cover looking west.


9/27/2005

5. View from north edge U-3ax/bl cover looking south.


9/27/2005

6. View from east edge U-3ax/bl cover looking west.


9/27/2005
7. View from south edge U-3ax/bl cover looking north.


9/27/2005
8. View from west edge U-3ax/bl cover looking east.


12/12/2005

1. View from center U-3ax/bl cover looking north.


12/12/2005

2. View from center U-3ax/bl cover looking east.


12/12/2005

3. View from center U-3ax/bl cover looking south.


12/12/2005

4. View from center U-3ax/bl cover looking west.


12/12/2005
5. View from north edge U-3ax/bl cover looking south.


12/12/2005
6. View from east edge U-3ax/bl cover looking west.


12/12/2005

7. View from south edge U-3ax/bl cover looking north.


12/12/2005

8. View from west edge U-3ax/bl cover looking east.


12/12/2005

9. Subsidence crack along eastside of the cover.


12/12/2005

10. Circular subsidence crack on the cover.


12/12/2005

11. Reoccurring subsidence crack on the cover.


12/12/2005

12. Small animal burrow on a subsidence crack.


12/12/2005
13. Small animal burrow on the cover.


12/12/2005
14. Small animal burrow behind the west TDR.

03/23/2006
1. View from center U-3ax/bl cover looking north.

03/23/2006
2. View from center U-3ax/bl cover looking east.

03/23/2006
3. View from center U-3ax/bl cover looking south.

03/23/2006
4. View from center U-3ax/bl cover looking west.

03/23/2006
5. View from north edge U-3ax/bl cover looking south.

03/23/2006
6. View from east edge U-3ax/bl cover looking west.

03/23/2006
7. View from south edge U-3ax/bl cover looking north.

03/23/2006
8. View from west edge U-3ax/bl cover looking east.


06/20/2006
1. View from center U-3ax/bl cover looking north.


06/20/2006
2. View from center U-3ax/bl cover looking east.


06/20/2006
3. View from center U-3ax/bl cover looking south.


06/20/2006
4. View from center U-3ax/bl cover looking west.


06/20/2006
5. View from north edge U-3ax/bl cover looking south.


06/20/2006
6. View from east edge U-3ax/bl cover looking west.


06/20/2006
7. View from south edge U-3ax/bl cover looking north.


06/20/2006
8. View from west edge U-3ax/bl cover looking east.

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# APPENDIX B

# MONITORING DATA*

*Monitoring data is summarized in Section 4.0 of this report, and the complete data set is kept in the project files in Mercury, NV.

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# APPENDIX C

# SUBSIDENCE SURVEY PLATS

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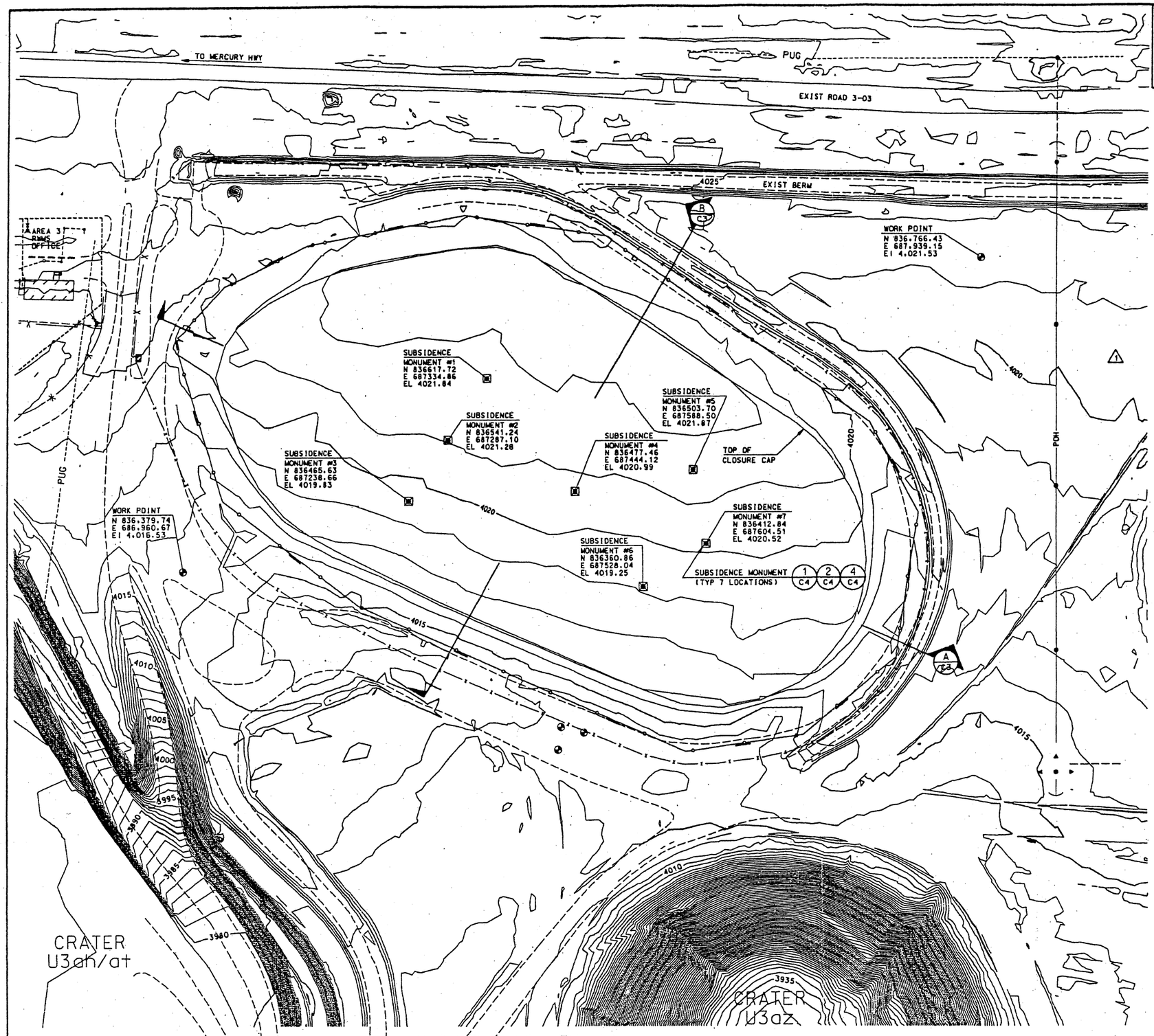


GRADING PLAN

SCALE : 1" = 60'

# DUAL ENGLISH/METRIC DRAWING

ALL METRIC DIMENSIONS AND NOTATIONS ARE SHOWN BELOW THE DIMENSION LINE OR IN PARENTHESIS.

WHOLE NUMBERS INDICATE MILLIMETERS
DECIMAL NUMBERS SHOWN TO TWO (2) PLACES INDICATE METERS
DECIMAL NUMBERS SHOWN TO THREE (3) PLACES INDICATE KILOMETERS

## GENERAL NOTES

1. NATIVE MATERIAL SOILS WERE OBTAINED FROM THE AREA 3 BORROW PIT LOCATED 1.5 MILES (2.41 KM) SOUTH OF THE RWMS.
2. ALL SIDE SLOPES OF THE CLOSURE CAP ARE A MAXIMUM OF 10H:1V.
3. BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927, NEVADA STATE PLANE COORDINATES, CENTRAL ZONE, FEET. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929, FEET.

## REFERENCES

| | |
|---|---|
| TITLE SHEET | JS-003-00004-T1 |
| SECTIONS | JS-003-00004-C3 |
| DETAILS | JS-003-00004-C4 |

**AS-BUILT**

ORIGINAL AS-BUILT SIGNED BY

| Bechtel Nevada | | | JAS for SJE | | N/A | N/A |
|---|---|---|---|---|---|---|
| J. L. Smith for E. Campbell | 3/29/01 | JLS | 3/29/01 | JAS | N/A | N/A |
| N/A | | N/A | N/A | | N/A | N/A |

UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES AND CONSTRUCTION FEATURES ARE CORRECTED, AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.

GRAPHIC SCALE

0 30 60 120 180 FEET

1" = 60'

CONTOUR INTERVAL = 1 FT

ORIGINAL MYLARS SIGNED BY:

| | | | | | |
|---|---|---|---|---|---|
| DESIGNED | NDJ | | | | |
| DRAWN | AL | 1 | INCORPORATED DCN JS-003-00004-C02.001-001. DATED 8/21/2002 | JAS | STC |
| CHECKED | JAS | 0 | AS-BUILT. DATED 03/29/01. REVISED AND REDRAWN. | NDJ | |
| EXCEPTIONS | N/A | 0 | ISSUED FOR CONSTRUCTION 8/8/00 | | |
| MAP REF NO. | N/A | REVISION NUMBER | REVISION DESCRIPTION | DRAWN | CHECKED |

SUBMITTED BECHTEL NEVADA — DATE 8/7/00
C. LANER
ORDER
STEVE NACHT — DEPT OF ENERGY PROJECT ENGINEER — DATE 8/8/00
SABINE CURTIS — PROJECT NUMBER 00004-A03 — PROJECT AUTH NO N/A — ACTIVITY CODE C1X08388

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE LAS VEGAS, NEVADA
Bechtel Nevada
P.O. BOX 98521 LAS VEGAS, NV 89193-8521

NEVADA TEST SITE — AREA 03
RADIOACTIVE WASTE MANAGEMENT SITE
CAU 110 U3ax/bl RCRA EQUIVALENT CLOSURE

GRADING PLAN

DRAWING NUMBER JS-003-00004-C2

SHEET OF REV 2

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# APPENDIX D

# VEGETATION MONITORING REPORT

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# VEGETATION MONITORING
# CAU 110, U3ax/bl CLOSURE COVER
# May 2006

## INTRODUCTION AND BACKGROUND

A closure cover for the U3ax/bl disposal unit in Area 3 of the Nevada Test Site was approved and constructed in the fall of 2000. Immediately after the construction of the closure cover actions were taken to reestablish a cover of native vegetation. The surface of the completed closure cover was ripped to about 15 centimeters (cm) (6 inches [in]) and disked to provide a suitable seedbed. A seed mix consisting of nine native shrub species, two native grasses and one native forb was used to seed the surface soils using a drill seeder equipped with multiple drag chains. All plant species included in the seed mix are typically shallow rooted plants. A straw mulch was applied and secured using a crimper. The slopes of the closure cover and the area between the cover and fence were not seeded. All revegetation activities were completed by the end of December 2000. The success of the revegetation effort has been monitored annually since the spring of 2001.

Natural precipitation in this region is unpredictable and meager. To minimize the effects of typical dry conditions and to maximize the potential for seed germination and plant establishment a solid-set irrigation system consisting of a 10-centemeter (cm) 4-inch (in) pipe feeding 21 lateral lines and 207 super stand sprinklers was assembled and deployed in late December 2000. The first irrigation was in the latter part of January 2001 and the last was the first week of June 2001. The combination of natural precipitation and supplemental irrigation totaled 21.6 cm (8.5 in), which is 5.0 cm (1.97 in) more than the average precipitation received from January to June for this area.

Growing conditions at the closure cover site have not been favorable since revegetation occurred in 2000. Based on precipitation records from 1961 to 2005, precipitation received during the growing season, which is defined as the period from September of the previous year through June of the current year. The average amount of precipitation received during the growing season, as recorded at the BJ Wye weather station just north and west of the U3 ax/bl closure cover, is 13.2 cm (5.2 in). In 2001, 10.9 cm (4.3 in) of precipitation were received, which is slightly below the average. In 2002, 4.1 cm (1.6 in) were received, and in 2003, 8.6 cm (3.4 in), completing the 3$^{rd}$ consecutive year with below normal precipitation. Few significant precipitation events occurred from 2001 to 2003. Storms were typically small and failed to provide sufficient moisture for either seed germination or sustained plant growth. Finally in 2004 and 2005 above normal precipitation was experienced: 14.7 cm (5.8 in) in 2004 and 25.4 cm (10.0 in) in 2005. Through May of this year precipitation is 5.6 cm (4.0 in) which is slightly below the average amount received during the growing season.

In 2005 an increase in the number of small mammals on the closure cover was noted and because of the potential effect of small mammal burrows on the soil water holding capacity and the rate of water infiltration (Arthur and Markham 1983; Laundre 1989, 1993; Smith et al. 1995) action was taken to reduce the number of small mammals on the closure cover and adjacent area between the closure cover and fence. Approximately 100 small mammal traps were placed near

active burrows on and around the closure cover in the spring of 2005. Trapping occurred in the spring with the objective of removing pregnant animals prior to their first litter of the year and again in the summer and fall to remove animals that evaded the spring trapping and animals that may have migrated onto the site. All trapped animals were relocated to an area within similar habitat and outside their home range (Howard 1994).

## OBJECTIVES

The objective of this report is to present the results of the vegetation monitoring conducted in May 2006. The status of the vegetation on the closure cover is described, compared with adjacent areas not revegetated and with the vegetation common in similar habitat types. Any problems are identified and remedial actions recommended to ensure that a viable vegetative cover is maintained on the U3 ax/bl closure cover. The results of the small mammal trapping and relocation effort are also presented in this report. The number of captures by species is reported for the different trapping sessions since it was initiated in the spring of 2005.

## METHODS

### Vegetation Monitoring

The success of the revegetation efforts at the Uax/bl closure cover is evaluated by comparing plant cover, density and diversity data with adjacent unseeded areas and with data from similar vegetation types on the Nevada Test Site. Field sampling was completed on May 14, 15 and 16 in 2006. Fifteen 100-meter (m) (328-foot) long transects were permanently located on the closure cover at 25-m (82-foot) intervals starting at the western edge and continuing to the eastern end. Transects are oriented in a north-south direction. Five of the fifteen transects were randomly selected (3, 4, 8, 12, and 14) and sampled in 2006.

Five 50-m (164-foot) permanent transects were located between the closure cover and the perimeter fence. Three of the five transects were randomly selected (1, 2, and 4) and sampled in 2006. These transects are located along the north-eastern edge and south-western edge of the closure cover. All five plots are located in areas that were not seeded in the fall of 2000.

Plant cover is estimated using an ocular projection device which is placed at a given interval along each transect. At each placement four ocular points are projected and the type of cover, i.e., rock, bare ground, litter, mulch, or plant species, intercepted by the points is recorded. A total of 100 points are sampled per transect on the closure cover and 50 points along each of the transects sampled in the unseeded area. Absolute cover is determined by dividing the number of points recorded for each cover class or species by the total number of points projected.

Plant density is estimated using a meter square quadrat, which is placed at given intervals along each transect. At each location the number of individual plants encountered within each quadrat is counted and recorded. Twenty quadrats are placed at five-m (16.4 feet[ft]) intervals along the transects located on the closure cover and 10 quadrats at five-m (16.4 ft) intervals along transects

located on the unseeded area. Plants density estimates are averaged over all quadrats and reported as number of plants per unit area, i.e., meter squared ($m^2$).

Plant diversity is a measurement of the number of different species found on a site. Plant diversity is determined by counting and recording the number of species found within each quadrat used to sample plant density. The numbers are averaged and reported as the number of species per area, i.e., seed or unseeded.

**Small Mammal Trapping and Relocation**

In 2005, 98 small mammal traps with trap covers were placed near active small mammal burrows on the closure cover. Traps were repositioned based on burrow activity and capture results. Trapping sessions occurred in April, June and September. The spring trapping session strategy is to remove resident animals prior to the first reproduction event. The June session targets those animals that escaped previous capture attempts and removing any animals that may have migrated onto the site. The fall session strategy, like the previous two, is to remove resident animals and reduce the number that would overwinter and occupy the site the next spring.

The trapping effort consists of six trap-nights in the spring, three per week for two consecutive weeks, and then three trap-nights in both the summer and fall. The number of trap-nights may be adjusted depending on the number of captures. The goal is to remove sufficient number of animals so that total captures are 10 or less during one trap-night. During each trapping session, traps are opened in the evening at a time when diurnal animals (ground squirrels, birds, etc) are least likely to be active and enter the traps. Traps are baited with a mix of bird seed and rolled oats. Traps are checked the following day and all sprung traps are removed from the site early enough in the morning to minimize stress to the captured animals. Stress may occur from prolonged exposure to the elements, mainly heat, and from prolonged confinement. Traps with captured animals are transported to an area of similar habitat and at a distance beyond their home range (Howard 1995). At this distance released animals are unlikely to return to the U3 ax/bl closure cover. Relocation sites are typically 3 to 8 kilometers (km) (five miles) from the U3 ax/bl closure cover. The animals are removed from the traps and descriptive information is gathered on each animal before it is relocated and released. Information recorded may include the species of the captured animal, its sex, reproductive status, vigor, age class and weight. The traps are then returned to the closure cover that evening and re-set at approximately the same locations from which they were removed.

## RESULTS AND RECOMMENDATIONS

**Vegetation Monitoring**

**Plant Cover** – Perennial plant cover increased to 19.6% in 2006, the highest it has been since the site was revegetated in 2000. The increase reflects increases in cover for both shadscale and Nevada ephedra (Table 1). Both are shrubs and have shown annual increases in cover since cover was first recorded in 2003 (Figure 1). Cover for winterfat, another native shrub, was the same this year as it was last year. Grasses are still not a major component of the vegetative cover as noted in the absence of any grass cover (Figure 1). Also of interest is the 0% percentage cover for annual plant species. This year and in 2002 are the only years that annual plants have not

contributed to total plant cover. The lack of annuals this year is most likely the result of below normal precipitation this spring which is always essential for the spring flora. However, another important factor is the establishment of native perennial plant species on the closure cover. These plant species are adapted to the dry growing conditions and out-compete the annuals for the limited amount of moisture received.

There was no living cover this year on the unseeded portion between the fence and the closure cover. Last year there was 23% cover on this area which was all from annual plants, primarily Russian thistle and halogeton, two noxious weeds. No native plant species have established in this area. The importance of reseeding the closure cover was reinforced again this year. Without reseeding, the closure cover would only have a vegetative cover during years of abundant precipitation and the period of active evapotranspiration would be limited to the short (weeks) lifespan of annual plants.

**Table 1. Average percentage plant cover on the closure cover at CAU 110, U3-ax/bl from 2001 to 2006.**

| Perennials | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Unseeded |
|---|---|---|---|---|---|---|---|
| Shadscale** | -* | -* | 2.2 | 8.6 | 15.4 | 18.0 | 0.0 |
| Nevada Ephedra | -* | -* | 0.0 | 0.4 | 0.8 | 1.2 | 0.0 |
| Winterfat | -* | -* | 0.2 | 0.6 | 0.4 | 0.4 | 0.0 |
| Fourwing saltbush | -* | -* | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| Total Perennial Plant Cover | 2.6 | 6.4 | 2.4 | 9.6 | 16.8 | 19.6 | 0.0 |
| Annuals | | | | | | | |
| Buckwheat | -* | -* | 0.6 | 0.2 | 1.2 | 0.0 | 0.0 |
| Halogeton | -* | -* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Russian thistle | -* | -* | 0.0 | 3.0 | 1.2 | 0.0 | 0.0 |
| Other annual forbs | -* | -* | 0.2 | 0.0 | 0.8 | 0.0 | 0.0 |
| Cheatgrass | -* | -* | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| Total Annual Plant Cover | 5.2 | 0.0 | 0.8 | 3.2 | 3.4 | 0.0 | 0.0 |
| TOTAL PLANT COVER | 7.8 | 6.4 | 3.2 | 12.8 | 20.2 | 19.6 | 0.0 |
| Litter/Mulch | 43.6 | 24.1 | 28.0 | 14.6 | 26.2 | 23.2 | 41.3 |
| Bare Ground/Rock | 48.6 | 69.5 | 68.8 | 72.6 | 53.6 | 57.2 | 58.7 |

* - Not recorded by species
** - See Table 3 for scientific names

The amount of exposed soil as measured by the percentage of bare ground has been about the same the last couple years (Table 1) and is 1.5% less than on the unseeded area. The difference between the vegetation on the closure cover and the unseeded area is what makes up the remaining 40%. On the closure cover it is a combination of perennial plant cover and plant

litter. On the unseeded area it is litter resulting from old annual plant stalks, mainly from Russian thistle and halogeton. This layer of litter on the unseeded area acts as a mulch and impedes evaporation of moisture from the soil.

To assess the revegetation success of a site, comparisons are typically made with adjacent undisturbed habitat. However there are now sites within close proximity of the U3 ax/bl closure cover that have not been disturbed. In the fall of 1962 permanent vegetation plots were established on the NTS to document long-term ecological changes (Webb et al., 2003) and could serve as a reference for the U3 ax/bl closure cover revegetation effort. Plant cover and density are estimated for each plot. The first sampling of these ecological plots occurred in 1963, again in 1975 and finally in 2002. One of the permanent plots is located near the U3 ax/bl closure cover in a shadscale/winterfat plant assemblage (Webb et al., 2003) which is similar to the type of vegetation that has established on the closure cover. This ecological monitoring plot was visited in 2002 to be sampled but was found to be heavily disturbed and was not sampled. Data collected in 1963 showed a total vegetative cover of 16.4% and in 1975 it was 25.8%. The amount of plant cover on the closure cover is 19.6% (Table 1) which is higher than the plant cover in 1963 and slightly lower than that estimated in 1975. The fluctuations in plant cover could have been the direct result of the amount of precipitation received during the growing season, which was 7.9 cm (3.1 in) in 1963, well below the normal of 13.2 cm (5.2 in). During the 1975 growing season 29.2 cm (11.5 in) of precipitation was received, which is almost twice the average and more than was received in 2005, which would easily explain the higher plant cover values.

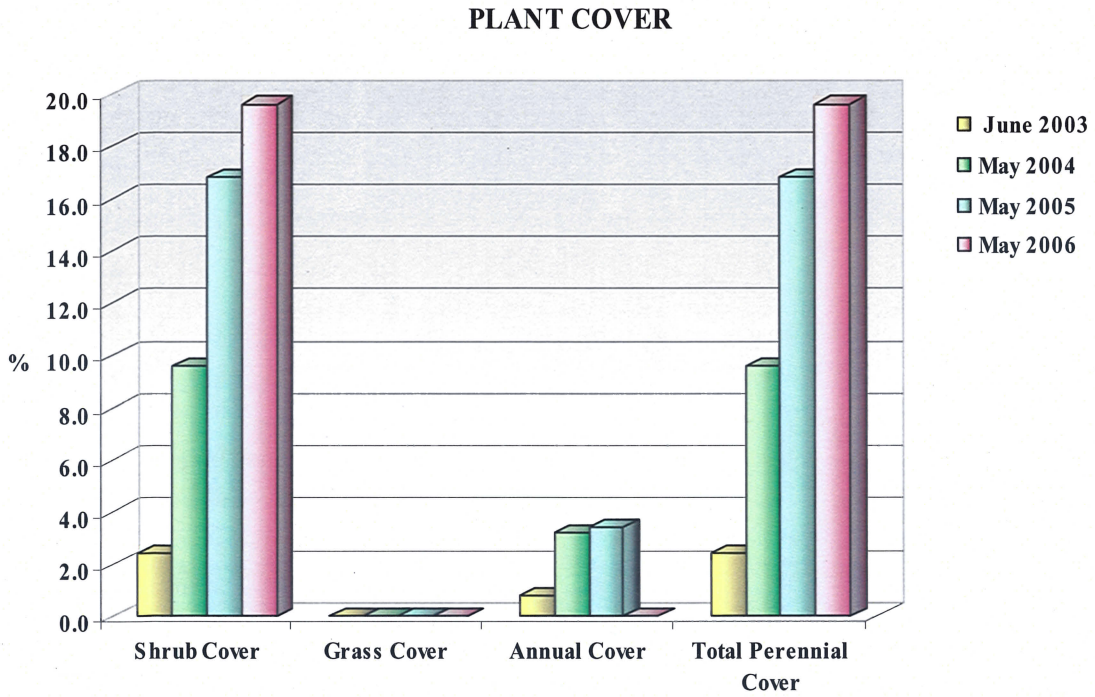


Figure 1. Changes in plant cover on the closure cover at CAU 110, U3-ax/bl over last four years.

Another difference between the vegetation on the closure cover and that recorded on the ecological monitoring plot is species composition. Bud sagebrush, spiny hopsage and wolfberry are common in the native plant community but they have not established on the closure cover. These species were included in the mix of seeds used to revegetate the site though it was known that they are typically very difficult to establish from seed. A few individual plants of bud sagebrush and spiny hopsage are present on the site, but neither species is present in sufficient numbers to make a significant contribution to total plant cover.

The other difference between the U3 ax/bl closure cover and the ecological monitoring plot is in the amount of perennial grasses. Grasses have not contributed to plant cover on the closure cover to date. On the ecological monitoring plot grasses made up less than 1% in 1963 but increased to 2.5% in 1973. Grasses contribute a small amount to overall plant cover in this vegetation type, however, it should be more than is currently measured on the closure cover. Indian ricegrass and squirreltail grass are present on the closure cover and with time may contribute more to total plant cover.

**Plant Density** – The 3.6 perennial plant species/$m^2$ represents the lowest density measured on the closure cover (Figure 2). The decrease cannot be attributed to a single species, rather a slight decline in all species including shadscale, Nevada ephedra, winterfat and Indian ricegrass (Table 2). Bud sagebrush and spiny hopsage were not encountered on the study plots this year. Spiny hopsage has been present on site since 2001. Spiny hopsage was observed on the closure cover, but it is uncommon. The other species of note is squirreltail. It was first observed on the closure cover in 2002 and a few individuals, mainly seedlings, were observed last year, but none were encountered this year. Several individual plants of fourwing saltbush are still present on the site although not encountered this year on the study plots. This species is not a preferred species on the closure cover because of its deep rooting system.

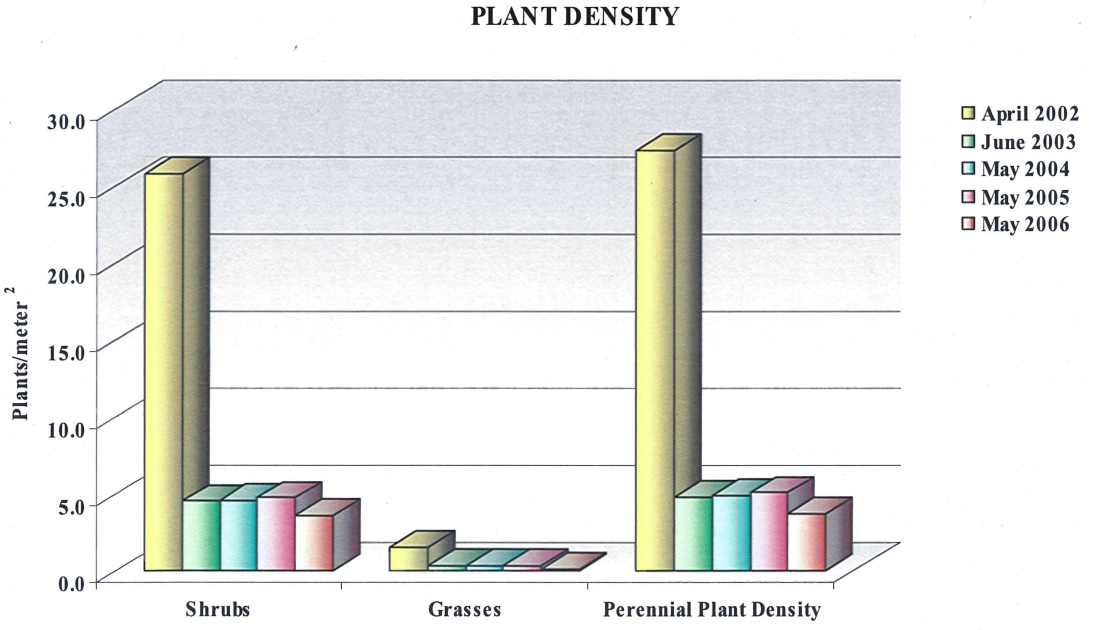


Figure 2. Changes in plant density on the closure cover at CAU 110, U3-ax/bl over last five years.

The density of annual plants was equally low (Table 2; Figure 2) and not different from the density of annual plants on the unseeded area. The most abundant annuals were Russian thistle and halogeton. Other annual species commonly found in previous years, were rarely encountered.

Plant density was lower this year than in the previous three years (Figure 2), however plant cover has increased (Table 1 and Figure 1) indicating that although the number of plants may decrease those that are established are increasing in size. Shadscale is the most dominant species although there are a few areas, primarily along the western edge of the closure cover, where the density of winterfat, Nevada ephedra and Indian ricegrass appears higher and shadscale is less dominant. With time these other species may spread over more of the closure cover. The plants on the closure cover continue to show signs of good growth. Plants are flowering and setting seed. As noted last year, several shadscale plants are dieing off, but this was the first year the density of this species has declined.

**Plant Diversity** – During the first couple growing seasons after reseeding there were about 10 different perennial plant species on the site. By the third growing season and the third year of below normal precipitation, budsage, rubber rabbitbrush, shrubby buckwheat and squirreltail grass, once present, were absent. Last year budsage and squirreltail grass, two species not found on the closure cover since 2002, were found on the study plots but neither were encountered this year (Table 2). The number of annual species dropped from the all time high of 13 species last year to seven this year. This number is typical of the site during periods of low annual precipitation.

The perennial plants found on the closure cover at U3-ax/bl are becoming well established and continue to provide a viable vegetative cover (Figures 3a-3d; 4a-4c). The density of perennial plant species has not change significantly over the last four years and plant cover continues to increase. It is near 20% this year, the highest plant cover for this site since revegetation occurred in the fall of 2000. The low density of grasses is a concern. However in certain parts of the closure cover grasses appear to be well established. Potentially with time more grasses as well as other species of native shrubs, such as spiny hopsage or bud sagebrush will establish on the site and provide a more diverse plant community and more similar to native plant communities in the area. At this time there is no indication that remedial revegetation is necessary. The Vegetation monitoring in future years should focus on annual weedy species, specifically halogeton, cheatgrass and Russian thistle. If these species increase in density and cover, and appear to have a detrimental effect on the perennial plant species, as evidenced by decreases in perennial plant cover and/or density, some remedial action may be necessary to protect the composition and stability of the vegetative cover on the CAU 110 U3 ax/bl closure cover.

**Table 2. Summary of plant density (plants/m$^2$) on the closure cover at CAU 110, U3-ax/bl from 2001 to 2006.**

| | Common Name | June '01 | Apr '02 | June '03 | May '04 | May '05 | May '06 | Unseeded |
|---|---|---|---|---|---|---|---|---|
| SHRUBS | Buckwheat | 11.3 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Budsage | 1.9 | 0.0 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0 |
| | Burrobush | 9.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Desert Thorn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Fourwing Saltbush* | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Nevada Ephedra | 6.8 | 6.7 | 1.3 | 1.5 | 1.8 | 1.3 | 0.0 |
| | Rubber Rabbitbrush | 11.2 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Shadscale | 13.4 | 10.3 | 2.7 | 2.3 | 2.5 | 1.9 | 0.0 |
| | Spiny Hopsage | 1.9 | 0.1 | 0.1 | 0.02 | 0.02 | 0 | 0.0 |
| | Winterfat | 0.3 | 2.7 | 0.4 | 0.7 | 0.4 | 0.3 | 0.0 |
| Total | | 56.3 | 25.8 | 4.5 | 4.5 | 4.7 | 3.5 | 0.0 |
| GRASSES | Indian Ricegrass | 5.8 | 1.3 | 0.3 | 0.4 | 0.3 | 0.1 | 0.0 |
| | Squirreltail | 3.3 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| | Annual grasses | 0.0 | 0.0 | 0.1 | 0.5 | 1.9 | 1.2 | 0.03 |
| Total | | 9.1 | 1.5 | 0.4 | 0.9 | 2.3 | 1.3 | 0.03 |
| ANNUAL FORBS | Globemallow | <0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Buckwheat | - | - | 15.1 | 7.8 | 13.7 | 0.2 | 0.0 |
| | Halogeton | - | - | 0.2 | 3.9 | 12.5 | 0.01 | 0.0 |
| | Russian thistle | - | - | 3.4 | 77.0 | 70.3 | 3.2 | 3.4 |
| | Other annual forbs | - | - | 0.8 | 0.4 | 2.0 | 0.1 | 0.1 |
| Total | | | | 19.5 | 88.7 | 98.5 | 3.6 | 3.5 |
| PERENNIAL PLANT DENSITY | | 65.4 | 27.3 | 4.8 | 4.9 | 5.1 | 3.6 | 0.0 |
| TOTAL PLANT DENSITY | | 65.4 | 27.3 | 24.4 | 85.8 | 105.6 | 7.2 | 3.5 |
| NUMBER PERENNIAL SPECIES | | 11 | 9 | 5 | 5 | 7 | 5 | 0 |
| NUMBER ANNUAL SPECIES | | 0 | 0 | 6 | 5 | 13 | 7 | 3 |

* Not Seeded
See Table 3 for scientific names

**Figure 3a. CAU 110, U3-ax/bl closure cover: June 2001, looking east from center of cover.**

**Figure 3b. CAU 110, U3-ax/bl closure cover: June 2002, looking southeast from center of cover.**

**Figure 3c. CAU 110, U3-ax/bl closure cover: June 2005, looking southeast from center of cover.**

**Figure 3d. CAU 110, U3-ax/bl closure cover: May 2006, looking southeast from center of cover.**

**Figure 4a. CAU 110, U3-ax/bl closure cover: May 2004, looking southeast from center of cover.**

**Figure 4b. CAU 110, U3-ax/bl closure cover: June 2005, looking southeast from center of cover.**

**Figure 4c. CAU 110, U3-ax/bl closure cover: May 2006, looking southeast from center of cover.**

Table 3. Scientific and common names of plant species seeded or encountered on CAU 110, U3-ax/bl closure cover.

| Lifeform | Scientific Name | Common Name |
|---|---|---|
| SHRUBS | *Picrothamnus desertorum* | Bud sagebrush |
| | *Atriplex confertifolia* | Shadscale |
| | *Ephedra nevadensis* | Nevada ephedra |
| | *Ericameria nauseosa* | Rubber rabbitbrush |
| | *Eriognum fasciculatum* | Buckwheat |
| | *Grayia spinosa* | Spiny hopsage |
| | *Hymenoclea salsola* | White burrobush |
| | *Krascheninnikovia lanata* | Winterfat |
| | *Lycium andersonii* | Anderson's wolfberry |
| | *Atriplex canescens* (not seeded) | Fourwing saltbush |
| GRASSES | *Achnatherum hymenoides* | Indian ricegrass |
| | *Elymus elymoides* | Squirreltail |
| FORBS | *Sphaeralcea ambigua* | Globemallow |
| ANNUALS | Grasses | |
| | *Bromus rubens* | Red brome |
| | *Bromus tectorum* | Cheatgrass |
| | *Schimus arabicus* | Arabian schismus |
| | Forbs | |
| | *Amsinckia tessellata* | Bristly fiddleneck |
| | *Chaenactis stevioides* | Steve's pincushion |
| | *Cryptantha nevadensis* | Nevada cateyes |
| | *Descurania pinnata* | Pinnate tansymustard |
| | *Eriogonum species* | Buckwheat |
| | *Eriogonum nidularium* | Birdnest buckwheat |
| | *Halogeton glomerata* | Halogeton |
| | *Malacothrix glabrata* | Smooth desert dandelion |
| | *Mentzelia species* | Blazingstar |
| | *Salsola tragus* | Prickly Russian thistle |
| | *Sisymbrium altissimum* | Tumblemustard |

## Small Mammal Trapping and Relocation

The 2005 trapping effort consisted of six trap nights, three per week for two consecutive weeks, in April and then three trap nights in both June and September. Between April 12th and April 21, two trapping sessions of 3 consecutive trap nights per session were conducted. A total of 131 animals were removed from the closure cover and relocated approximately 8 km (5 miles) from the site (Table 4). During the week of June 14th, another trapping session of three consecutive nights was conducted and 26 animals were captured and relocated. The final trapping session in

2005 was conducted for three consecutive nights starting on September 20th. A total of 29 animals were captured and relocated.

Trapping in 2006 was scheduled for two weeks beginning the week of April 17th. The goal was to trap until a single night's trapping would yield 10 animals or less. Because the numbers were well above 10 after six days, trapping was extended for two additional weeks, for a total of twelve trap-nights. A total of 449 animals were captured and relocated during the three weeks, which is more than twice as many animals captured and relocated in 2005 (Table 4). Since the spring of 2005, 635 animals have been removed from the CAU 110, U3-ax/bl closure cover area, 315 from the closure cover and 320 from the area between the closure cover and the fence. Kangaroo rats (Figure 5), primarily Merriam's and some Great Basin, are the most common group of small mammals captured (56% of all captures). Over all sessions 359 kangaroo rats were captured and relocated. A total of 272 deer mice (Figure 6) were captured (43% of all captures) and relocated. One whitetail antelope squirrel, one grasshopper mouse and two longtailed pocketmice were captured and relocated (less than 1% of all captures) (Table 4).

The fluctuation of small mammal populations from year to year is typically the result of available forage. Plant production, especially annual forbs as well as perennial grasses and shrubs, was exceptionally high last year; an event that may only occur once or twice in a decade, if not two. Small mammals throughout the region took advantage of this increased food source and numbers have increased significantly. This year there was little, if any, annual forb production and the number of small mammals will most likely decline in the near future.

The capture and relocation of small mammals on the U3-ax/bl closure cover was initiated with the objective of minimizing the possibility of these animals burrowing into and transferring to the surface the waste material buried at the site. Burrowing animals have been shown to move contaminated material to the surface and at the same time the animal can become externally

**Table 4. Results of trapping and relocation of small mammals on the closure cover and surrounding area within the perimeter fence at CAU 110, U3-ax/bl from April 2005 to May 2006.**

| | Apr '05 | | Jun '05 | | Sept '05 | | Apr/May '06 | | Totals To Date | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Cover | Fence | Cover | Fence | Cover | Fence | Cover | Fence | Cover | Fence |
| Merriam's Kangaroo Rat | 57 | 42 | 5 | 13 | 3 | 15 | 91 | 107 | 156 | 177 |
| Great Basin Kangaroo Rat | 0 | 0 | 0 | 0 | 1 | 2 | 17 | 6 | 18 | 8 |
| Whitetail Antelope Squirrel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Longtailed Pocketmouse | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| Grasshopper Mouse | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Deer Mouse | 13 | 17 | 8 | 0 | 5 | 3 | 112 | 114 | 138 | 134 |
| | 72 | 59 | 13 | 13 | 9 | 20 | 221 | 228 | 315 | 320 |

Figure 5. Merriam's kangaroo rat being processed prior to release.

contaminated (Arthur and Markham 1983; Smith et al. 1995). The most common small mammal found at the site is the kangaroo rat. The average depth of the kangaroo rat burrows ranges from 51 cm – 61 cm (20-24 in) (Anderson and Allred 1964; Howard 1994) while others have reported an average of 33 cm (13 in) and a maximum of 89 cm (35 in) (Hampton 2006). The deer mouse, the other common small mammal found on the site, has burrows shallower than the kangaroo rat, typically 25.4 cm (10 in) deep and maximum depths of 50.8 cm (20 in) (Hampton 2006). The depth of burrows for either of the animals is dependent on sufficient vegetation at the site and the type of soils. In the case of the closure cover at CAU 110, U3-ax/bl the cover is a compacted fill material seven feet deep (DOE 2000). During revegetation of the site the surface 15-20 cm (6-8 in) was ripped with a grader equipped with ripper teeth to alleviate the surface soil compaction and create a better seedbed. Surface soils currently do not show signs of compaction. However, difficulty in driving temporary 15 cm (6 in) and 30 cm (12 in) stakes into the subsurface soils suggest that these soils remain compacted and probably would resist or at least impede causal deep penetration into the closure cover by burrowing animals. Because of the compacted subsurface soils and based on typical burrow depths it is unlikely that the small mammals inhabiting the site could burrow through seven feet of native alluvial fill to reach the waste material.

Figure 6. Data recorded on deer mouse prior to release.

A second concern with the increase in the number of animal burrows on the closure cover is the effect that the burrows would have on the evapotransporation effectiveness of the closure cover. Studies indicate that animal intrusion into soil barriers increases water holding capacity of the soil and the rate of water infiltration (Arthur and Markham 1983). Work by Laundre (1992) indicated the increased water infiltration due to the presence of small mammal burrows may compromise the integrity of land burial waste sites. Laundre (1992) further concluded that burrows moved water to deeper parts of soil profile. Smith et al. (1995) suggested that burrowing activity may increase the water infiltration rate and increase soil erosion, but also create a natural ventilation system that may decrease water intrusion. Link et al. (1995) found little or no impact of small mammal burrows on soil moisture content in isolation barriers, although they cautioned that it was a short term study. Without conducting site specific studies, as was done by these scientists, it is difficult to predict the effects of the small mammal burrows on water infiltration rates and depth of water penetration on the U3 ax/bl closure cover. The few studies reviewed suggest that the presence of burrows on the U3 ax/bl closure cover may increase the rate of water infiltration

and increase the depth of water infiltration. One positive effect as suggested by Smith et al. (1995) may be an increase in the aeration of the soil which may enhance evaporation. Small mammals occupying the U3 ax/bl closure cover are unlikely to burrow deep enough to reach the waste material. It is possible however, and several research studies have shown that animal burrows may affect the rate and depth of water infiltration. There are several approaches that could be pursued to minimize the impacts of the small mammals occupying the closure cover. One is to prevent the movement of burrowing animals onto the site from adjacent areas by constructing an exclusion fence. Another approach would be to allow movement of animals on and off the closure cover but frequently remove the animals from the site. A final option would be to take no action unless increases in water infiltration, as may be measured by depth of penetration and rate of water movement into the soil, are detected.

To exclude all small mammals from the site would require the installation of a barrier fence (Howard 1994) around the perimeter of the closure cover. Once the fence was installed an intensive trapping session would be necessary to remove all animals from inside the fenced area (the closure cover). Subsequent trapping sessions may be required because it is seldom possible to trap 100% of the animals. Alternative methods of removing small mammals may have to be used in conjunction with trapping. Periodic monitoring in the future would document the presence or absence of small mammals on the site. Such an effort would require around 762 m (2500 ft) of 91 cm (36 in) metal flashing, labor for installation, some minimal maintenance over the years, and periodic monitoring to ensure animals are not present.

The method that has been employed the last couple years has been the trapping and relocation of animals during key periods during the life cycle of the animals. This effort currently includes annual trapping and relocation, but could also include control measures such as the installation of raptor perches (Hall et al., 1981) or crushing of burrows after a trapping session. It is impossible to completing remove the small mammals from the site by trapping and relocating. Although animals are relocated several kilometers from the site, small mammals from nearby populations quickly move onto the closure cover in the absence of competition. Animals may move in from as far away as 2.2 km (1 mile) (Hall et al. 1981; Howard 1994).

The installation of perches may increase the natural predation on the small mammal population but such structures have not been proven to be effective in controlling small mammals (Hall et al. 1981). Collapsing the burrows after each trapping session may minimize their effect on water infiltration but may only last as long as it takes animals from adjacent areas to move onto the site. This approach would require an ongoing commitment of labor and some resources.

Another approach would be to monitor the movement of moisture in the closure cover. When and if concerns are detected as to the rate of water infiltration and more importantly the depth of infiltration, then corrective actions could be taken. The critical issue for this approach would be the ability of instrumentation to detect changes that could be linked to the presence of small mammal burrows as opposed to other factors. The effort for this approach would be minimal until a problem is identified, at which time the effort would be as defined for the previously described approaches.

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# APPENDIX E

# PRECIPITATION RECORDS

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# NTS PRECIPITATION

## July 2005

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
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| 19 | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| 21 | | | | 0.01 | | | | 0.03 | 0.04 | | | | | | | | |
| 22 | 0.05 | 0.02 | 0.03 | 0.55 | 0.12 | | | | 0.57 | 0.01 | | | 1.40 | 0.04 | | 0.18 | |
| 23 | | 1.00 | 0.93 | | | | 0.63 | | | | | | | 0.43 | | 0.18 | |
| 24 | 0.05 | | 0.02 | 0.14 | 0.12 | 0.05 | | | 0.10 | 0.01 | | | | | | | 0.06 |
| 25 | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | |
| 28 | 0.36 | 0.15 | 0.10 | 0.31 | 0.57 | 0.28 | 0.03 | 0.16 | 0.30 | 0.76 | 0.21 | 0.17 | | 0.08 | 0.70 | 0.24 | 0.58 |
| 29 | 0.06 | 0.05 | 0.02 | | 0.16 | 0.39 | 0.02 | | 0.03 | | 0.20 | | | 0.05 | 0.20 | 0.15 | 0.28 |
| 30 | | | | | | | | | | | | | | | | | 0.03 |
| 31 | | | | 0.18 | | | | | | | | | | | | | 0.02 |
| TOTAL | 0.52 | 1.22 | 1.10 | 1.19 | 0.97 | 0.72 | 0.68 | 0.19 | 1.04 | 0.78 | 0.41 | 0.17 | 1.40 | 0.60 | 0.90 | 0.75 | 0.97 |

Area 12 Dip Stick Rain Gage Reading: 0.80 inches of precipitation from 071/01/2005 to 08/01/2005

Data Tabulated By: Raymond D. Dennis 08/02/2005

Data Quality Control: Raymond D. Dennis 08/02/2005

Certified By: Douglas A. Shaffer 08/22/05

## NTS PRECIPITATION

### August 2005

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | 0.30 | 0.23 | | | | 0.50 | 0.46 | 0.46 | | | | | | | 0.03 | | |
| 5 | | 0.20 | 0.27 | 0.06 | 0.05 | | 0.06 | | 0.04 | 0.08 | | | | 0.01 | | 0.07 | 0.02 |
| 6 | | | | | | 0.02 | | 0.03 | | 0.80 | | | | | | | |
| 7 | 0.01 | | | | 0.04 | | | 0.43 | | 0.20 | 0.33 | 0.04 | 0.10 | | 0.10 | | 0.03 |
| 8 | | 0.03 | | | 0.03 | | | | | | | | | | 0.75 | | 0.11 |
| 9 | | | | 0.13 | | | | | | | | 0.03 | | | | | |
| 10 | 0.35 | 0.06 | | | | 0.31 | | | | | | | | | 0.01 | | |
| 11 | | | 0.43 | | | | | | | 0.35 | 0.01 | | | | 0.15 | 0.05 | |
| 12 | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | |
| 14 | 0.14 | 0.41 | 0.18 | 0.02 | 0.03 | 0.14 | 0.10 | 0.14 | 0.02 | 0.31 | 0.32 | 0.31 | 0.08 | 0.05 | | 0.07 | 0.05 |
| 15 | | | | T | | | | | | 0.01 | 0.01 | 0.08 | | | 0.01 | | |
| 16 | 0.35 | 0.13 | 0.03 | | 0.09 | 0.28 | 0.18 | 0.23 | 0.02 | 0.03 | 0.37 | 0.01 | 0.08 | 0.02 | 0.14 | 0.02 | 0.03 |
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| 31 | | | | | | | | | | | | | | | | | |
| TOTAL | 1.15 | 1.06 | 0.91 | 0.21 | 0.24 | 1.25 | 0.80 | 1.29 | 0.08 | 1.78 | 1.04 | 0.47 | 0.26 | 0.08 | 1.19 | 0.21 | 0.24 |

Area 12 Dip Stick Rain Gage Reading: 1.40 inches of precipitation from 08/02/2005 to 09/01/2005

Data Tabulated By: Raymond D. Dennis 09/06/2005

Data Quality Control: Raymond D. Dennis 09/06/2005

Certified By: [signature] 09-06-2005

# NTS PRECIPITATION

## September 2005

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
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| 19 | | | | | | | | | | | | | | | | | |
| 20 | 1.07 | 0.45 | 0.44 | 0.44 | 0.36 | 0.81 | 1.00 | 0.85 | 0.34 | 0.66 | 1.21 | 1.08 | 0.45 | 0.53 | 0.64 | 0.20 | 0.40 |
| 21 | | | | | | | | 0.02 | | 0.01 | 0.04 | 0.01 | 0.01 | | 0.02 | | |
| 22 | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| 26 | 0.04 | 0.01 | | | | 0.03 | 0.01 | 0.01 | 0.01 | 0.03 | | 0.03 | 0.07 | 0.01 | 0.01 | 0.01 | |
| 27 | 0.01 | 0.01 | | 0.01 | | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | | 0.01 | |
| 28 | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| TOTAL | 1.12 | 0.47 | 0.44 | 0.45 | 0.36 | 0.85 | 1.02 | 0.89 | 0.36 | 0.71 | 1.26 | 1.13 | 0.54 | 0.55 | 0.67 | 0.22 | 0.40 |

Area 12 Dip Stick Rain Gage Reading: 1.00 inches of precipitation from 09/01/2005 to 10/04/2005

Data Tabulated By: Raymond D. Dennis 10/06/05

Data Quality Control: Raymond D. Dennis 10/06/05

Certified By: [signature] 10-06-2005

## NTS PRECIPITATION

October 2005

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
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| 8 | | | | | | | | | | | | | | | | | 0.06 |
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| 15 | | | | | | | | | | | | | | | | | |
| 16 | | | | 0.01 | | | | | 0.02 | | | | | | | | |
| 17 | 0.66 | 0.38 | 0.45 | 0.31 | 0.34 | 0.57 | 0.44 | 0.30 | 0.47 | 0.41 | 0.32 | 0.33 | 0.60 | 0.35 | 0.30 | 0.25 | 0.29 |
| 18 | 0.15 | 0.10 | 0.13 | 0.20 | 0.13 | 0.26 | 0.07 | 0.30 | 0.02 | 0.32 | 0.13 | 0.03 | 0.15 | 0.10 | 0.30 | 0.12 | 0.29 |
| 19 | | 0.01 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
| 25 | | | 0.03 | 0.10 | | | 0.20 | 0.09 | 0.02 | | 0.06 | | | 0.20 | 0.08 | | |
| 26 | | | | | | | | | | | | | | | | | |
| 27 | 0.03 | | 0.02 | 0.01 | 0.03 | 0.03 | | | 0.02 | | | 0.01 | 0.01 | | | | |
| 28 | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | |
| TOTAL | 0.84 | 0.49 | 0.63 | 0.63 | 0.50 | 0.86 | 0.71 | 0.69 | 0.55 | 0.73 | 0.51 | 0.37 | 0.76 | 0.65 | 0.68 | 0.37 | 0.64 |

Area 12 Dip Stick Rain Gage Reading: 0.90 inches of precipitation from 10/04/2005 to 11/02/2005

Data Tabulated By: Raymond D. Dennis 11/03/2005

Data Quality Control: Raymond D. Dennis 11/03/2005

Certified By: Douglas C. Shields 11/03/2005

## NTS PRECIPITATION

November 2005

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
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| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | 0.17 | 0.05 | 0.14 | | 0.48 | 0.35 | 0.03 | 0.35 | 0.43 | 0.87 | 0.25 | 0.02 | | 0.02 | 0.35 | 0.23 | 0.22 |
| 11 | 0.08 | 0.13 | 0.03 | 0.14 | | | | 0.03 | 0.10 | 0.02 | 0.01 | 0.01 | 0.08 | 0.08 | 0.01 | 0.04 | 0.10 |
| 12 | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | |
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| 29 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| TOTAL | 0.25 | 0.18 | 0.17 | 0.14 | 0.48 | 0.35 | 0.03 | 0.38 | 0.53 | 0.89 | 0.26 | 0.03 | 0.08 | 0.10 | 0.36 | 0.27 | 0.32 |

Area 12 Dip Stick Rain Gage Reading: 0.30 inches of precipitation from 01/02/2005 to 02/02/2005

Data Tabulated By: Raymond D. Dennis 12/05/2005

Data Quality Control: 12/05/2005

Certified By: 12-05-2005

# NTS PRECIPITATION

December 2005

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | 0.03 | | | | | | 0.01 | 0.01 | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
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| 18 | | | | | | | | | | | | | | | | | |
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| 24 | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| 26 | 0.04 | | | | | 0.07 | | 0.02 | | 0.02 | 0.01 | 0.05 | 0.03 | | | | |
| 27 | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| 31 | 0.23 | 0.19 | 0.09 | | 0.01 | 0.23 | 0.01 | 0.05 | 0.01 | 0.14 | 0.03 | 0.11 | 0.08 | 0.02 | 0.04 | 0.01 | 0.10 |
| TOTAL | 0.27 | 0.19 | 0.09 | 0.00 | 0.01 | 0.33 | 0.01 | 0.07 | 0.01 | 0.16 | 0.04 | 0.17 | 0.12 | 0.02 | 0.04 | 0.01 | 0.10 |

Area 12 Dip Stick Rain Gage Reading: 1.10 inches of precipitation from 12/02/2005 to 01/04/2006

Data Tabulated By: Raymond D. Dennis 01/09/2006

Data Quality Control: Raymond D. Dennis 01/09/2006

Certified By: Wade Schamberger 1/09/2006

# NTS PRECIPITATION

## January 2006

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.42 | 0.35 | 0.25 | 0.23 | 0.15 | 0.47 | 0.17 | 0.45 | 0.17 | 0.50 | 0.26 | 0.19 | 0.39 | 0.17 | 0.46 | 0.12 | 0.39 |
| 2 | 0.28 | 0.10 | 0.16 | 0.23 | 0.10 | 0.36 | 0.10 | 0.13 | 0.16 | 0.22 | 0.21 | 0.18 | 0.09 | 0.10 | 0.25 | 0.16 | 0.09 |
| 3 | 0.12 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
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| 13 | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | |
| 15 | 0.02 | | | | | 0.04 | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | |
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| 24 | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| 26 | 0.04 | | | | | 0.02 | | | | | | 0.05 | | | | | |
| 27 | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | 0.01 | | | | | | | | | | | 0.03 | | | | | |
| 31 | | | | | | | | | | | | | | | | | |
| TOTAL | 0.89 | 0.45 | 0.41 | 0.46 | 0.25 | 0.89 | 0.27 | 0.58 | 0.33 | 0.72 | 0.47 | 0.45 | 0.48 | 0.27 | 0.71 | 0.28 | 0.48 |

Area 12 Dip Stick Rain Gage Reading: 0.00 inches of precipitation from 1/03/2006 to 2/01/2006

Data Tabulated By: R.G. Lantz

Data Quality Control: R. [illegible] 2/3/06

Certified By: Ward Schaeffer 2/3/06

## NTS PRECIPITATION

### February 2006

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
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| 14 | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | |
| 17 | 0.12 | | | | | 0.08 | | 0.03 | | | 0.01 | 0.01 | 0.03 | | 0.02 | | 0.01 |
| 18 | 0.02 | | | | | 0.02 | | 0.01 | | | | 0.01 | | | 0.01 | | |
| 19 | 0.11 | 0.07 | 0.18 | 0.05 | 0.14 | 0.14 | 0.08 | 0.13 | 0.04 | 0.13 | 0.11 | 0.08 | 0.06 | 0.20 | 0.09 | 0.25 | 0.06 |
| 20 | | | 0.06 | | 0.03 | | | 0.02 | | | | | | 0.02 | | 0.05 | 0.05 |
| 21 | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | 0.03 | | | | | | |
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | |
| 27 | 0.60 | 0.36 | 0.60 | 0.37 | 0.17 | 0.92 | 0.58 | 0.60 | 0.30 | 0.74 | 0.64 | 0.45 | 0.38 | 0.57 | 0.38 | 0.20 | 0.18 |
| 28 | 0.42 | 0.09 | 0.39 | 0.48 | 0.20 | 0.19 | 0.03 | 0.33 | 0.41 | 0.26 | 0.13 | 0.17 | 0.17 | 0.18 | 0.40 | 0.13 | 0.29 |
| TOTAL | 1.27 | 0.52 | 1.23 | 0.90 | 0.54 | 1.35 | 0.69 | 1.12 | 0.75 | 1.13 | 0.92 | 0.72 | 0.64 | 0.97 | 0.90 | 0.63 | 0.59 |

Area 12 Dip Stick Rain Gage Reading: 1.10 inches of precipitation from 02/01/2006 to 02/01/2006

Data Tabulated By: Raymond O. Dennis 03/07/2006

Data Quality Control: Raymond O. Dennis 03/07/2006

Certified By: Walt W. Schlueter 3/7/06

## NTS PRECIPITATION

### March 2006

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | 0.01 | | | | | | | | | | | | | | | | |
| 3 | 0.11 | | 0.07 | 0.07 | 0.01 | 0.15 | 0.02 | 0.01 | 0.03 | 0.05 | 0.02 | 0.06 | | 0.02 | 0.01 | 0.05 | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | 0.04 | T | 0.01 | | 0.03 | | 0.01 | 0.04 | 0.05 | | | 0.07 | | | |
| 7 | 0.18 | | | 0.11 | 0.01 | 0.19 | | | 0.10 | 0.04 | 0.01 | 0.16 | 0.09 | 0.07 | 0.03 | | |
| 8 | | | | | | | | | | | | 0.01 | | | | | |
| 9 | 0.01 | | | | | 0.01 | | | | | | | | | | | |
| 10 | 0.09 | 0.02 | 0.07 | T | 0.03 | 0.10 | 0.02 | 0.01 | 0.02 | 0.03 | 0.03 | 0.06 | 0.06 | | 0.13 | 0.06 | 0.02 |
| 11 | 0.55 | 0.13 | 0.13 | T | 0.11 | 0.60 | 0.06 | 0.42 | 0.03 | 0.15 | 0.44 | 0.28 | 0.37 | 0.07 | 0.37 | 0.01 | 0.09 |
| 12 | 0.02 | | | 0.02 | | | | 0.01 | | 0.02 | 0.02 | 0.10 | 0.03 | 0.01 | | | 0.04 |
| 13 | | | | | | | | | | | | | | | | | |
| 14 | 0.04 | | | | 0.01 | 0.05 | | | | 0.03 | 0.02 | 0.07 | 0.01 | | | | |
| 15 | | | | | | | | | | | 0.01 | | | | | | |
| 16 | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | 0.04 | | 0.01 | | | |
| 18 | 0.60 | 0.14 | 0.14 | 0.09 | 0.12 | 0.52 | 0.36 | 0.28 | 0.13 | 0.09 | 0.15 | 0.45 | 0.22 | 0.07 | 0.13 | 0.08 | 0.10 |
| 19 | 0.02 | | | | | 0.01 | | 0.02 | | 0.01 | 0.04 | 0.02 | | | 0.02 | | |
| 20 | 0.03 | | | | | 0.03 | | | | | 0.01 | 0.01 | | | | | 0.02 |
| 21 | 0.02 | | | 0.02 | 0.06 | 0.01 | 0.01 | | 0.01 | 0.02 | | 0.04 | | | | 0.06 | 0.02 |
| 22 | | | | | | | | | | 0.01 | | 0.01 | | | | | |
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
| 25 | 0.01 | | 0.02 | | | 0.01 | 0.01 | | | | 0.01 | | 0.02 | | | | |
| 26 | | | | | | | | | | | | | | | | | |
| 27 | 0.03 | | 0.08 | | | 0.03 | | 0.03 | | | | | | | 0.07 | | |
| 28 | 0.87 | 0.62 | 1.29 | 1.57 | 0.70 | 1.30 | 1.40 | 0.84 | 1.08 | 1.42 | 1.10 | 0.59 | 0.78 | 1.30 | 1.39 | 0.89 | 0.78 |
| 29 | 0.55 | | 0.05 | T | | 0.43 | | 0.06 | | 0.03 | 0.04 | 0.28 | 0.07 | | 0.06 | 0.03 | 0.03 |
| 30 | 0.03 | | | | | 0.01 | 0.02 | 0.01 | | | 0.01 | 0.02 | 0.02 | | 0.01 | | |
| 31 | | | | | | | | | | | | | | | | | |
| TOTAL | 3.17 | 0.91 | 1.89 | 1.88 | 1.06 | 3.45 | 1.93 | 1.69 | 1.41 | 1.94 | 1.96 | 2.20 | 1.67 | 1.62 | 2.22 | 1.18 | 1.10 |

Area 12 Dip Stick Rain Gage Reading: 3.00 inches of precipitation from 03/01/2006 to 04/03/2006

Data Tabulated By: Raymond D. Dennis 04/06/06

Data Quality Control: Raymond D. Dennis 04/06/06

Certified By: Dana D. Schult III 04/06/06

# NTS PRECIPITATION

## April 2006

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.10 | | | | 0.02 | 0.06 | | 0.02 | | | | 0.02 | 0.10 | | | 0.02 | |
| 2 | 0.02 | | | | | 0.01 | | 0.01 | | | 0.01 | 0.02 | 0.01 | | | | |
| 3 | 0.06 | 0.02 | 0.03 | T | | 0.09 | 0.26 | 0.09 | | | 0.06 | 0.05 | 0.12 | 0.09 | 0.13 | | 0.03 |
| 4 | 0.65 | 0.17 | 0.43 | 0.44 | 0.20 | 0.49 | 0.40 | 0.65 | 0.47 | 0.10 | 0.86 | 0.66 | 0.27 | 0.33 | 0.37 | 0.31 | 0.10 |
| 5 | 0.29 | 0.25 | 0.05 | 0.26 | 0.02 | 0.28 | 0.14 | 0.03 | | 0.30 | 0.09 | 0.12 | 0.25 | 0.04 | 0.11 | | 0.12 |
| 6 | | | | | | | | | | 0.15 | | | 0.40 | | | | |
| 7 | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | 0.03 | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 11 | | | | T | | | | 0.01 | | | 0.02 | 0.06 | | | | | |
| 12 | | | | | | | | | | | | 0.03 | | | | | |
| 13 | | | | | | | | | | | | | | | | | |
| 14 | 0.10 | 0.12 | 0.02 | T | 0.09 | 0.09 | 0.02 | 0.16 | | 0.02 | 0.05 | 0.20 | 0.10 | 0.04 | 0.02 | 0.04 | 0.05 |
| 15 | | | | | | | | | | | | | | | | | |
| 16 | 0.03 | | 0.02 | | | | 0.01 | | | 0.01 | | 0.04 | | | | | |
| 17 | | | | T | | 0.04 | | | | 0.01 | | | 0.05 | | | | |
| 18 | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | 0.04 | | | | | |
| 22 | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | 0.01 | | | | | |
| 24 | 0.02 | | | | | | | | | | | 0.01 | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | |
| 27 | | | | T | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | | 0.09 | | | | | | | | | | | | | | | |
| TOTAL | 1.27 | 0.65 | 0.55 | 0.70 | 0.33 | 1.06 | 0.83 | 0.97 | 0.47 | 0.59 | 1.09 | 1.29 | 1.30 | 0.50 | 0.63 | 0.37 | 0.30 |

Area 12 Dip Stick Rain Gage Reading: 1.00 inches of precipitation from 04/04/2006 to 05/05/2006

Data Tabulated By: Raymond D. Dennis 05/08/2006

Data Quality Control: 05/08/06

Certified By: 05/08/06

# NTS PRECIPITATION

## May 2006

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | 0.32 | | | | | 0.12 | | 1.16 | 0.05 | | | | 0.02 | | 0.10 | | |
| 5 | | | | | | | | 0.02 | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | |
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| 14 | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | 0.02 | | | | | | | | | |
| 17 | | | | | | | | | | | | 0.01 | | | | | |
| 18 | | | | T | | 0.05 | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| 21 | 0.13 | 0.05 | | T | | 0.15 | | | | | | 0.06 | 0.08 | | 0.02 | | |
| 22 | 0.30 | 0.10 | 0.08 | T | 0.07 | 0.22 | | 0.03 | | 0.15 | 0.02 | 0.02 | 0.18 | 0.02 | 0.24 | 0.05 | 0.10 |
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
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| 28 | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | |
| TOTAL | 0.75 | 0.15 | 0.08 | 0.00 | 0.07 | 0.54 | 0.00 | 1.23 | 0.05 | 0.15 | 0.02 | 0.09 | 0.28 | 0.02 | 0.36 | 0.05 | 0.10 |

Area 12 Dip Stick Rain Gage Reading: 0.50 inches of precipitation from 05/05/2006 to 06/02/2006

Data Tabulated By: Raymond D. Dominguez 6/5/06

Data Quality Control: Raymond D. Dominguez 6/5/06

Certified By: [signature] 6/5/06

## NTS PRECIPITATION

### June 2006

| | A12 | BJY | CS | DRA | A06 | E Tu | 4JA | LF2 | MER | MV | 40 Mi | PM1 | PHS | RV | TS2 | W5B | UCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| 7 | | | | 0.06 | | | 0.05 | | 0.07 | | | | | 0.03 | | | 0.02 |
| 8 | | | | T | 0.04 | 0.05 | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | 0.01 | | | | | | | | |
| 13 | | | | 0.06 | | | | | 0.07 | | | | | | | 0.02 | 0.02 |
| 14 | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | |
| 27 | 0.11 | | 0.02 | | | 0.08 | | | 0.04 | | | | 0.05 | 0.03 | 0.02 | | |
| 28 | | | | T | | | | | | | | | | | | | |
| 29 | | | | T | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| TOTAL | 0.11 | 0.00 | 0.02 | 0.12 | 0.04 | 0.13 | 0.05 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 | 0.05 | 0.06 | 0.02 | 0.02 | 0.04 |

Area 12 Dip Stick Rain Gage Reading: 0.10 inches of precipitation from 06/02/2006 to 07/01/2006

Data Tabulated By: M Wood 7/7/06

Data Quality Control: M Wood 7/7/06

Certified By: [signature] 7/11/06

# APPENDIX F

# SITE SPECIFIC MONITORING DATA

*Monitoring data is summarized in Section 4.0 of this report, and the complete data set is kept in the project files in Mercury, NV.

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