Nevada
Environmental
Restoration
Project

DOE/NV--1315

National Nuclear Security Administration

Post-Closure Inspection Report for the Tonopah Test Range, Nevada

For Calendar Year 2008

Controlled Copy No.:_____

Revision: 0

March 2009

Environmental Restoration
Project

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

DISCLAIMER

DOE/NV--1315

POST-CLOSURE INSPECTION REPORT FOR THE TONOPAH TEST RANGE, NEVADA

FOR CALENDAR YEAR 2008

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

Controlled Copy No.____
Revision: 0
March 2009

THIS PAGE INTENTIONALLY LEFT BLANK

POST-CLOSURE INSPECTION REPORT FOR THE TONOPAH TEST RANGE, NEVADA

FOR CALENDAR YEAR 2008

Approved By: Original signed by: K Cabble Date: 3-11-09

Kevin J. Cabble
Federal Sub-Project Director
Industrial Sites Sub-Project

Approved By: Original signed by: R Boehlecke Date: 3/11/09

Robert F. Boehlecke
Federal Project Director
Environmental Restoration Project

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

CADD	Corrective Action Decision Document
CAS	Corrective Action Site
CAU	Corrective Action Unit
CR	Closure Report
DOE/NV	U.S. Department of Energy, Nevada Operations Office
NDEP	Nevada Division of Environmental Protection
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
ROTC	Record of Technical Change
TTR	Tonopah Test Range

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

This report provides the results of the annual post-closure inspections conducted at the closed Corrective Action Unit (CAU) sites located on the Tonopah Test Range (TTR), Nevada. This report covers calendar year 2008 and includes inspection and repair activities completed at the following ten CAUs:

- CAU 400: Bomblet Pit and Five Points Landfill (TTR)
- CAU 404: Roller Coaster Lagoons and Trench (TTR)
- CAU 407: Roller Coaster RadSafe Area (TTR)
- CAU 423: Area 3 Underground Discharge Point, Building 0360 (TTR)
- CAU 424: Area 3 Landfill Complexes (TTR)
- CAU 426: Cactus Spring Waste Trenches (TTR)
- CAU 427: Area 3 Septic Waste Systems 2, 6 (TTR)
- CAU 453: Area 9 UXO Landfill (TTR)
- CAU 484: Surface Debris, Waste Sites, and Burn Area (TTR)
- CAU 487: Thunderwell Site (TTR)

The annual post-closure inspections were conducted May 20–21, 2008. The first semiannual inspection at CAU 484 was conducted on March 6, 2008, after known inclement weather that prevented access to the site during the winter months subsided. Semiannual inspections are required at CAU 484 for the first year of post-closure monitoring, after which inspections will be performed annually.

All inspections were conducted according to the post-closure plans in the approved Closure Reports. The post-closure inspection plan for each CAU is included in Attachment B, with the exception of CAU 400. CAU 400 does not require post-closure inspections, but inspections of the vegetation and fencing are conducted as a best management practice. The inspection checklists for each site inspection are included in Attachment C, the field notes are included in Attachment D, and the site photographs are included in Attachment E. Vegetation monitoring of CAU 400, CAU 404, CAU 407, and CAU 426 was performed in May 2008, and the vegetation monitoring report is included in Attachment F.

Maintenance and/or repairs were performed at CAUs 407, 427, and 453. Loose barbed wire fencing at CAU 407 was tightened on July 10, 2008. On August 1, 2008, additional lava rock was brought in and spread over the areas where it delineates the use-restricted areas at CAU 427. Animal burrows at CAU 453 were backfilled on August 1, 2008.

TTR post-closure site inspections should continue as scheduled with the exception of CAUs 404, 423, and 427. These sites were reevaluated against recent risk-based closure criteria. Results of the reevaluation are presented in the document *Recommendations and Justifications for Modifications for Use Restrictions Established under the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office Federal Facility Agreement and Consent Order* (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2008). As a result of this evaluation, the use restrictions were removed from

CAUs 423 and 427 and the use restriction for CAU 404 has been changed to administrative (i.e., no inspections are required). The remaining sites will continue to be inspected.

Vegetation survey inspections have been conducted annually at CAUs 400, 404, 407, and 426. Discontination of vegetation surveys is recommended at the CAU 400 Bomblet Pit and CAU 426, which have been successfully revegetated. Fencing should remain at these sites. Discontinuation of vegetation surveys is also recommended at CAU 404, which has been changed to an administrative closure with no inspections required. Vegetation monitoring at the CAU 400 Five Points Landfill and CAU 407 should continue.

1.0 INTRODUCTION

1.1 SCOPE AND OBJECTIVES

This report includes results of inspections, maintenance and repair activities, and conclusions and recommendations for calendar year 2008 for ten Corrective Action Units (CAUs) on the Tonopah Test Range (TTR), Nevada. The CAUs are shown in Figure 1 of Attachment A. The CAUs and Corrective Action Sites (CASs) in this report include the following:

- **CAU 400: Bomblet Pit and Five Points Landfill (TTR)**
  - CAS TA-19-001-05PT: Ordnance Disposal Pit
  - CAS TA-55-001-TAB2: Ordnance Disposal Pit
- **CAU 404: Roller Coaster Lagoons and Trench (TTR)**
  - CAS TA-03-001-TARC: Roller Coaster Lagoons
  - CAS TA-21-001-TARC: Roller Coaster N. Disposal Trench
- **CAU 407: Roller Coaster RadSafe Area (TTR)**
  - CAS TA-23-001-TARC: Roller Coaster RadSafe Area
- **CAU 423: Area 3 Underground Discharge Point, Building 0360 (TTR)**
  - CAS 03-02-002-0308: Underground Discharge Point
- **CAU 424: Area 3 Landfill Complexes (TTR)**
  - CAS 03-08-001-A301: Landfill Cell A3-1
  - CAS 03-08-002-A302: Landfill Cell A3-2
  - CAS 03-08-002-A303: Landfill Cell A3-3
  - CAS 03-08-002-A304: Landfill Cell A3-4
  - CAS 03-08-002-A305: Landfill Cell A3-5
  - CAS 03-08-002-A306: Landfill Cell A3-6
  - CAS 03-08-002-A308: Landfill Cell A3-8
- **CAU 426: Cactus Spring Waste Trenches (TTR)**
  - CAS RG-08-001-RGCS: Waste Trenches
- **CAU 427: Area 3 Septic Waste Systems 2, 6 (TTR)**
  - CAS 03-05-002-SW02: Septic Waste System
  - CAS 03-05-002-SW06: Septic Waste System
- **CAU 453: Area 9 UXO Landfill (TTR)**
  - CAS 09-55-001-0952: Area 9 Landfill
- **CAU 484: Surface Debris, Waste Sites, and Burn Area (TTR)**
  - CAS RG-52-007-TAML: Davis Gun Penetrator Test
- **CAU 487: Thunderwell Site (TTR)**
  - CAS RG-26-001-RGRV: Thunderwell Site

Post-closure inspections consist of the following activities to evaluate and document the condition of the closed units. CAU-specific inspection requirements are included in Attachment B.

- Site inspections and photographs to verify site conditions and note variances from previous inspections
- Inspection of fencing, signs, monuments, and/or markers to determine if repairs and/or maintenance are needed
- Inspection of soil covers for indications of subsidence, erosion, or unauthorized use
- Vegetation survey to quantify the condition of vegetative covers
- Subsidence survey to indicate any cover subsidence
- Preparation and submittal of an annual report

This Post-Closure Inspection Report includes the following sections:

- Section 1.0: Introduction
- Section 2.0: Post-Closure Inspections
- Section 3.0: Summary
- Section 4.0: References
- Attachment A: Figures
- Attachment B: Post-Closure Inspection Plans
- Attachment C: Post-Closure Inspection Checklists
- Attachment D: Field Notes
- Attachment E: Photographs
- Attachment F: Post-Closure Vegetation Monitoring Report
- Library Distribution List

2.0 POST-CLOSURE INSPECTIONS

Post-closure site inspections of TTR CAUs for the period January 2008 through December 2008 were conducted on May 20 and May 21, 2008. An additional inspection was conducted at the new CAU 484 post-closure sites on March 6, 2008. Copies of post-closure inspection plans as previously published in the applicable Closure Report (CR) for each CAU are included in Attachment B. Copies of the site inspection checklists are included in Attachment C, field notes are included in Attachment D, and site photographs are included in Attachment E.

2.1 CAU 400: BOMBLET PIT AND FIVE POINTS LANDFILL (TTR)

2.1.1 Introduction

There are no specific post-closure requirements in the CR for CAU 400, Bomblet Pit and Five Points Landfill (TTR); however, when the sites were vegetated in 1997 under the *Tonopah Test Range Closure Sites Revegetation Plan* (U.S. Department of Energy, Nevada Operations Office [DOE/NV], 1997), fencing was installed at the Bomblet Pit (CAS TA-55-001-TAB2, Ordnance Disposal Pit) and the Five Points Landfill (CAS TA-19-001-05PT, Ordnance Disposal Pit). As stated in Section 3.5.4 of the revegetation plan (DOE/NV, 1997), fencing was required at both CASs for a minimum of 5 years in order to give the plants sufficient time to become established. While this period has passed, inspections are still conducted at CAU 400 to document vegetation growth and inspect the integrity of the fences. Removal of site fencing may be proposed once vegetation on the covers is well established. Vegetation monitoring of CAU 400 was conducted in May 2008, and the results are included in Attachment F.

2.1.2 CAU 400 Inspection Results

Bomblet Pit (CAS TA-55-001-TAB2, Ordnance Disposal Pit): The Bomblet Pit is presented in Figure 2 of Attachment A. The annual inspection was conducted on May 21, 2008. The fence, signs, and cover were in good condition. As for cover vegetation, the goals of revegetation have been accomplished at the CAU 400 Bomblet Pit site. Native species are established and contribute significantly to overall plant cover and density. Revegetation success standards have been exceeded. No issues or concerns were noted.

Five Points Landfill (CAS TA-19-001-05PT, Ordnance Disposal Pit): The Five Points Landfill is presented in Figure 3 of Attachment A. The annual inspection was conducted on May 21, 2008. All signs and fencing were in good condition. The cover vegetation appeared normal and healthy in the area that had not previously been flooded, and this area has met the standard for revegetation. The vegetation located on the area that was flooded in 2003 and 2006 does not support a viable native plant community at this time; however, both shrubs and grasses are again establishing in this area. No issues or concerns were noted.

2.1.3 CAU 400 Maintenance and Repairs

No maintenance or repairs at CAU 400 were required in 2008.

2.1.4 CAU 400 Conclusions and Recommendations

The Bomblet Pit and Five Points Landfill were observed to be in good condition. Site inspections should continue as scheduled. Vegetation at the Five Points Landfill meets the

revegetation standard in the area that was not flooded; however, the area that was flooded is still recovering, and vegetation monitoring of this site should continue. Vegetation at the Bomblet Pit exceeded the revegetation standards, and discontinuation of vegetation monitoring is recommended. Removal of the fencing is not expected to impact site conditions at the Bomblet Pit site; however, the recommendation is to leave the fence in place.

2.2 CAU 404: ROLLER COASTER LAGOONS AND TRENCH (TTR)

2.2.1 Introduction

CAU 404, Roller Coaster Lagoons and Trench (TTR), consists of two CASs (CAS TA-03-001-TARC, Roller Coaster Lagoons, and CAS TA-21-001-TARC, Roller Coaster N. Disposal Trench). Post-closure requirements are described in the CR for CAU 404 (DOE/NV, 1998a), which was approved by the Nevada Division of Environmental Protection (NDEP) on May 18, 1999.

A diagram showing the site location and configuration is presented as Figure 4 of Attachment A. The site inspections are conducted according to the CAU 404 post-closure inspection plan (Attachment B). In addition to site inspections, vegetation monitoring of the site was conducted in May 2008, and the results are included in Attachment F.

2.2.2 CAU 404 Inspection Results

The annual inspection was conducted on May 20, 2008. This site was in good condition. No damage was noted to the fencing, signs, or cover. Revegetation success standards have been exceeded. The vegetation was healthy and well established. Native species are established and contribute significantly to plant cover and density. Because the density of grasses is greater than in the surrounding areas, removal of the fence could create a grazing issue; if the fence is removed, then vegetation monitoring should continue. No issues or concerns were noted.

2.2.3 CAU 404 Maintenance and Repairs

No maintenance or repairs at CAU 404 were required in 2008.

2.2.4 CAU 404 Conclusions and Recommendations

The site was observed to be in good condition during the 2008 inspection. The goals of revegetation have been accomplished. The conditions at these two CASs were reevaluated in 2008 against risk-based corrective action criteria. Results of the reevaluation are presented in the document *Recommendations and Justifications for Modifications for Use Restrictions Established under the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office Federal Facility Agreement and Consent Order* (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2008). As a result of the reevaluation, requirements for inspecting and maintaining these use restrictions have been canceled, and postings and signs associated with the use restrictions will be removed. However, the fence will remain in place to prevent grazing. No further inspections or vegetation surveys of this site will be conducted.

2.3 CAU 407: ROLLER COASTER RADSAFE AREA (TTR)

2.3.1 Introduction

CAU 407, Roller Coaster RadSafe Area (TTR), consists of one CAS (CAS TA-23-001-TARC, Roller Coaster RadSafe Area). Post-closure requirements for CAU 407 are described in the CR (DOE/NV, 2001a). Revision 1 of the CR was approved by NDEP on February 22, 2002, and calls for inspections to be conducted in the first 6 months following cover construction, after which inspections are to be conducted twice yearly for 2 years. In December 2006, NDEP agreed to reduce the frequency of inspections to annual. Previous inspections have noted erosion on the cover margins, and maintenance was completed to help prevent future erosion; consequently, inspections will continue until the site stabilizes.

A diagram of the site is presented in Figure 5 of Attachment A. Inspections are conducted according to the CAU 407 post-closure plan (Attachment B). In addition to inspections, vegetation monitoring was conducted in May 2008, and the results are included in Attachment F.

2.3.2 CAU 407 Inspection Results

The annual inspection was conducted on May 20, 2008. The fence was erect and stable, but some of the strands of barbed wire were loose and were recommended to be tightened as a best management practice. All warning signs were in good condition. The cover was in good condition with the exception of some small animal burrows on the side slope of the waste unit cover. These were determined to not be significant and do not require remedial action at this time. Vegetation is becoming established on the cover. Plant density on the site is higher than on the reference area, even after substantial declines in plant density over the last four years. There is no evidence that water moving off the cover is creating erosion gullies.

2.3.3 CAU 407 Maintenance and Repairs

Loose barbed wire on the south and northwest corner fence was tightened on July 10, 2008.

2.3.4 CAU 407 Conclusions and Recommendations

Minor repairs were made as needed in July 2008. This site was otherwise observed to be in good condition. The site inspections should continue as scheduled, and the health of the vegetation and integrity of the cover should continue to be monitored until the site has stabilized.

2.4 CAU 423: AREA 3 UNDERGROUND DISCHARGE POINT, BUILDING 0360 (TTR)

2.4.1 Introduction

CAU 423, Area 3 Underground Discharge Point, Building 0360 (TTR), consists of one CAS (CAS 03-02-002-0308, Underground Discharge Point). CAU 423 was closed in place, with one warning sign and one at-grade marker installed, as detailed in the CR (DOE/NV, 1999a). The CR did not originally require post-closure inspections. A Record of Technical Change (ROTC) to the CR (NNSA/NSO, 2005), specifying the post-closure inspection requirements, was approved by NDEP on June 6, 2005 (Attachment B). A diagram showing the site location and configuration is presented in Figure 6 of Attachment A.

2.4.2 CAU 423 Inspection Results

The annual inspection was conducted on May 21, 2008. The warning sign and at-grade marker were in good condition. No issues or concerns were noted.

2.4.3 CAU 423 Maintenance and Repairs

No maintenance or repairs at CAU 423 were required in 2008.

2.4.4 CAU 423 Conclusions and Recommendations

The site was observed to be in good condition during the 2008 inspection. The site conditions at this CAS were reevaluated in 2008 against risk-based corrective action criteria. Results of the reevaluation are presented in the document *Recommendations and Justifications for Modifications for Use Restrictions Established under the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office Federal Facility Agreement and Consent Order* (NNSA/NSO, 2008). As a result of the reevaluation, requirements for inspecting and maintaining this site and the use restriction itself have been removed. No further inspections of this site will be conducted.

2.5 CAU 424: AREA 3 LANDFILL COMPLEXES (TTR)

2.5.1 Introduction

CAU 424, Area 3 Landfill Complexes (TTR), consists of eight CASs. Seven landfill cells (CAS 03-08-001-A301, Landfill Cell A3-1; CAS 03-08-002-A302, Landfill Cell A3-2; CAS 03-08-002-A303, Landfill Cell A3-3; CAS 03-08-002-A304, Landfill Cell A3-4; CAS 03-08-002-A305, Landfill Cell A3-5; CAS 03-08-002-A306, Landfill Cell A3-6; and CAS 03-08-002-A308, Landfill Cell A3-8) were closed with soil covers and require post-closure inspections. CAS 03-08-002-A307, Landfill Cell A3-7, was not used as a landfill site and was closed without taking any corrective action. CAU 424 closure activities included removing small volumes of soil containing petroleum hydrocarbons, repairing cell covers that were cracked and/or had subsided, and installing concrete monuments on the ground surface and at-grade markers at the corners of the landfill cells. Post-closure requirements for CAU 424 are detailed in the CR, which was approved by NDEP on August 24, 1999 (DOE/NV, 1999b).

The site inspections are conducted according to the CAU 424 post-closure inspection plan (Attachment B). A diagram showing the landfill locations is presented in Figure 7 of Attachment A.

2.5.2 CAU 424 Inspection Results

The annual inspection was conducted on May 21, 2008.

Landfill Cell A3-1 (CAS 03-08-001-A301): Landfill Cell A3-1 is located at the north end of CAU 424 and is the largest of the landfill cells. The cover and seven concrete monuments that demarcate the landfill cell were examined. All signs, survey markers, and monuments were in good condition. Vegetation is established throughout the site, and no cracking, erosion, or subsidence of the cover was noted. No issues or concerns were noted.

Landfill Cell A3-2 (CAS 03-08-002-A302): Landfill Cell A3-2 is located due south of Landfill Cell A3-1. The overall condition of the unit was good. All four concrete monuments and the landfill cover were examined and found to be in good condition. All signs and brass survey

markers were legible and intact. No signs of erosion, subsidence, or evidence of unauthorized use were noted. No issues or concerns were noted.

Landfill Cell A3-3 (CAS 03-08-002-A303): Landfill Cell A3-3 straddles the western fence of the TTR Area 3 Compound, with the portion of the landfill outside the fence marked by three concrete monuments on the ground surface, and the portion inside the fence marked by three at-grade markers. The overall condition of the site was good. All monuments and markers were located and inspected. All monuments, brass survey markers, and warning signs were in good condition. No subsidence, cracking, or erosion was noted. No issues or concerns were noted.

Landfill Cell A3-4 (CAS 03-08-002-A304): Landfill Cell A3-4 is located south of Dykes Drive at the south end of the CAU. The overall condition of the site was good, and vegetation was established throughout the site. Five concrete monuments on the ground surface and one at-grade brass survey marker were located and inspected. All monuments, the brass survey marker, and warning signs were in good condition. No issues or concerns were noted.

Landfill Cell A3-5 (CAS 03-08-002-A305): Landfill Cell A3-5 is located west of Moody Avenue inside a fenced area in Area 10 south of the Air Force First-Aid Station. All four concrete monuments and attached warning signs and brass survey markers were located and found to be in good condition. No evidence of subsidence, cracking, or erosion was noted, and sparse vegetation was present. The overall condition of the site was good. No issues or concerns were noted.

Landfill Cell A3-6 (CAS 03-08-002-A306): Landfill Cell A3-6 is located immediately west and outside of the fence of the TTR Area 3 Compound. All four concrete monuments and attached warning signs and brass survey markers were located and found to be in good condition. The overall condition of the landfill cover was good. No evidence of subsidence, cracking, or erosion was noted. No issues or concerns were noted.

Landfill Cell A3-8 (CAS 03-08-002-A308): Landfill Cell A3-8 is located southwest of the Area 3 Compound in the boxcar storage yard. Three of the four at-grade brass markers were located and determined to be in good condition. The fourth corner monument was not located during the site inspection; however, it was located using the GPS on July 9, 2008, and found to be present and in good condition but buried beneath approximately 0.5 inches of soil. No erosion, subsidence, or evidence of unauthorized use was noted at the site. The overall condition of the cover was good. No issues or concerns were noted.

2.5.3 CAU 424 Maintenance and Repairs

No maintenance or repairs at CAU 424 were required in 2008.

2.5.4 CAU 424 Conclusions and Recommendations

All seven CASs in CAU 424 were observed to be in good condition. The site inspections should continue as scheduled.

2.6 CAU 426: CACTUS SPRING WASTE TRENCHES (TTR)

2.6.1 Introduction

CAU 426, Cactus Spring Waste Trenches (TTR), consists of one CAS (CAS RG-08-001-RGCS, Waste Trenches). The post-closure requirements are described in the CR for CAU 426 (DOE/NV, 1998b), which was approved by NDEP on May 13, 1999.

A diagram showing the site location and configuration is presented in Figure 8 of Attachment A. The site inspections are conducted according to the CAU 426 post-closure inspection plan (Attachment B). In addition to site inspections, vegetation monitoring of the site was conducted in May 2008, and the results are included in Attachment F.

2.6.2 CAU 426 Inspection Results

The annual inspection was conducted on May 20, 2008. The fence perimeter was walked, and the site was found to be in good condition. Small animal burrows were observed to be at the northeast fence corner; however, the site conditions were not significant enough to warrant a corrective action. No erosion, subsidence, or evidence of unauthorized use was noted. Vegetation was well established and healthy throughout the site. A plant community composed of native shrubs, grasses, and forbs has established on the site. No issues or concerns were noted.

2.6.3 CAU 426 Maintenance and Repairs

No maintenance or repairs at CAU 426 were required in 2008.

2.6.4 CAU 426 Conclusions and Recommendations

The site was observed to be in good condition. Site inspections should continue as scheduled. As in 2007, revegetation success standards were achieved again in 2008. Discontinuation of vegetation monitoring is recommended, as is leaving the fence in place and inspecting it annually to verify that it is in good condition. The fence should remain to discourage grazing animals.

2.7 CAU 427: AREA 3 SEPTIC WASTE SYSTEMS 2, 6 (TTR)

2.7.1 Introduction

CAU 427, Area 3 Septic Waste Systems 2, 6 (TTR), consists of two CASs (CAS 03-05-002-SW02, Septic Waste System, and CAS 03-05-002-SW06, Septic Waste System). The closed leachfields are located in the TTR Area 3 compound in a high-traffic area. For this reason, the leachfield corners are marked by subsurface metal markers each covered with red lava rock to the ground surface. The red rock aids in visually locating the markers during site inspections. Post-closure requirements for CAU 427 are detailed in the CR for CAU 427 (DOE/NV, 1999c), which was approved by NDEP on August 27, 1999.

A diagram showing the site location and configuration is presented in Figure 9 of Attachment A. The site inspections are conducted according to the CAU 427 post-closure inspection plan (Attachment B).

2.7.2 CAU 427 Inspection Results

The annual inspection was conducted on May 20, 2008. All 21 subsurface metal markers, including four markers at Leachfield A, four markers at Leachfield B, four markers at the Abandoned Leachfield, four markers at the Pre-1965 Leachfield, and five markers at Septic Tank 33-5, were located. The five warning signs were intact, in place, and legible. The site was observed to be in good condition; however, the lava rock placed in heavy traffic areas was beginning to be displaced. No maintenance or repairs were recommended. No issues or concerns were noted.

2.7.3 CAU 427 Maintenance and Repairs

No maintenance or repairs at CAU 427 were required in 2008. As a best management practice, some additional lava rock was placed on August 1, 2008, in areas where it had been displaced due to heavy traffic.

2.7.4 CAU 427 Conclusions and Recommendations

The site was observed to be in good condition during the 2008 inspection. The site conditions at this CAS were reevaluated in 2008 against risk-based corrective action criteria. Results of the reevaluation are presented in the document *Recommendations and Justifications for Modifications for Use Restrictions Established under the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office Federal Facility Agreement and Consent Order* (NNSA/NSO, 2008). As a result of the reevaluation, requirements for inspecting and maintaining this site and the use restriction itself have been removed. No further inspections of this site will be conducted.

2.8 CAU 453: AREA 9 UXO LANDFILL (TTR)

2.8.1 Introduction

CAU 453, Area 9 UXO Landfill (TTR), consists of one CAS (CAS 09-55-001-0952, Area 9 Landfill). Post-closure requirements for CAU 453 are described in the CR for CAU 453 (DOE/NV, 1999d), which was approved by NDEP on September 10, 1999.

A diagram showing the site location and configuration is presented in Figure 10 of Attachment A. The site inspections are conducted according to the CAU 453 post-closure inspection plan (Attachment B).

2.8.2 CAU 453 Inspection Results

The annual inspection was conducted on May 21, 2008. The fence, signs, 16 concrete monuments, and covers were all in excellent condition. There was evidence of animal burrowing at the site that required follow-up action.

2.8.3 CAU 453 Maintenance and Repairs

Animal burrows observed during the annual inspection were backfilled on August 1, 2008.

2.8.4 CAU 453 Conclusions and Recommendations

The site was observed to be in good condition. Inspections should continue as scheduled.

2.9 CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA (TTR)

2.9.1 Introduction

CAU 484, Surface Debris, Waste Sites, and Burn Area (TTR), consists of six CASs. A use restriction was implemented for one of the CASs (CAS RG-52-007-TAML, Davis Gun Penetrator Test). Post-closure requirements for CAU 484 are described in the CR for CAU 484 (NNSA/NSO, 2007), which was approved by NDEP on October 5, 2007.

A diagram showing the site location and configuration is presented in Figure 11 of Attachment A. The site inspections are conducted according to the CAU 484 post-closure inspection plan (Attachment B).

2.9.2 CAU 484 Inspection Results

Semiannual inspections are required at CAU 484 for the first year of post-closure monitoring, after which inspections will be performed annually. Because this was the first year of inspections after closure of CAU 484, two inspections were conducted. The first semiannual inspection was conducted on March 6, 2008, after known inclement weather that prevented access to the site during the winter months subsided. The second inspection was conducted on May 20, 2008. The use restriction and radiological signs and the covers were in good condition. Some settling of the CA-1 cover was observed during the March inspection; however, the cover is still mounded and prevents ponding on the cover surface. No issues or concerns were noted, and no maintenance or repairs were recommended.

2.9.3 CAU 484 Maintenance and Repairs

No maintenance or repairs at CAU 484 were required in 2008.

2.9.4 CAU 484 Conclusions and Recommendations

The site was observed to be in good condition. Site inspections should continue as scheduled.

2.10 CAU 487: THUNDERWELL SITE (TTR)

2.10.1 Introduction

CAU 487, Thunderwell Site (TTR), consists of one CAS (CAS RG-26-001-RGRV, Thunderwell Site). The Corrective Action Decision Document (CADD)/CR was approved by NDEP on December 17, 2001 (DOE/NV, 2001b). Buried waste and debris were present at the site but no contamination was found. Use restrictions were implemented at the site as explained in the CADD/CR, but no post-closure inspections were proposed. Two separate use restrictions were implemented to address areas associated with subsurface geophysical anomalies (anomalies A-8 and A-17). Concrete monuments were installed at both locations of buried waste. A ROTC to modify the CADD/CR to include post-closure inspections and use restriction information was approved by NDEP on July 30, 2004 (NNSA/NSO, 2004).

A diagram of the site location and configuration is presented in Figure 12 of Attachment A.

2.10.2 CAU 487 Inspection Results

The annual inspection was conducted on May 21, 2008. All warning signs were in place, intact, and legible. No issues or concerns were noted.

2.10.3 CAU 487 Maintenance and Repairs

No maintenance or repairs at CAU 487 were required in 2008.

2.10.4 CAU 487 Conclusions and Recommendations

The site was observed to be in good condition. Site inspections should continue as scheduled.

THIS PAGE INTENTIONALLY LEFT BLANK

3.0 SUMMARY

3.1 CAU 400: BOMBLET PIT AND FIVE POINTS LANDFILL (TTR)

Site inspections at CAS TA-55-001-TAB2, Ordnance Disposal Pit (Bomblet Pit), and CAS TA-19-001-05PT, Ordnance Disposal Pit (Five Points Landfill), indicated the sites were in good condition. No maintenance or repairs were required. Site inspections should continue as scheduled. An ecological specialist should continue to evaluate vegetation conditions at the Five Points Landfill, especially in the area that experienced flooding. The Bomblet Pit site has been successfully revegetated; therefore, discontinuation of vegetation surveys by an ecological specialist is recommended. Fencing should remain in place, to prevent excessive grazing, and should continue to be inspected for integrity during the annual inspection.

3.2 CAU 404: ROLLER COASTER LAGOONS AND TRENCH (TTR)

The site inspection indicated that the site was in good condition. No maintenance or repairs were required. No further site inspections, including evaluation of the vegetation conditions by an ecological specialist, will be conducted because the use restriction has been changed to administrative, and no longer require inspections or maintenance. CAU 404 will not be included in future post-closure inspection reports.

3.3 CAU 407: ROLLER COASTER RADSAFE AREA (TTR)

Minor repairs were completed in July 2008 to tighten the fence. This site was otherwise observed to be in good condition. Site inspections should continue as scheduled, and an ecological specialist should continue to evaluate vegetation conditions.

3.4 CAU 423: AREA 3 UNDERGROUND DISCHARGE POINT, BUILDING 0360 (TTR)

The site inspection indicated that the site was in good condition. No maintenance or repairs were required. No further site inspections will be conducted because the use restriction has been removed. CAU 423 will not be included in future post-closure inspection reports.

3.5 CAU 424: AREA 3 LANDFILL COMPLEXES (TTR)

The site inspection indicated that the site was in good condition. No maintenance or repairs were required. Site inspections should continue as scheduled.

3.6 CAU 426: CACTUS SPRING WASTE TRENCHES (TTR)

The site inspection indicated that the site was in good condition. No maintenance or repairs were required. Site inspections should continue as scheduled. Discontinuation of vegetation surveys by an ecological specialist is recommended because the site has been successfully revegetated. Fencing should remain in place, to prevent excessive grazing, and should continue to be inspected for integrity during the annual inspection.

3.7 CAU 427: AREA 3 SEPTIC WASTE SYSTEMS 2, 6 (TTR)

The site inspection indicated that the site was in good condition. No maintenance or repairs were required. As a best management practice, additional lava rock was placed on August 1, 2008, in areas where it had been displaced due to heavy traffic. No further site inspections will be conducted because the use restriction has been removed. CAU 427 will not be included in future post-closure inspection reports.

3.8 CAU 453: AREA 9 UXO LANDFILL (TTR)

The site inspection indicated that the site was in good condition. Animal burrows observed during the annual inspection were backfilled on August 1, 2008. Site inspections should continue as scheduled.

3.9 CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA (TTR)

The site inspections indicated that the site was in good condition. No maintenance or repairs were required. Site inspections should continue as scheduled.

3.10 CAU 487: THUNDERWELL SITE (TTR)

The site inspection indicated that the site was in good condition. No maintenance or repairs were required. Site inspections should continue as scheduled.

4.0 REFERENCES

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

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

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2004. *Record of Technical Change No. 2 for the Final Corrective Action Decision Document/Closure Report for Corrective Action Unit 487: Thunderwell Site, Tonopah Test Range, Nevada,* Revision 0, November 2001. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2005. *Record of Technical Change No. CR-1 for the Final Closure Report for Corrective Action Unit 423: Area 3 Building 0360 Underground Discharge Point, Tonopah Test Range, Nevada,* Revision 0, July 1999. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2007. *Closure Report for Corrective Action Unit 484: Surface Debris, Waste Sites, and Burn Area, Tonopah Test Range, Nevada*, DOE/NV--1226. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2008. *Recommendations and Justifications for Modifications for Use Restrictions Established under the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office Federal Facility Agreement and Consent Order,* DOE/NV--1237. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1997. *Tonopah Test Range Closure Sites Revegetation Plan*, DOE/NV/11718-115 UC-702. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1998a. *Closure Report for Corrective Action Unit 404: Roller Coaster Sewage Lagoons and North Disposal Trench, Tonopah Test Range, Nevada*, DOE/NV/11718-187 UC-702. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1998b. *Closure Report for Corrective Action Unit 426: Cactus Spring Waste Trenches, Tonopah Test Range, Nevada*, DOE/NV/11718-226 UC-702. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999a. *Closure Report for Corrective Action Unit 423: Area 3 Building 03-60 Underground Discharge Point, Tonopah Test Range, Nevada*, DOE/NV/11718--319. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999b. *Closure Report for Corrective Action Unit 424: Area 3 Landfill Complexes, Tonopah Test Range, Nevada*, DOE/NV/11718--283. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999c. *Closure Report for Corrective Action Unit 427: Area 3 Septic Waste Systems 2 and 6, Tonopah Test Range, Nevada*, DOE/NV/11718--326. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999d. *Closure Report for Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada*, DOE/NV/11718--284. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 2001a. *Closure Report for Corrective Action Unit 407: Roller Coaster RadSafe Area, Tonopah Test Range, Nevada*, DOE/NV--694-REV-1. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 2001b. *Corrective Action Decision Document/Closure Report for Corrective Action Unit 487: Thunderwell Site, Tonopah Test Range, Nevada*, DOE/NV--761. Las Vegas, NV.

ATTACHMENT A
FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

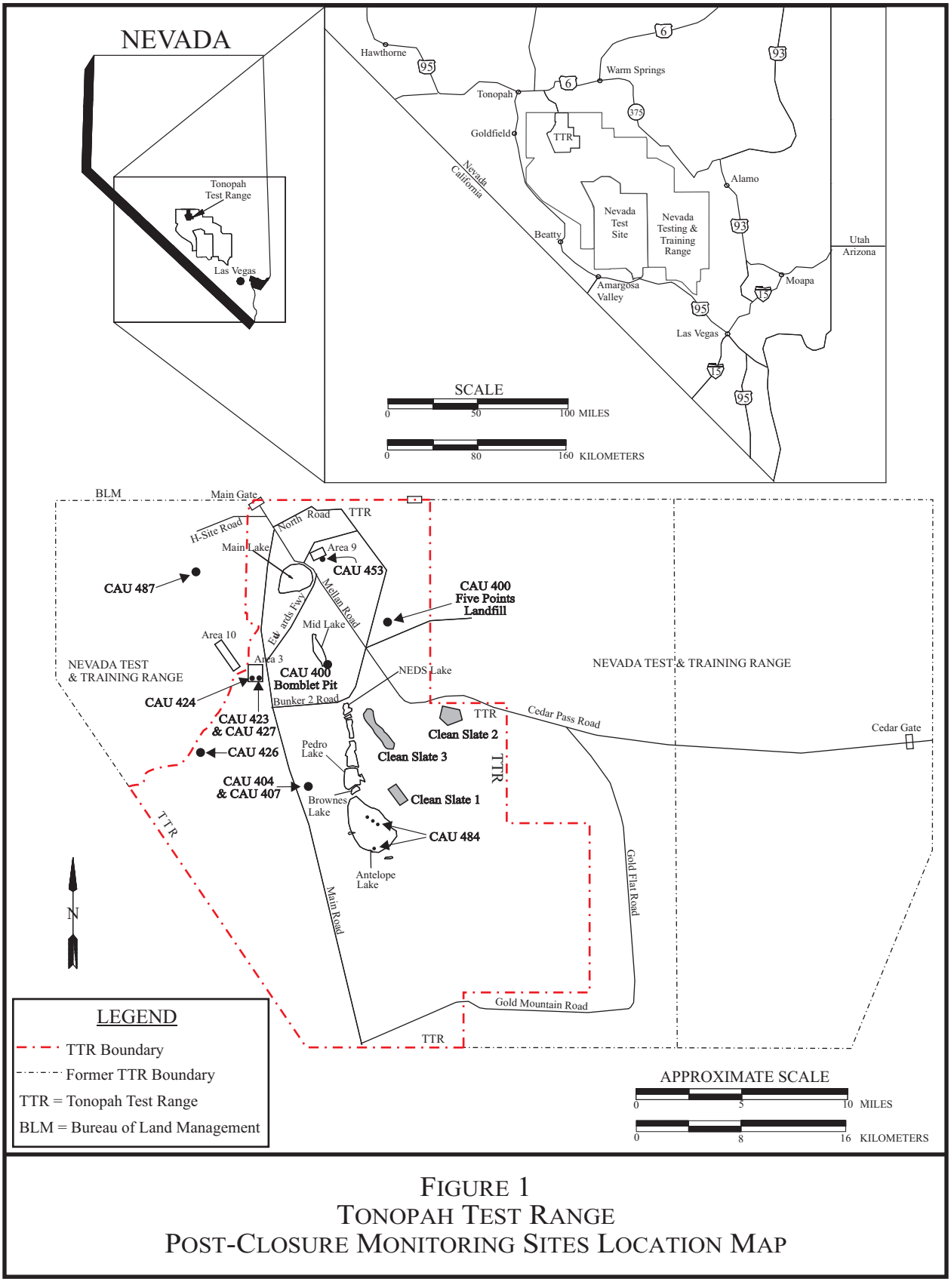


FIGURE 1
TONOPAH TEST RANGE
POST-CLOSURE MONITORING SITES LOCATION MAP

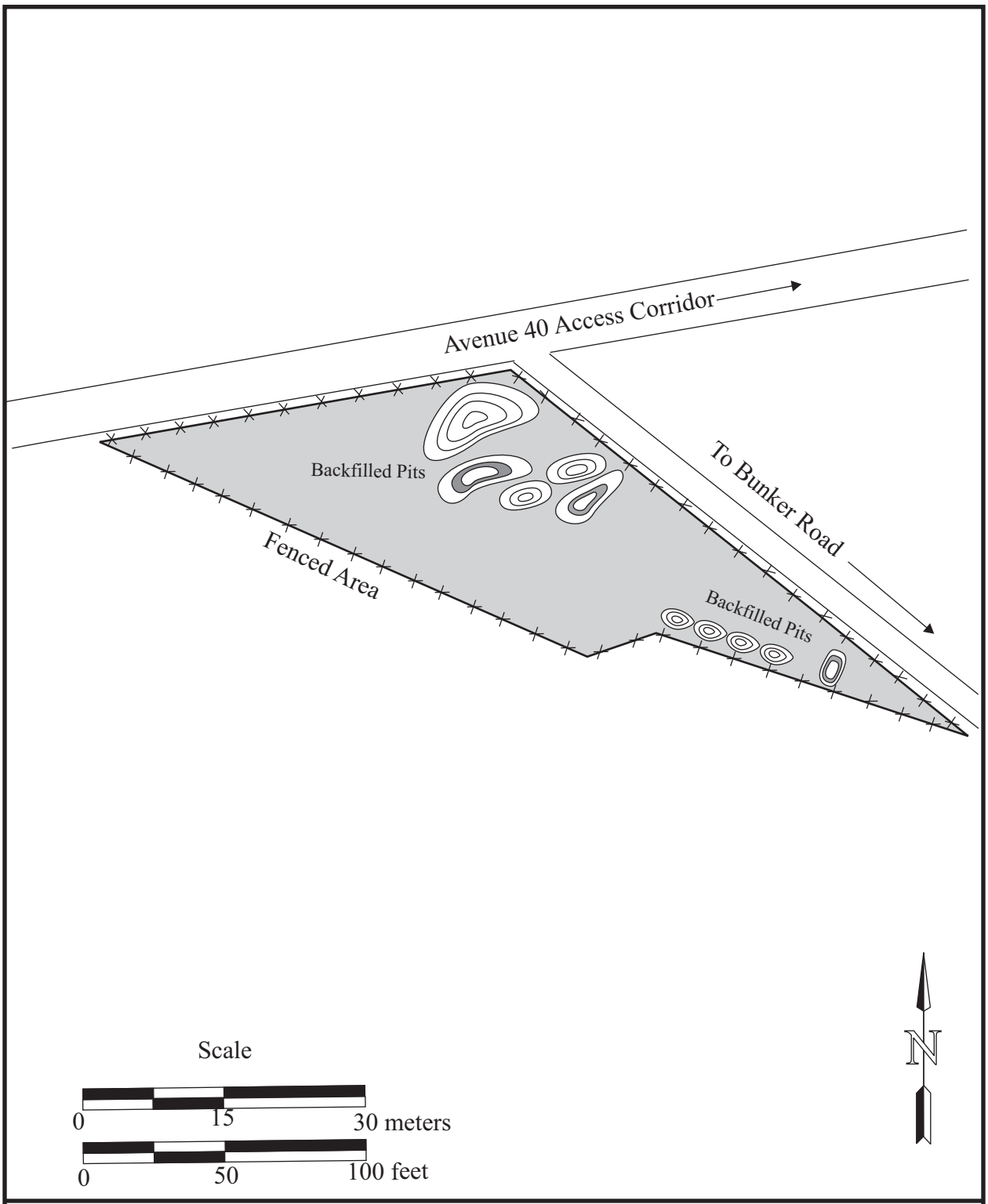


FIGURE 2
CAU 400 BOMBLET PIT LOCATION MAP

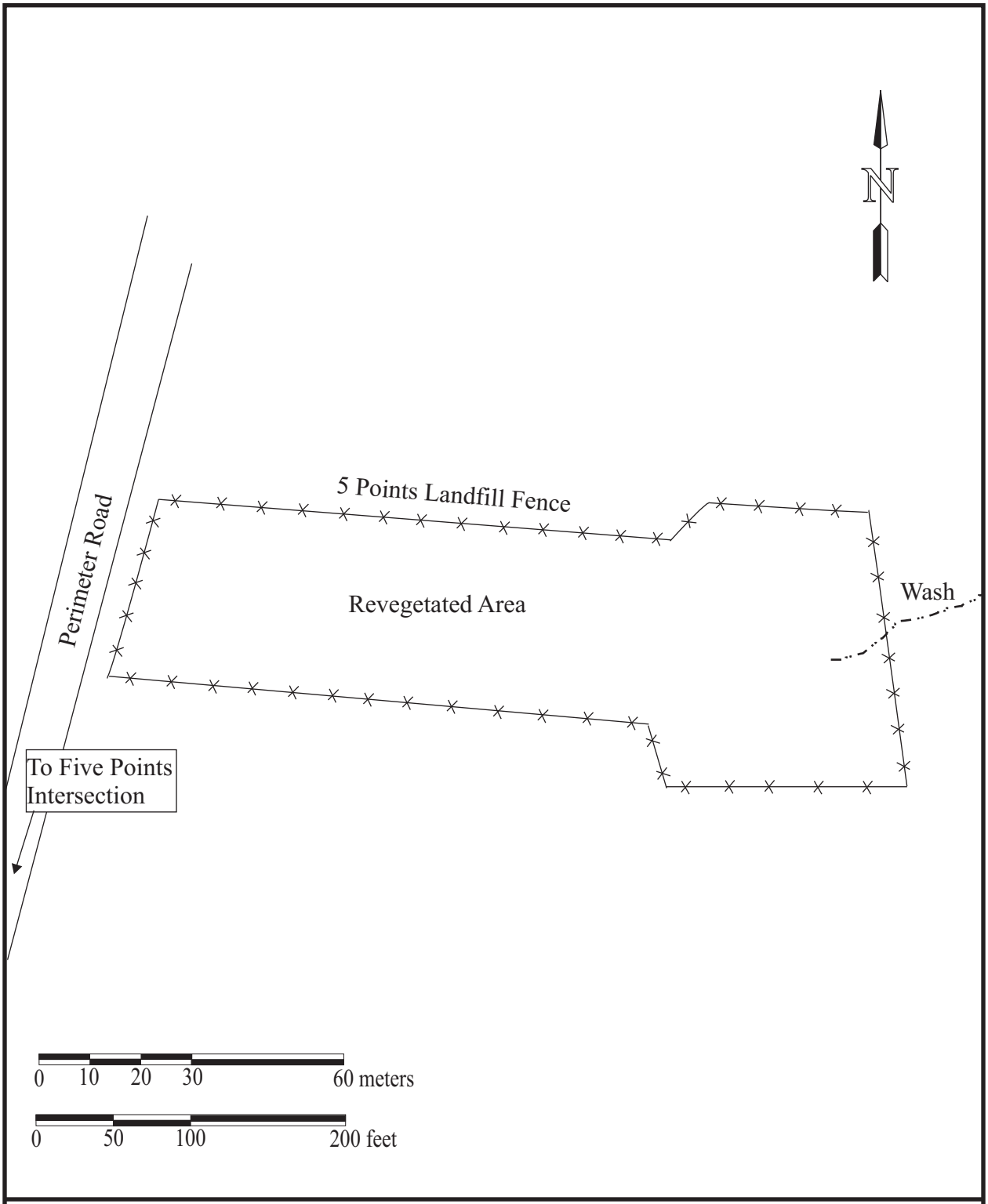


FIGURE 3
CAU 400 FIVE POINTS LANDFILL LOCATION MAP

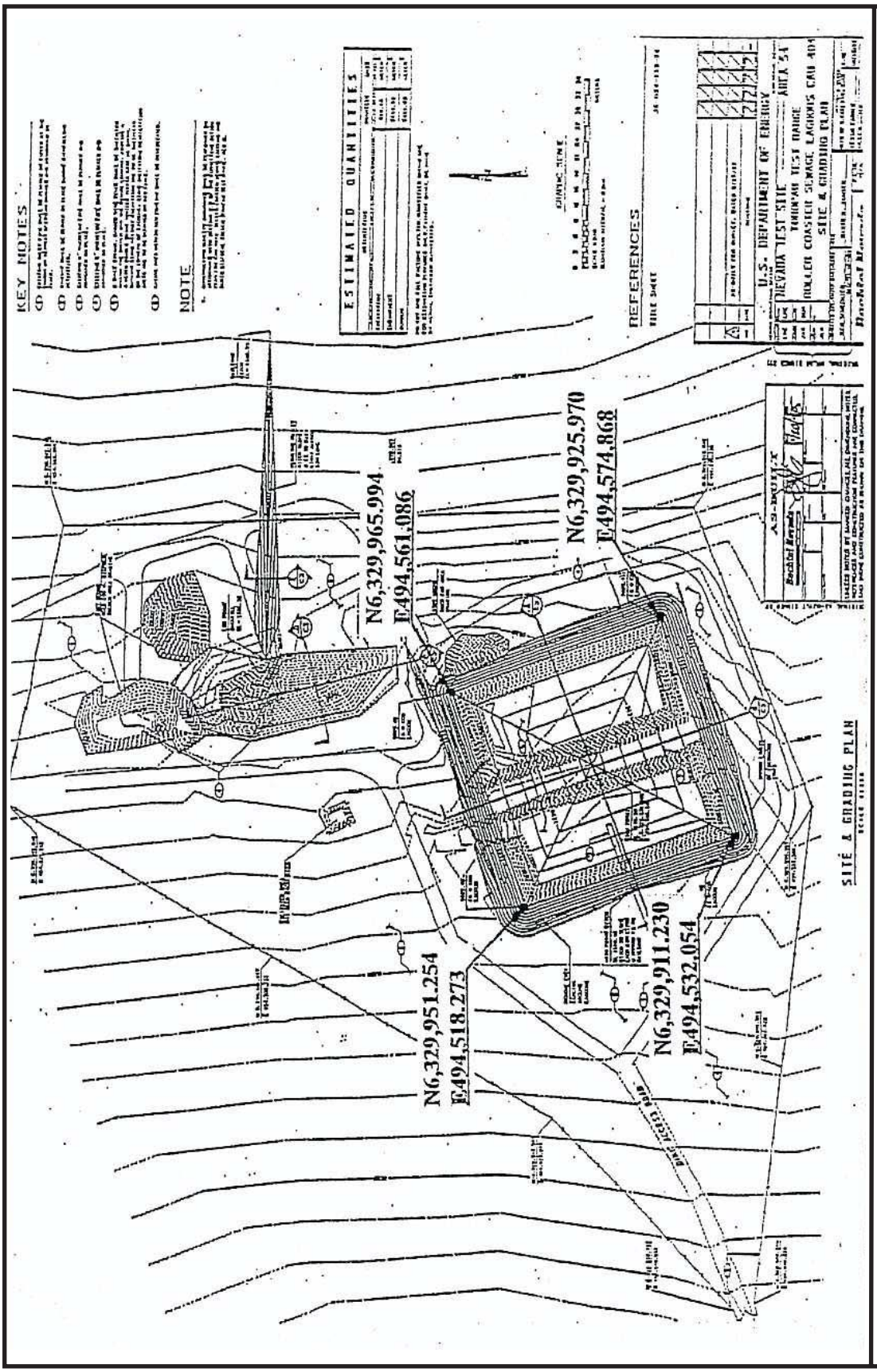


FIGURE 4
CAU 404 ROLLER COASTER LAGOONS AND TRENCH LOCATION MAP

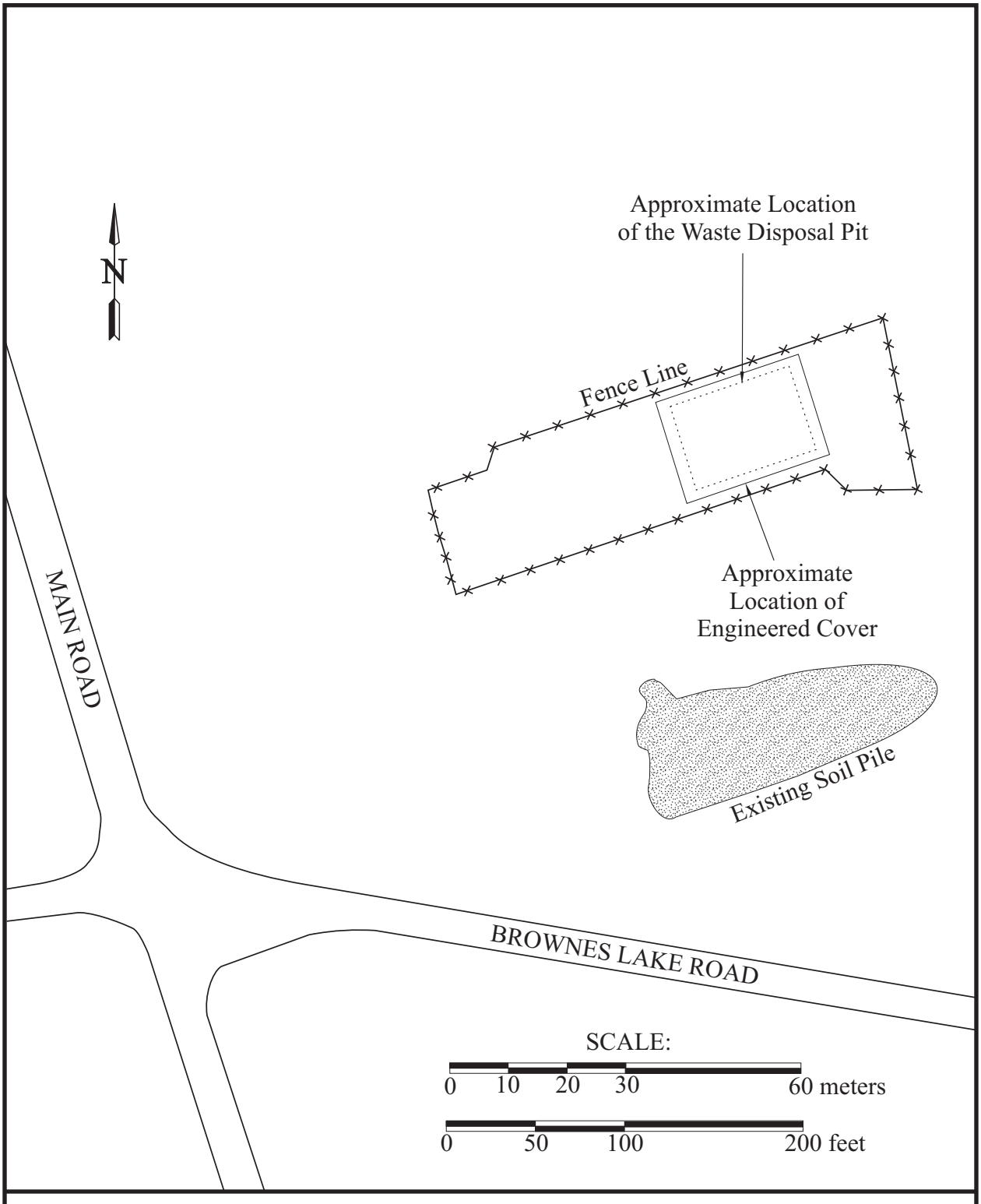


FIGURE 5
CAU 407 ROLLER COASTER RADSAFE AREA LOCATION MAP

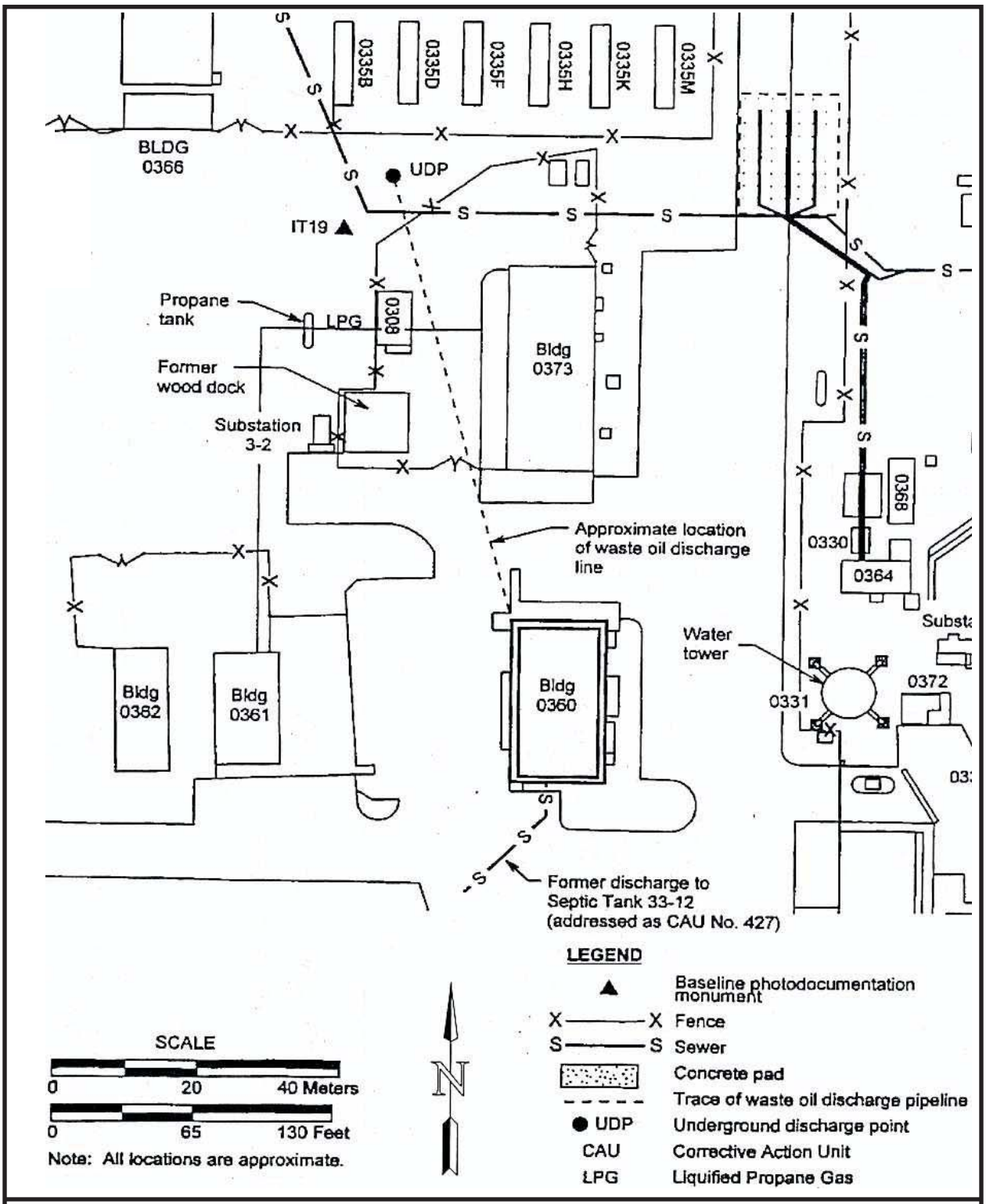


FIGURE 6
CAU 423 AREA 3 UNDERGROUND DISCHARGE POINT,
BUILDING 0360 LOCATION MAP

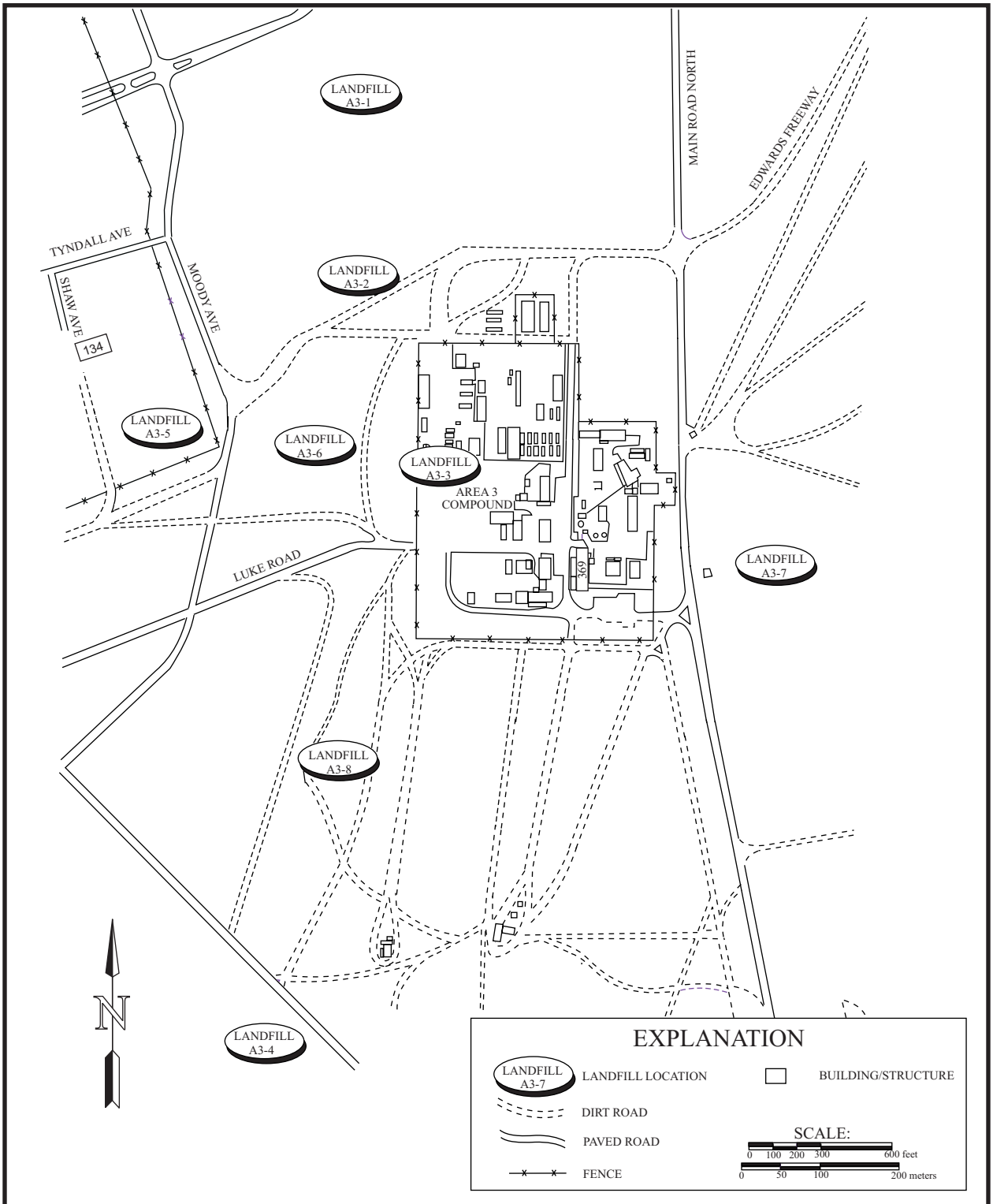


FIGURE 7
CAU 424 AREA 3 LANDFILL COMPLEXES LOCATION MAP

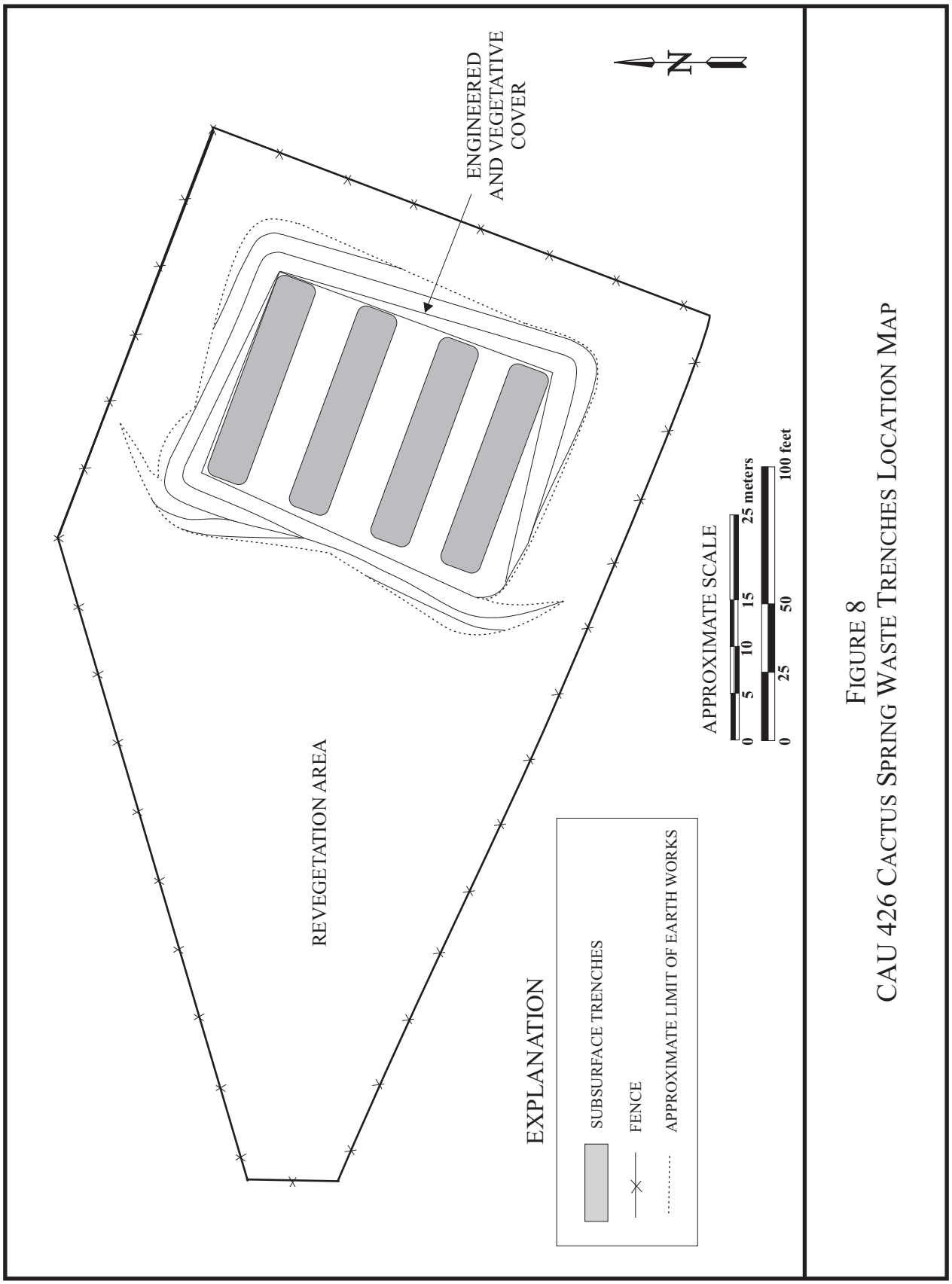


FIGURE 8
CAU 426 CACTUS SPRING WASTE TRENCHES LOCATION MAP

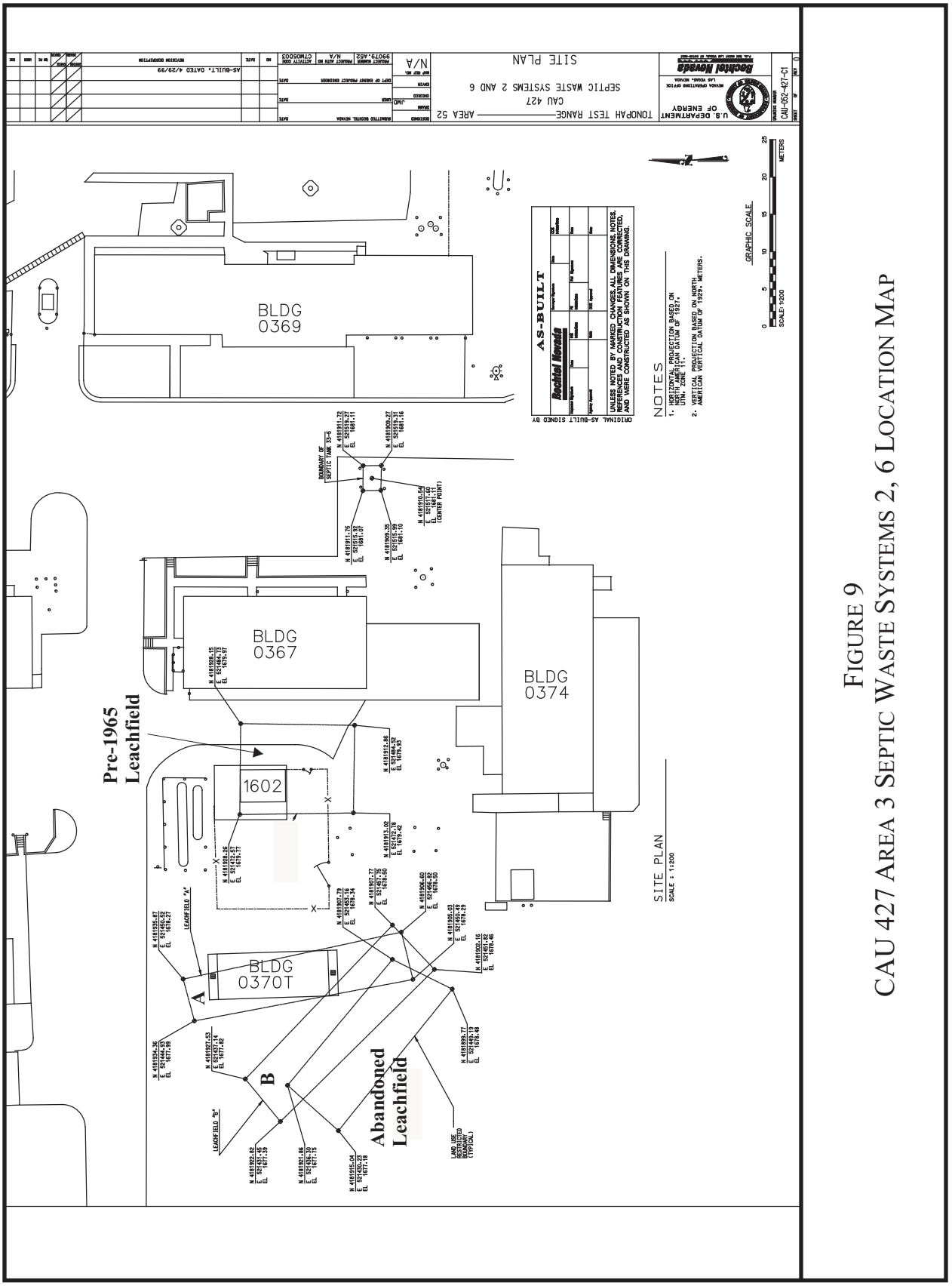


FIGURE 9
CAU 427 AREA 3 SEPTIC WASTE SYSTEMS 2, 6 LOCATION MAP

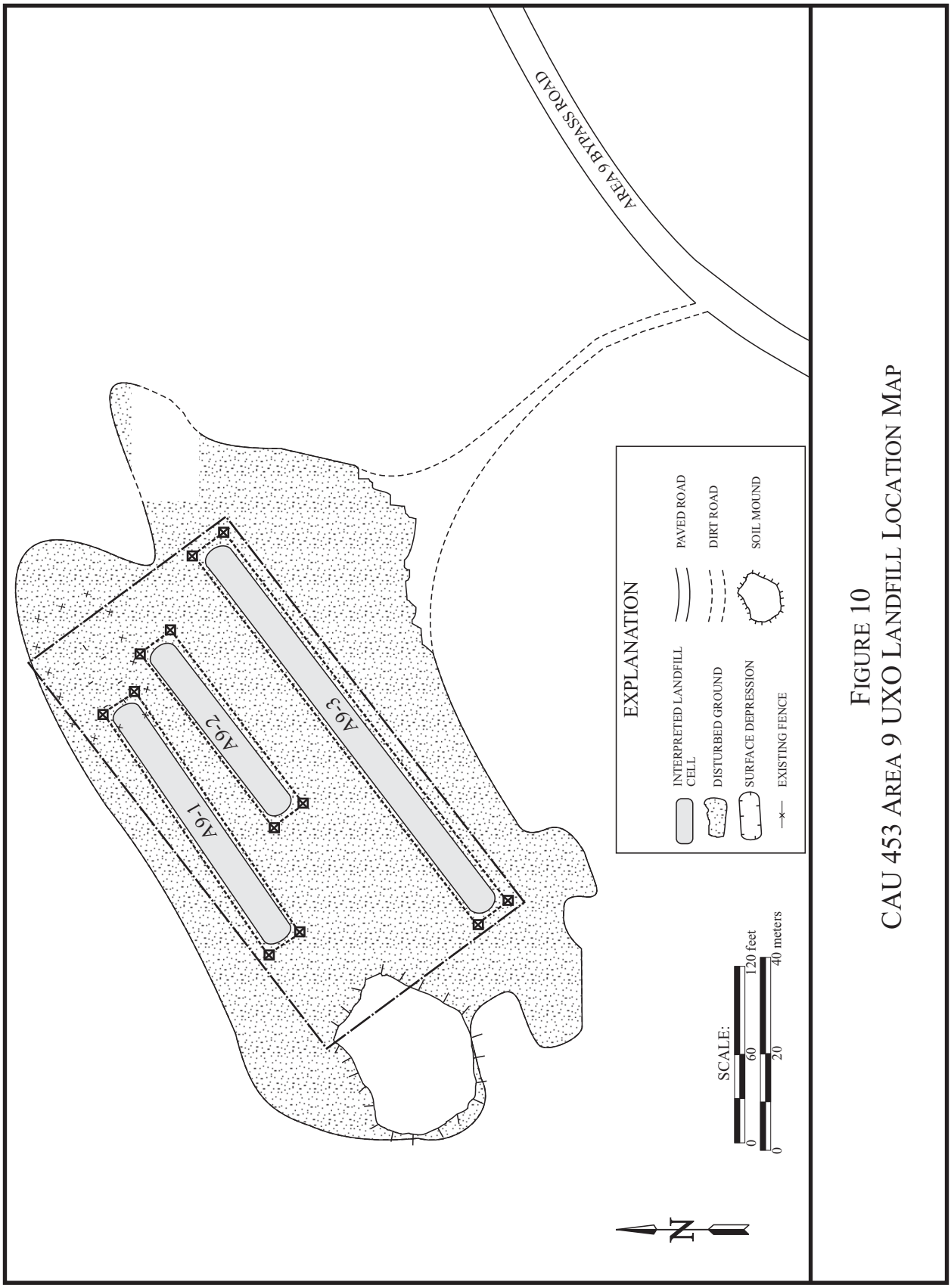


FIGURE 10
CAU 453 AREA 9 UXO LANDFILL LOCATION MAP

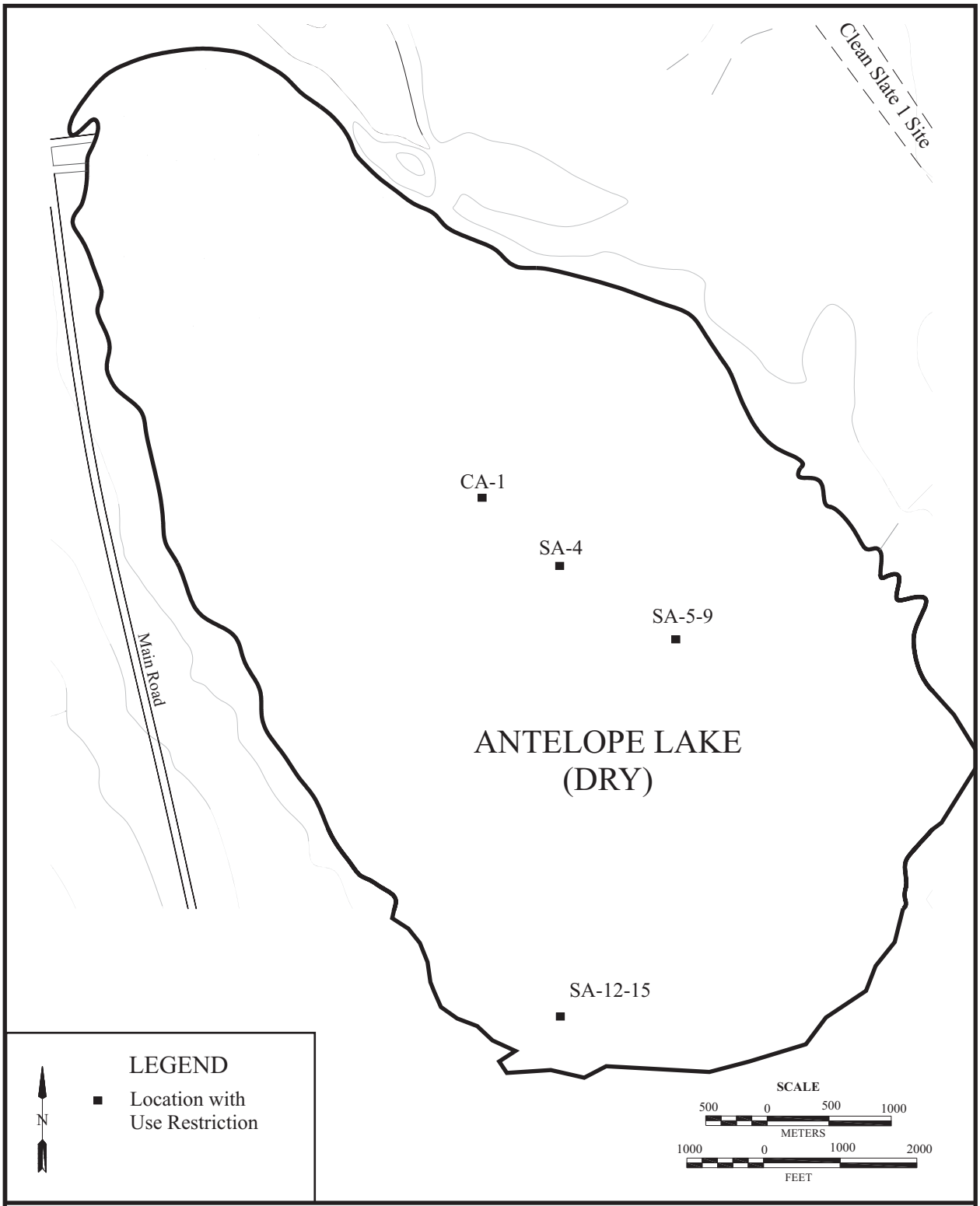


FIGURE 11
CAU 484 SURFACE DEBRIS, WASTE SITES, AND BURN AREA (TTR)
LOCATION MAP

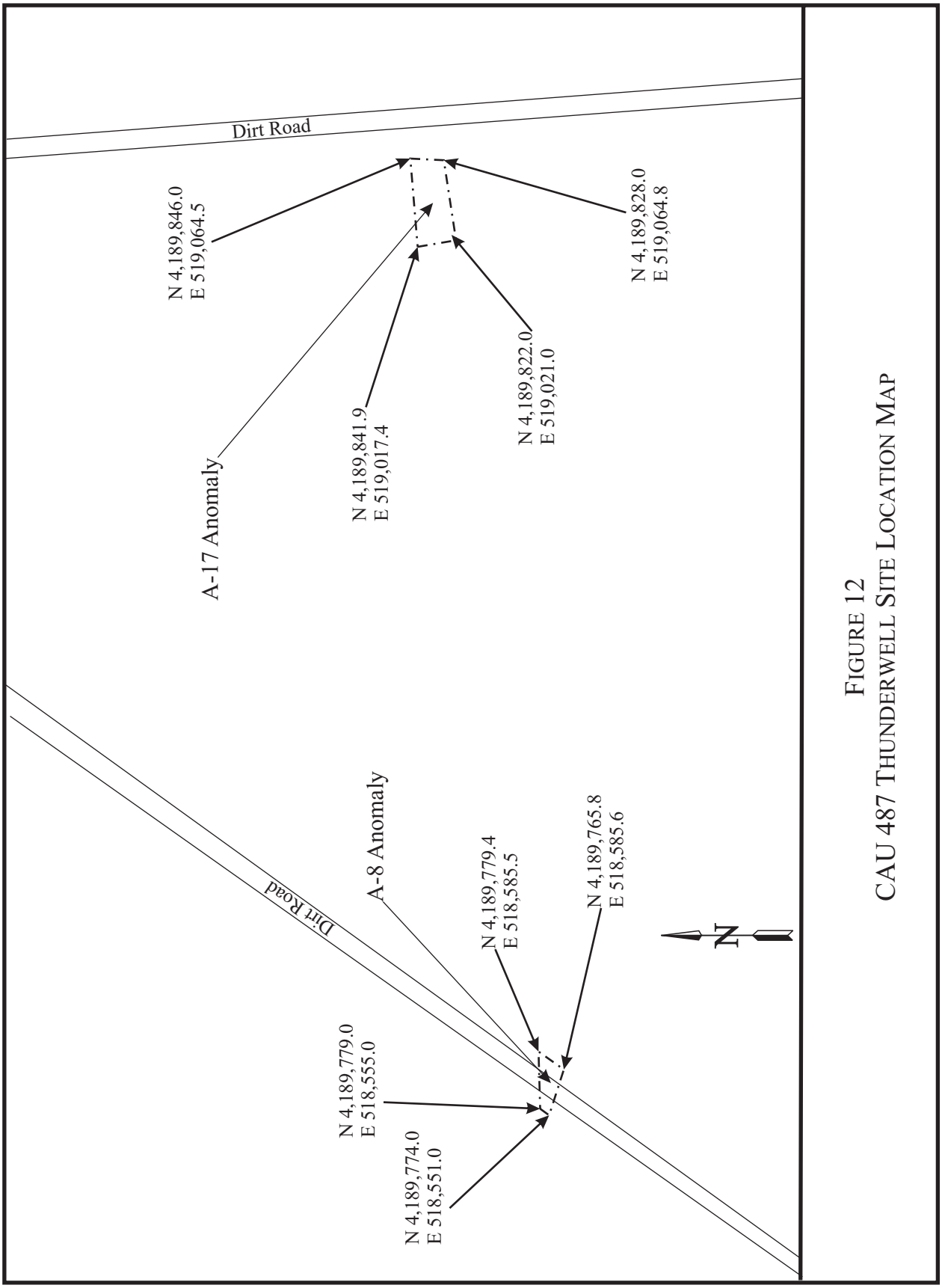


FIGURE 12
CAU 487 THUNDERWELL SITE LOCATION MAP

ATTACHMENT B
POST-CLOSURE INSPECTION PLANS

THIS PAGE INTENTIONALLY LEFT BLANK

CORRECTIVE ACTION UNIT (CAU) 404: ROLLER COASTER LAGOONS AND TRENCH POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved CAU 404 CR, *Closure Report for Corrective Action Unit 404: Roller Coaster Sewage Lagoons and North Disposal Trench, Tonopah Test Range, Nevada*, Revision 0, September 1998, DOE/NV-11718-187 UC-702. Las Vegas, Nevada

Post-Closure monitoring of the covers is intended to determine:

- If maintenance repairs to the perimeter fence are required.
- If remedial action is necessary to establish a vegetative cover.
- If maintenance and repairs to the engineered cover is required.
- When a cessation to post-closure monitoring can be proposed.

POST-CLOSURE MONITORING

The monitoring will consist of biannual (twice per year) visual inspections of:

- The cover for condition (subsidence, significant erosion, unauthorized excavation, etc.) and plant development.
- The fence and signs to determine if repairs are required.

Additional, nonscheduled inspections may be required after severe weather events such as heavy rainfall, flash flooding, and high winds. Any identified maintenance and repair requirements will be remediated within 90 days of discovery and documented in writing at the time of repair. Additional revegetation work would be conducted during the next revegetation window (October to February).

Intrusion into or sampling of the impacted materials in the East or West Sewage Lagoon is not proposed during the post-closure monitoring period.

Monitoring of the vegetative cover will be conducted during the first, third, and fifth year after revegetation. Monitoring during the first year will determine if germination of seeded plant species has occurred. By the third year, plant establishment will be evaluated. By the fifth year, the objective of determining if burrowing animals have moved onto the site and to what depth they might be expected to penetrate the cover. The erosion condition of the soil will be evaluated using a qualitative erosion condition classification developed by the Bureau of Land Management. Information gathered will be compared to natural conditions and will be used in assessing whether or not remedial action is necessary so that a viable vegetative cover is established.

ANNUAL REPORTING

An annual report will be prepared that will provide the observations and describe modifications and/or repairs made to the cover and cover area. The annual report will be prepared following

the second inspection of each year that post-closure monitoring is conducted. The annual reports will include the following information:

- Discussion of observations
- Inspection checklist and maintenance record
- Conclusions and recommendations

A copy of each annual report will be submitted to the NDEP.

DURATION

The biannual inspections will be performed for five years after the planting of the vegetative covers, and will be documented on inspection forms.

Completion of post-closure monitoring of CAU 404 may be proposed after two consecutive years of visual inspections have not indicated the need to revegetate or provide maintenance to the vegetative covers. Completion of post-closure monitoring may be proposed within five years after the original revegetation of the site and include the removal of the fence since the plants will have attained a maturity to not be significantly affected by the grazing of wild horses.

CAU 407: ROLLER COASTER RADSAFE POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved CAU 407 CR, *Closure Report for Corrective Action Unit 407: Roller Coaster RADSAFE Area, Tonopah Test Range, Nevada*, Revision 1, December 2001, DOE/NV--694-REV-1. Las Vegas, Nevada

INSPECTIONS

Inspections consist of visually inspecting the cover for signs of erosion, animal burrows, cracks, water ponding, vegetation, and inspecting the fencing and postings. Inspections will be performed twice during the first six months after construction of the cover has been completed. After completion of the quarterly inspections, the cover systems will be inspected and monitored semiannually (twice per year) for the next two years. The frequency after the second year will be determined by NDEP, based on the results of the previous inspections. Any identified maintenance and repair requirements will be remedied within 90 working days of discovery and documented in writing at the time of repair.

Results of all inspections in a given year will be addressed in a single annual report. The annual report will include the following information:

- Discussion of observations.
- Inspection checklist and maintenance record.
- Conclusions and recommendations.

A copy of each annual report will be submitted to the NDEP. A copy of the inspection checklist is provided in Attachment B.

THIS PAGE INTENTIONALLY LEFT BLANK

CAU 423: AREA 3 BUILDING 0360 UNDERGROUND DISCHARGE POINT POST-CLOSURE INSPECTION PLAN

The following text appeared in the approved and published Record of Technical Change Number CR-1 to the CAU 423 CR, *Closure Report for Corrective Action Unit 423: Area 3 Building 03-60 Underground Discharge Point, Tonopah Test Range, Nevada*, Revision 0, July 1999, DOE/NV/11718--319. Las Vegas, Nevada

Post-closure monitoring at CAU 423 will consist of biannual inspections (twice per year) to verify that the warning sign and concrete marker are in good condition and that the Use Restriction has been maintained. Any identified maintenance or repair requirements will be remedied within 90 working days of discovery and documented in writing at the time of repair. Results of all inspections in a given year will be addressed in a single annual report. The annual report will include the following information:

- Discussion of observations
- Inspection checklist and maintenance record
- Conclusions and recommendations

A copy of each annual report will be submitted to the NDEP.

THIS PAGE INTENTIONALLY LEFT BLANK

CAU 424: AREA 3 LANDFILL COMPLEXES POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved CAU 424 CR, *Closure Report for Corrective Action Unit 424: Area 3 Landfill Complexes, Tonopah Test Range, Nevada*, Revision 0, July 1999, DOE/NV/11718--283. Las Vegas, Nevada

Post-closure inspection of the Area 3 Landfill sites is intended to determine:

- If maintenance repairs to the landfill soil covers are needed.
- If maintenance and repairs to the landfill markers and warning signs are needed.
- If modifications to the Use Restriction administrative controls are needed.
- If termination of post-closure inspection can be proposed in the future.

POST-CLOSURE INSPECTION

The inspection will consist of biannual (twice per year) visual inspections of:

- The soil cover for indications of subsidence, erosion, unauthorized use, etc.
- The landfill markers and warning signs, to verify they are in-place, intact, and readable.
- The inspections will be documented on a checklist and with photography, if needed.

If damage to the soil covers, landfill markers, or warning signs is noted, then maintenance will be performed and may include placement and compaction of additional backfill, and repair or replacement of markers and signs. Additional nonscheduled inspections may be required after severe weather events such as heavy rainfall, flash flooding, and high winds. Any identified maintenance and repair requirements will be remedied within 90 days of discovery and documented in writing at the time of repair.

ANNUAL REPORTING

An annual report will be prepared that will provide the observations and describe modifications and/or repairs made to the cover and cover area. The annual post-closure inspection report will be prepared and submitted to NDEP following the second inspection of each year that post-closure inspection is conducted. The annual reports will include the following information:

- Discussion of observations.
- Inspection checklist and maintenance record.
- Conclusions and recommendations.

DURATION

The biannual inspections will be performed for five years after the completion of closure activities, and will be documented on inspection forms.

Completion of post-closure inspection of CAU 424 may be proposed by DOE/NV to the NDEP after two consecutive years of visual inspections have not indicated recurrence of subsidence. Completion of post-closure monitoring may be proposed by DOE/NV to the NDEP within five years after the completion of closure activities.

CAU 426: CACTUS SPRING WASTE TRENCHES POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved CAU 426 CR, *Closure Report for Corrective Action Unit 426: Cactus Spring Waste Trenches, Tonopah Test Range, Nevada*, Revision 0, August 1998, DOE/NV/11718-226 UC-702. Las Vegas, Nevada

Post-Closure of the covers is intended to determine:

- If maintenance repairs to the perimeter fence are required.
- If remedial action is necessary to establish a vegetative cover.
- If maintenance and repairs to the engineered cover is required.
- When a cessation to post-closure monitoring can be proposed.

POST-CLOSURE MONITORING

The monitoring will consist of biannual (twice per year) visual inspections of:

- The cover for condition (subsidence, significant erosion, unauthorized excavation, etc.) and plant development.
- The fence and signs to determine if repairs are required.

Additional, nonscheduled inspections may be required after severe weather events such as heavy rainfall, flash flooding, and high winds. Any identified maintenance and repair requirements will be remediated within 90 days of discovery and documented in writing at the time of repair. Additional revegetation work would be conducted during the next revegetation window (October to February).

Intrusion into or sampling of the trench contents is not proposed during the post-closure monitoring period.

Monitoring of the vegetative cover will be conducted during the first, third, and fifth year after revegetation. Monitoring during the first year will determine if germination of seeded plant species has occurred. By the third year, plant establishment will be evaluated. By the fifth year, the objective of determining if burrowing animals have moved onto the site and to what depth they might be expected to penetrate the cover. The erosion condition of the soil will be evaluated using a qualitative erosion condition classification developed by the Bureau of Land Management. Information gathered will be compared to natural conditions and will be used in assessing whether or not remedial action is necessary so that a viable vegetative cover is established.

ANNUAL REPORTING

An annual report will be prepared that will provide the observations and describe modifications and/or repairs made to the cover and cover area. The annual report will be prepared following

the second inspection of each year that post-closure monitoring is conducted. The annual reports will include the following information:

- Discussion of observations.
- Inspection checklist and maintenance record.
- Conclusions and recommendations.

A copy of each annual report will be submitted to the NDEP.

DURATION

The biannual inspections will be performed for five years after the planting of the vegetative covers, and will be documented on inspection forms.

Completion of post-closure monitoring of CAU 426 may be proposed after two consecutive years of visual inspections have not indicated the need to revegetate or provide maintenance to the vegetative covers. Completion of post-closure monitoring may be proposed within five years after the original revegetation of the site and include the removal of the fence since the plants will have attained a maturity to not be significantly affected by the grazing of wild horses.

CAU 427: AREA 3 SEPTIC WASTE SYSTEMS 2, 6 POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved CAU 427 CR, *Closure Report for Corrective Action Unit 427 Area 3 Septic Waste Systems 2 and 6, Tonopah Test Range, Nevada*, Revision 0, August 1999, DOE/NV--561. Las Vegas, Nevada

Post-Closure inspection of CAU 427 use restricted land is intended to determine:

- If maintenance and repairs to the closed leachfield or septic tank soil and asphalt covers are needed.
- If maintenance and repairs to the closed leachfield and septic tank markers and warning signs are needed.
- If modifications to the Use Restriction administrative controls are needed.
- If termination of post-closure inspection can be proposed in the future.

POST-CLOSURE INSPECTION

The inspection will consist of annual (once per year) visual inspections of:

- The soil and asphalt cover for indications of subsidence, erosion, unauthorized use, etc.
- The leachfield and septic tank markers and warning signs to verify they are in-place, intact, and readable
- The inspections will be documented on a checklist (Attachment C) and, if needed, with photography

Repairs to the soil covers (placement and compaction of additional backfill), landfill markers, and warning signs (repair, reposition, and/or replacement) may be required.

Inspections are not required after severe weather events such as heavy rainfall, flash floods, and high winds, because the leachfield waste is buried in the subsurface. However, any identified maintenance and repair requirements noted before or after a inspection will be remedied within 90 days of discovery and documented in writing at the time of repair.

ANNUAL REPORTING

An annual report will provide the inspector's observations of CAU 427s land-use-restricted areas and describe modifications and/or repairs made to Leachfield A, Leachfield B, Pre-1965 Leachfield, 1965-1975 Leachfield, and/or Septic Tank 33-5. The annual post-closure inspection report will be prepared and submitted to NDEP before the completion of the fiscal year in which the inspection was conducted. The annual reports will include the following information:

- Discussion of observations.
- Inspection checklist and maintenance record.
- Conclusions and recommendations.

DURATION

The biannual inspections will be performed for five years after the completion of closure activities, and will be documented on inspection forms.

Completion of post-closure monitoring of CAU 427 may be proposed by the DOE/NV to the NDEP if after two consecutive years of visual inspections, indications of subsidence depression recurrences have not been detected. Completion of post-closure inspection may be proposed by DOE/NV to the NDEP within five years after the completion of closure activities.

CAU 453: AREA 9 UXO LANDFILL POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved CAU 453 CR, *Closure Report for Corrective Action Unit 453: Area 9 UXO-Landfill, Tonopah Test Range, Nevada*, Revision 0, July 1999, DOE/NV/11718--284. Las Vegas, Nevada

Post-Closure of the covers is intended to determine:

- If maintenance and repairs to the cell soil covers are needed.
- If maintenance and repairs to the perimeter fence, warning signs, and monuments are needed.
- If modifications to the administrative Use Restrictions are needed.
- If termination of post-closure inspection can be proposed in the future.

POST-CLOSURE INSPECTION

The inspection will consist of biannual (once per year) visual inspections of:

- The cell soil cover, for indications of subsidence, erosion, unauthorized use, etc.
- The perimeter fence, warning signs, and monuments, for signs of wear disturbance, etc.

The inspections will be documented on a checklist and with photography, if needed. Repairs to the cell soil covers (placement and compaction of additional fill), perimeter fence, warning signs, and monuments (repair, reposition, and/or replacement) may be required. Additional, nonscheduled inspections may be required after severe weather events such as heavy rainfall, flash flooding, and high winds. Any identified maintenance and repair requirements will be remediated within 90 days of discovery and documented in writing at the time of repair.

ANNUAL REPORTING

An annual post-closure inspection report will be prepared that will provide the observations and describe modifications and/or repairs made to the cover and cover area. The annual report will be prepared and submitted to NDEP following the second inspection of each year that post-closure inspection is conducted. The annual reports will include the following information:

- Discussion of observations.
- Inspection checklist and maintenance record.
- Conclusions and recommendations.

DURATION

The biannual inspections will be performed for five years after the completion of closure activities, and will be documented on inspection forms.

Completion of post-closure inspection of CAU 453 may be proposed by DOE/NV to NDEP within five years after the completion of closure activities. Completion of post-closure inspection may also be proposed by DOE/NV to NDEP if two consecutive years of visual inspections do not indicate the recurrence of subsidence depressions.

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved CAU 484 CR, *Closure Report for Corrective Action Unit 484: Surface Debris, Waste Sites, and Burn Area, Tonopah Test Range, Nevada*, Revision 0, September 2007, DOE/NV--1226. Las Vegas, Nevada

Results of all inspections in a given year will be documented in the annual combined post-closure report for the TTR. This report will include a discussion of inspections and observations, and copies of the site inspection checklists. This report will be submitted to the NDEP annually or as otherwise agreed to with the NDEP.

INSPECTIONS

Inspections will be performed semi-annually for the first year post-closure, after which they will be performed annually. Inspections will consist of visual observations to verify that the underground radioactive material area and UR warning signs are in place and readable and that the UR is maintained. The interior of each of the UR areas will also be inspected to confirm that there have been no disturbances. Any repairs or maintenance will be documented in writing at the time of the repair. A Post-Closure Inspection Checklist will be completed to document the results of the inspection and to describe repairs that were performed since the previous inspection.

MONITORING

No monitoring other than visual inspections will be required for CAU 484.

THIS PAGE INTENTIONALLY LEFT BLANK

CAU 487: THUNDERWELL SITE, POST-CLOSURE INSPECTION PLAN

The following text appeared in the published and approved Record of Technical Change Number 2 for the final *Corrective Action Decision Document/Closure Report for Corrective Action Unit 487: Thunderwell Site, Tonopah Test Range, Nevada*, Revision 0, November 2001, DOE/NV--761. Las Vegas, Nevada

The post-closure inspection of CAS RG-26-001-RGRV will consist of semi-annual (twice per year) visual inspections of the monument markers and postings to verify that they are in-place, intact, and readable. Visual inspections of the monuments and signage, and indications of ground disturbance within the Use Restriction area will be conducted. Observations and any modifications and/or repairs to the monuments or postings will be included in the annual *Post-Closure Inspection Report for the Tonopah Test Range, Nevada.*

THIS PAGE INTENTIONALLY LEFT BLANK

ATTACHMENT C
POST-CLOSURE INSPECTION CHECKLISTS

THIS PAGE INTENTIONALLY LEFT BLANK

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 400: BOMBLET PIT AND FIVE POINTS LANDFILL - CAS TA-19-001-05PT, ORDNANCE DISPOSAL PIT

Inspection Date and Time: 5/21/08 10:28 AM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Have the previous inspection reports been reviewed?	✓		
2. Were anomalies or trends detected on previous inspections?		✓	
3. Were maintenance or repairs performed since last inspection?		✓	

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:
a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the barbed wire fence damaged?		✓	
b. Have any posts been damaged or their anchoring weakened?		✓	
2. Waste Unit cover:	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of human intrusion onto the site?		✓	
b. Is there evidence of horses or rabbits on site?		✓	
c. Are weedy annual plants present?		✓	
If yes, are they a problem?			NA ✓
d. Are seeded plant species found on site?	✓		

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 400: BOMBLET PIT AND FIVE POINTS LANDFILL - CAS TA-19-001-05PT, ORDNANCE DISPOSAL PIT

2. Waste Unit cover (continued):	YES	NO	EXPLANATION (required if shaded box is checked)
e. Is there evidence of plant mortality?		✓	Vegetation is starting to grow back from a previous flood event.
3. Photograph Documentation:	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	6		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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 fencing at the site is in very good condition. The vegetation is starting to grow back in areas that were significantly impacted by flooding. There are no corrective actions required at this site.

F. CERTIFICATION

I have conducted an inspection of CAS TA-19-001-05PT, Ordnance Disposal Pit (Five Points Landfill), in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/21/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☐ Photos ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 400: BOMBLET PIT AND FIVE POINTS LANDFILL - CAS TA-55-001-TAB2, ORDNANCE DISPOSAL PIT

Inspection Date and Time: 5/21/08 9:45 AM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Have the previous inspection reports been reviewed?	✓		
2. Were anomalies or trends detected on previous inspections?		✓	
3. Were maintenance or repairs performed since last inspection?		✓	

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:

a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the gate damaged?		✓	
b. Is the wire fence damaged?		✓	
c. Is the chicken wire fence damaged?		✓	
e. Have any posts been damaged or their anchoring weakened?		✓	
2. Waste Unit cover:	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of human intrusion onto the site?		✓	
b. Is there evidence of horses or rabbits on site?		✓	
c. Are seeded plant species found on site?	✓		

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 400: BOMBLET PIT AND FIVE POINTS LANDFILL - **CAS TA-55-001-TAB2, ORDNANCE DISPOSAL PIT**

2. Waste Unit cover (continued):	YES	NO	EXPLANATION (required if shaded box is checked)
d. Are weedy annual plants present?		✓	
If yes, are they a problem?			NA ✓
e. Is there evidence of plant mortality?		✓	

3. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	4		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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 barbed-wire and chicken-wire (mesh) fencing were in great condition. The corner fence posts and gate were sturdy and in excellent condition. The vegetation appeared to be very mature in growth. A few small and one large animal burrow was noticed at the perimeter fence. Overall site conditions were good without issues or concerns.

F. CERTIFICATION

I have conducted an inspection of CAS TA-55-001-TAB2, Ordnance Disposal Pit (Bomblet Pit), in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/21/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☐ Photos ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 404: ROLLER COASTER LAGOONS AND TRENCHES
- CAS TA-03-001-TARC, ROLLER COASTER LAGOONS
- CAS TA-21-001-TARC, ROLLER COASTER N. DISPOSAL TRENCH

Inspection Date and Time: 5/20/08 3:55 PM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	
a. If yes, has site repair resulted in a change from as-built conditions?			NA ✓
b. If yes (to 4a), are revised as-built plans available that reflect repair changes?			NA ✓

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:
a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the gate damaged?		✓	
c. Is the fence damaged?		✓	
d. Have any posts been damaged or their anchoring weakened?		✓	
e. Are the vegetation signs damaged or missing?		✓	

POST-CLOSURE INSPECTION CHECKLIST

CAU 404: ROLLER COASTER LAGOONS AND TRENCHES
- CAS TA-03-001-TARC, ROLLER COASTER LAGOONS
- CAS TA-21-001-TARC, ROLLER COASTER N. DISPOSAL TRENCH

1. Site markers (continued):	YES	NO	EXPLANATION (required if shaded box is checked)
f. Are the signs legible?	✓		
g. How many of the signs need to be replaced?	0		

2. Waste Unit cover:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) on or aournd the cap?		✓	
d. Is there evidence of ponding on the waste cover?		✓	
e. Is there evidence of human intrusion onto the site?		✓	
f. Is there evidence of animal burrowing?		✓	
g. Is there evidence of horses or rabbits on site?		✓	
h. Is organic mulch adequate to prevent erosion?	✓		
i. Are weedy annual plants present?		✓	
If yes, are they a problem?			NA ✓
j. Are seeded plant species found on site?	✓		
k. Is there evidence of plant mortality?		✓	

3. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	8		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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?		✓	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 404: ROLLER COASTER LAGOONS AND TRENCHES
- **CAS TA-03-001-TARC, ROLLER COASTER LAGOONS**
- **CAS TA-21-001-TARC, ROLLER COASTER N. DISPOSAL TRENCH**

5. Field conclusions/recommendations: The signage and fencing was in excellent condition. The vegetation appeared to be at a very high maturity level. There was no evidence of intrusion at the site. The site has no issues warranting a corrective action.

F. CERTIFICATION

I have conducted an inspection of CASs TA-03-001-TARC, Roller Coaster Lagoons, and TA-21-001-TARC, Roller Coaster N. Disposal Trench, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/20/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☑ Photos ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 407: ROLLER COASTER RADSAFE AREA
CAS TA-23-001-TARC, ROLLER COASTER RADSAFE AREA

Inspection Date and Time: 5/20/08 3:36 PM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	
a. If yes, has site repair resulted in a change from as-built conditions?			NA ✓
b. If yes (to 4a), are revised as-built plans available that reflect repair changes?			NA ✓

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:
a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the perimeter (barbed wire) fence damaged?		✓	A couple of strands (barbed wire) were looser than normal, but the fencing was erect and stable.
b. Is the mesh wire fence damaged?		✓	
c. Have any posts been damaged or their anchoring weakened?		✓	
d. Are the URMA signs damaged or missing?		✓	
e. Are the signs legible?	✓		

POST-CLOSURE INSPECTION CHECKLIST

CAU 407: ROLLER COASTER RADSAFE AREA
CAS TA-23-001-TARC, ROLLER COASTER RADSAFE AREA

1. Site markers (continued):	YES	NO	EXPLANATION (required if shaded box is checked)
f. How many of the signs need to be replaced?	0		

2. Waste Unit cover:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) on or aournd the cap?		✓	
d. Is there evidence of ponding on the waste cover?		✓	
e. Is there evidence of human intrusion onto the site?		✓	
f. Is there evidence of animal burrowing?	✓		A few animal burrows were noticed on the south side slope of the soil cover.
g. Is there evidence of horses or rabbits on site?		✓	
h. Is organic mulch adequate to prevent erosion?	✓		
i. Are weedy annual plants present? (If yes, are they a problem?)		✓	
j. Are seeded plant species found on site?	✓		
k. Is there evidence of plant mortality?		✓	

3. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	11		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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?	✓		As a best mgmt practice, loose barbed wire strands of fencing will be tightened.

5. Field conclusions/recommendations: The radiological postings are intact and in excellent condition. The fencing is erect and stable; however, a couple of barbed wire strands that were loose will be tightened as a best management practice. Also, animal burrows were noticed on the side slope of the waste unit cover that will be addressed by NSTec ecological services.

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 407: ROLLER COASTER RADSAFE AREA
CAS TA-23-001-TARC, ROLLER COASTER RADSAFE AREA

F. CERTIFICATION

I have conducted an inspection of CAS TA-23-001-TARC, Roller Coaster RadSafe Area, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/20/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☑ Photos ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 423: UNDERGROUND DISCHARGE POINT, BUILDING 0360
CAS 03-02-002-0308, UNDERGROUND DISCHARGE POINT

Inspection Date and Time: 5/21/08 2:06 PM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	
a. If yes, obtain a copy of maintenance records and attach to checklist.			NA ✓

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:
a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the surface marker in good condition?	✓		
b. Is the warning sign (posted on adjacent fence) damaged or missing?		✓	
c. Is the sign legible?	✓		
d. Does the sign need to be replaced?	No		
2. Use-restricted area:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of human intrusion into the use-restricted area?		✓	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 423: UNDERGROUND DISCHARGE POINT, BUILDING 0360
CAS 03-02-002-0308, UNDERGROUND DISCHARGE POINT

3. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	1		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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 use restriction signage and post marker are in excellent condition. There are no issues or concerns at this site.

F. CERTIFICATION

I have conducted an inspection of CAS 03-02-002-0308, Underground Discharge Point, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/21/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☐ Maintenance records ☐ Photos ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 424: AREA 3 LANDFILL COMPLEX
- **CAS 03-08-001-A301, LANDFILL A3-1**
- **CAS 03-08-001-A302, LANDFILL A3-2**
- **CAS 03-08-001-A303, LANDFILL A3-3**
- **CAS 03-08-001-A304, LANDFILL A3-4**
- **CAS 03-08-001-A305, LANDFILL A3-5**
- **CAS 03-08-001-A306, LANDFILL A3-6**
- **CAS 03-08-001-A308, LANDFILL A3-8**

Inspection Date and Time: 5/21/08 2:14 PM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07 - 5/16/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	
a. If yes, obtain a copy of maintenance records and attach to checklist.			NA ✓
b. If yes, at which sites?	NA ✓		
c. If yes, has site repair resulted in a change from as-built conditions?			NA ✓
d. If yes (to 4c), are revised as-built plans available that reflect repair changes?			NA ✓

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:
a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers (Landfill A3-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the seven (7) boundary monuments been disturbed?		✓	

POST-CLOSURE INSPECTION CHECKLIST

CAU 424: AREA 3 LANDFILL COMPLEX
- **CAS 03-08-001-A301, LANDFILL A3-1**
- **CAS 03-08-001-A302, LANDFILL A3-2**
- **CAS 03-08-001-A303, LANDFILL A3-3**
- **CAS 03-08-001-A304, LANDFILL A3-4**
- **CAS 03-08-001-A305, LANDFILL A3-5**
- **CAS 03-08-001-A306, LANDFILL A3-6**
- **CAS 03-08-001-A308, LANDFILL A3-8**

1. Site markers (Landfill A3-1), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
b. Are all boundary monuments in good condition?	✓		
c. Are all brass survey markers in good condition?	✓		
d. Are any of the warning signs damaged or missing?		✓	
e. Are all signs legible?	✓		
f. How many signs need to be replaced?	0		

2. Use-restricted area (Landfill A3-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

3. Site markers (Landfill A3-2):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the four (4) boundary monuments been disturbed?		✓	
b. Are all boundary monuments in good condition?	✓		
c. Are all brass survey markers in good condition?	✓		
d. Are any of the warning signs damaged or missing?		✓	
e. Are all signs legible?	✓		
f. How many signs need to be replaced?	0		

4. Use-restricted area (Landfill A3-2):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

5. Site markers (Landfill A3-3, western 2 cells):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the three (3) boundary monuments been disturbed?		✓	

POST-CLOSURE INSPECTION CHECKLIST

CAU 424: AREA 3 LANDFILL COMPLEX
- **CAS 03-08-001-A301, LANDFILL A3-1**
- **CAS 03-08-001-A302, LANDFILL A3-2**
- **CAS 03-08-001-A303, LANDFILL A3-3**
- **CAS 03-08-001-A304, LANDFILL A3-4**
- **CAS 03-08-001-A305, LANDFILL A3-5**
- **CAS 03-08-001-A306, LANDFILL A3-6**
- **CAS 03-08-001-A308, LANDFILL A3-8**

5. Site markers (Landfill A3-3, western 2 cells), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
b. Are all boundary monuments in good condition?	✓		
c. Are all brass survey markers in good condition?	✓		
d. Are any of the warning signs damaged or missing?		✓	
e. Are all signs legible?	✓		
f. How many signs need to be replaced?	0		
g. Are all three (3) surface markers in good condition?	✓		

6. Use-restricted area (Landfill A3-3, western 2 cells):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

7. Site markers (Landfill A3-3, eastern cell):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the three (3) boundary monuments been disturbed?		✓	
b. Are all brass survey markers in good condition?	✓		

8. Use-restricted area (Landfill A3-3, eastern cell):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

9. Site markers (Landfill A3-4):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the five (5) boundary monuments been disturbed?		✓	
b. Are all boundary monuments in good condition?	✓		
c. Are all brass survey markers in good condition?	✓		
d. Are any of the warning signs damaged or missing?		✓	

POST-CLOSURE INSPECTION CHECKLIST

CAU 424: AREA 3 LANDFILL COMPLEX
- CAS 03-08-001-A301, LANDFILL A3-1
- CAS 03-08-001-A302, LANDFILL A3-2
- CAS 03-08-001-A303, LANDFILL A3-3
- CAS 03-08-001-A304, LANDFILL A3-4
- CAS 03-08-001-A305, LANDFILL A3-5
- CAS 03-08-001-A306, LANDFILL A3-6
- CAS 03-08-001-A308, LANDFILL A3-8

9. Site markers (Landfill A3-4), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
e. Are all signs legible?	✓		
f. How many signs need to be replaced?	0		
g. Is the surface marker in good condition?	✓		

10. Use-restricted area (Landfill A3-4):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

11. Site markers (Landfill A3-5):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the four (4) boundary monuments been disturbed?		✓	
b. Are all boundary monuments in good condition?	✓		
c. Are all brass survey markers in good condition?	✓		
d. Are any of the warning signs damaged or missing?		✓	
e. Are all signs legible?	✓		
f. How many signs need to be replaced?	0		

12. Use-restricted area (Landfill A3-5):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

13. Site markers (Landfill A3-6):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the four (4) boundary monuments been disturbed?		✓	
b. Are all boundary monuments in good condition?	✓		
c. Are all brass survey markers in good condition?	✓		

POST-CLOSURE INSPECTION CHECKLIST

CAU 424: AREA 3 LANDFILL COMPLEX
- CAS 03-08-001-A301, LANDFILL A3-1
- CAS 03-08-001-A302, LANDFILL A3-2
- CAS 03-08-001-A303, LANDFILL A3-3
- CAS 03-08-001-A304, LANDFILL A3-4
- CAS 03-08-001-A305, LANDFILL A3-5
- CAS 03-08-001-A306, LANDFILL A3-6
- CAS 03-08-001-A308, LANDFILL A3-8

13. Site markers (Landfill A3-6), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
c. Are any of the warning signs damaged or missing?		✓	
d. Are all signs legible?	✓		
e. How many signs need to be replaced?	0		

14. Use-restricted area (Landfill A3-6):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

15. Site markers (Landfill A3-8):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are all four (4) surface markers in good condition?		✓	Three of the four surface markers were found and determined to be in good condition. The 4th surface marker could not be located.
b. Are all brass survey markers in good condition?		✓	Three of the four brass survey markers were located and in good condition. The 4th brass marker could not be located.
c. Are any of the warning signs damaged or missing?		✓	
d. Are all signs legible?	✓		
e. How many signs need to be replaced?	0		

16. Use-restricted area (Landfill A3-8):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) through or around the cover?		✓	
d. Is there evidence of animals burrowing into the cover?		✓	
e. Is there evidence of human intrusion into the cover?		✓	

17. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	10		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 424: AREA 3 LANDFILL COMPLEX
- **CAS 03-08-001-A302, LANDFILL A3-2**
- **CAS 03-08-001-A304, LANDFILL A3-4**
- **CAS 03-08-001-A306, LANDFILL A3-6**
- **CAS 03-08-001-A301, LANDFILL A3-1**
- **CAS 03-08-001-A303, LANDFILL A3-3**
- **CAS 03-08-001-A305, LANDFILL A3-5**
- **CAS 03-08-001-A308, LANDFILL A3-8**

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of any of the sites? (Immediate report required)		✓	**If yes, which one(s)?**
Date reported: _____ 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?		✓	Another site walkdown needs to be performed to confirm the surface marker with brass pin was overlooked or inadvertently removed.

5. Field conclusions/recommendations: The use restriction signs are in good condition. The aboveground monuments and surface grade monuments are in excellent condition. At Landfill A3-8, only three of four surface markers were located. A follow-up action is necessary to conduct a site walkdown to verify if the fourth marker was overlooked or inadvertently removed during a nearby miscellaneous equipment removal activity.

F. CERTIFICATION

I have conducted an inspection of CASs 03-08-001-A301 through A306 and A308, Landfills A3-1 through A3-6 and A3-8, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/21/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☐ Maintenance records ☐ Photos ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 426: CACTUS SPRING WASTE TRENCHES - CAS RG-008-001-RGCS, WASTE TRENCHES

Inspection Date and Time: 5/20/08 4:33PM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Have the site as-built plans and site base map been reviewed?	✓		
2. Has the Post-Closure Plan been reviewed?	✓		
3. Have the previous inspection reports been reviewed?	✓		
4. Were anomalies or trends detected on previous inspections?		✓	
5. Were maintenance or repairs performed since last inspection?		✓	
a. If yes, obtain a copy of maintenance records and attach to checklist.			NA ✓
b. If yes, has site repair resulted in a change from as-built conditions?			NA ✓
c. If yes (to 4b), are revised as-built plans available that reflect repair changes?			NA ✓

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:

a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the fence damaged?		✓	
b. Have any posts been damaged or their anchoring weakened?		✓	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 426: CACTUS SPRING WASTE TRENCHES - CAS RG-008-001-RGCS, WASTE TRENCHES

1. Site markers (continued):	YES	NO	EXPLANATION (required if shaded box is checked)
d. Are "vegetation" signs damaged or missing (located on each corner and in middle of fence side)?		✓	
e. Are the signs legible?	✓		
f. How many of the signs need to be replaced?	0		

2. Use-restricted area:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) on or near the use restriction boundary?		✓	
d. Is there vegetation (describe its condition)?	✓		
e. Is there evidence of human intrusion onto the site?		✓	
f. Is there evidence of animal burrowing?	✓		Small animal burrows were noticed at the NE fence corner.

3. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	7		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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?		✓	The animal burrow conditions were not significant to warrant a follow-up corrective action.

5. Field conclusions/recommendations: The signage and fencing were in great condition. The vegetation was very mature and in good condition. There were a few small animal burrows at the northeast fence corner; however, the site conditions were not significant enough to warrant a follow-up corrective action. This site had no issues or concerns.

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 426: CACTUS SPRING WASTE TRENCHES - CAS RG-008-001-RGCS, WASTE TRENCHES

F. CERTIFICATION

I have conducted an inspection of CAS RG-008-001-RGCS, Waste Trenches, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/20/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

- ☐ Maintenance records
- ☐ Photos
- ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 427: AREA 3 SEPTIC WASTE SYSTEMS 2, 6 - CAS 03-05-002-SW02, SEPTIC WASTE SYSTEM CAS 03-05-002-SW06, SEPTIC WASTE SYSTEM

Inspection Date and Time: 5/20/08 1:28 PM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:

a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers (Septic Tank 33-5):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any posts been damaged or their anchoring weakened?		✓	
b. Is the warning sign damaged or missing?		✓	
c. Is the sign legible?	✓		
d. Does the sign need to be replaced?		✓	
e. Is the lava rock (which identifies the subsurface markers and the corners of the use-restricted area) clearly visible?	✓		
f. Were all subsurface markers detected (using a magnetometer or equivalent)	✓		

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 427: AREA 3 SEPTIC WASTE SYSTEMS 2, 6 - CAS 03-05-002-SW02, SEPTIC WASTE SYSTEM CAS 03-05-002-SW06, SEPTIC WASTE SYSTEM

2. Use-restricted area (Septic Tank 33-5):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of human intrusion onto the site?		✓	
3. Site markers (pre-1965 Leachfield):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is the lava rock (which identifies the subsurface markers and the corners of the use-restricted area) clearly visible?	✓		Lava rock is starting to get displaced because the site is in a heavy traffic vehicle area.
b. Were all subsurface markers detected (using a magnetometer or equivalent)	✓		
4. Use-restricted area (pre-1965 Leachfield):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
e. Is there evidence of human intrusion onto the site?		✓	
5. Site markers (Leachfields A, B, & Abandoned):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is the warning sign (posted on Building 0370T) damaged or missing?		✓	
b. Is the sign legible?	✓		
c. Does the sign need to be replaced?		✓	
d. Is the lava rock (which identifies the subsurface markers and the corners of the use-restricted areas) clearly visible for all three areas?	✓		
e. Were all subsurface markers detected (using a magnetometer or equivalent)	✓		
6. Use-restricted area (Leachfields A, B, & Abandoned):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of human intrusion onto the site?		✓	
7. Photograph Documentation:	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	10		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.
E. FIELD CONCLUSIONS	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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?		✓	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 427: AREA 3 SEPTIC WASTE SYSTEMS 2, 6 - CAS 03-05-002-SW02, SEPTIC WASTE SYSTEM
CAS 03-05-002-SW06, SEPTIC WASTE SYSTEM

5. Field conclusions/recommendations: Surface grade monuments are visible with red lava rock and appear to be in good condition. The UR signage is legible and sign posts are stable. Lava rock placed in heavy traffic vehicle areas is starting to get displaced, but this is not an issue at this time warranting a follow-up corrective action.

F. CERTIFICATION

I have conducted an inspection of CASs 03-05-002-SW02, Septic Waste System, and 03-05-002-SW06, Septic Waste System, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/20/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

- ☑ Photos
- ☑ Field notes

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 453: AREA 9 UXO LANDFILL - CAS 09-55-001-0952, AREA 9 LANDFILL

Inspection Date and Time: 5/21/08 11:26AM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?	✓		A trend has been established for the presence of large animal burrows on the NE corner of Trench A9-1 and A9-2.
4. Were maintenance or repairs performed since last inspection?	✓		The animal burrows were backfilled by the Sandia primary contractor on Aug. 1, 2007.
a. If yes, obtain a copy of maintenance records and attach to checklist.			NA

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:

a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the gate damaged?		✓	
b. Is the gate lock in place and functional?	✓		
c. Is the fence damaged?		✓	
d. Have any posts been damaged or their anchoring weakened?		✓	
e. Have boundary monuments been disturbed?		✓	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 453: AREA 9 UXO LANDFILL - CAS 09-55-001-0952, AREA 9 LANDFILL

1. Site markers (continued):	YES	NO	EXPLANATION (required if shaded box is checked)
f. Are boundary monuments in good condition?	✓		
g. Are any of the use restriction warning signs damaged or missing?		✓	
h. Are all signs legible?	✓		
i. How many signs need to be replaced?	0		

2. Use-restricted area:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling?		✓	
b. Is there cracking?		✓	
c. Is there evidence of erosion (wind or water) over trenches A9-1, A9-2, or A9-3?		✓	
d. Is there evidence of human intrusion onto the site?		✓	
e. Is there evidence of animal burrowing into trenches A9-1, A9-2, or A9-3?	✓		Large animal burrows were noticed on the NE corner of Trench A9-1 and A9-2.

3. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	6		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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?	✓		Animal burrows will be backfilled within 90 days.

5. Field conclusions/recommendations: The use restriction signage and chain link fencing are in excellent condition. The aboveground monuments are sturdy and intact. There was no evidence of subsidence or low depression areas. However, there were a few large animal burrows on the northeast corner of Trench A9-1 and A9-2. A follow-up corrective action to backfill the animal burrows will occur within 90 days.

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 453: AREA 9 UXO LANDFILL - CAS 09-55-001-0952, AREA 9 LANDFILL

F. CERTIFICATION

I have conducted an inspection of CAS 09-55-001-0952, Area 9 Landfill, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/21/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

- ☑ Maintenance records
- ☑ Photos
- ☑ Field notes

SEMI-

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

Inspection Date and Time: 3/6/08 1:12 PM	Reason for Inspection: Semi-Annual
Date of Last Post-Closure Inspection: None	Reason for Last Post-Closure Inspection: None
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?		✓	This is the first post closure inspection at CAU 484 sites.
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	

C. SITE INSPECTION PREPARATION

Assemble the following, as needed, to conduct inspections:
a. Radio, pager, etc.
b. Camera
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers (CA-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any posts been damaged or their anchoring weakened?		✓	
c. Are any of the four (4) use restriction signs damaged or missing?		✓	
d. Are all use restriction signs legible?	✓		
e. How many use restriction signs need to be replaced?	0		
f. Are any of the four (4) URMA signs damaged or missing?		✓	
g. Are all URMA signs legible?	✓		
h. How many URMA signs need to be replaced?	0		

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

2. Use-restricted area (CA-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of human intrusion into the cover?		✓	The cover appears to have settled since its original construction.
3. Site markers (SA-4):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have any posts been damaged or their anchoring weakened?		✓	
c. Are any of the four (4) use restriction signs damaged or missing?		✓	
d. Are all use restriction signs legible?	✓		
e. How many use restriction signs need to be replaced?	0		
f. Are any of the four (4) URMA signs damaged or missing?		✓	
g. Are all URMA signs legible?	✓		
h. How many URMA signs need to be replaced?	0		
4. Use-restricted area (SA-4):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of human intrusion into the cover?		✓	
5. Site markers (SA-5-9):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have any posts been damaged or their anchoring weakened?		✓	
c. Are any of the four (4) use restriction signs damaged or missing?		✓	
d. Are all use restriction signs legible?	✓		
e. How many use restriction signs need to be replaced?	0		
f. Are any of the four (4) URMA signs damaged or missing?		✓	
g. Are all URMA signs legible?	✓		
h. How many URMA signs need to be replaced?	0		
6. Use-restricted area (SA-5-9):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of human intrusion into the cover?		✓	
7. Site markers (SA-12-15):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have any posts been damaged or their anchoring weakened?		✓	
c. Are any of the four (4) use restriction signs damaged or missing?		✓	
d. Are all use restriction signs legible?	✓		
e. How many use restriction signs need to be replaced?	0		
f. Are any of the four (4) URMA signs damaged or missing?		✓	

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

7. Site markers (SA-12-15), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
g. Are all URMA signs legible?	✓		
h. How many URMA signs need to be replaced?	0		
8. Use-restricted area (SA-12-15):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of human intrusion into the cover?		✓	
9. Photograph Documentation:	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	20		
If yes, has a photographic log been prepared?		✓	Log number: Photos are electronically logged on the ER Shared Drive under CAU 484.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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 use restriction signage and posts are in excellent condition. There is no evidence of human intrusion at any of the four corrective action sites. There are no issues or concerns at any of the post closure sites.

F. CERTIFICATION

I have conducted an inspection of CAS RG-52-007-TAML, Davis Gun Penetrator Test, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 3/6/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☑ Photos ☑ Field notes

Inspection Requirement: Semi-Annual

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

Inspection Date and Time: 5/20/08 2:38 PM	Reason for Inspection: Semi-annual
Date of Last Post-Closure Inspection: 3/6/08	Reason for Last Post-Closure Inspection: Semi-annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:

a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. General vicinity and site conditions (CA-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are access roads in good condition? **(If no, see Note A)**	✓		
b. Is there evidence of testing activities in the vicinity of the cover? **(If yes, see Note B)**		✓	
c. Is the berm that surrounds the cover intact? **(If no, see Note C)**	✓		
d. Are there cracks or fissures (wider than 1-inch across) on, adjacent to, or otherwise approaching the cover? **(See Note D for more information)**		✓	
2. Site markers (CA-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any posts been damaged or their anchoring weakened?		✓	

Inspection Requirement: Semi-Annual

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

2. Site markers (CA-1), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
b. Are any of the four (4) use restriction signs damaged or missing?		✓	
c. Are all use restriction signs legible?	✓		
d. How many use restriction signs need to be replaced?	0		
e. Are any of the four (4) URMA signs damaged or missing?		✓	
f. Are all URMA signs legible?	✓		
g. How many URMA signs need to be replaced?	0		

3. Use-restricted area (CA-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling, erosion (wind or water), or animal burrowing?		✓	
b. Is there evidence of human intrusion into the cover?		✓	
c. Is the cover still mounded such that it prevents ponding on the cover surface?	✓		

4. General vicinity and site conditions (SA-4):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are access roads in good condition? **(If no, see Note A)**	✓		
b. Is there evidence of testing activities in the vicinity of the cover? **(If yes, see Note B)**		✓	
c. Is the berm that surrounds the cover intact? **(If no, see Note C)**	✓		
d. Are there cracks or fissures (wider than 1-inch across) on, adjacent to, or otherwise approaching the cover? **(See Note D for more information)**		✓	

5. Site markers (SA-4):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any posts been damaged or their anchoring weakened?		✓	
b. Are any of the four (4) use restriction signs damaged or missing?		✓	
c. Are all use restriction signs legible?	✓		
d. How many use restriction signs need to be replaced?	0		
e. Are any of the four (4) URMA signs damaged or missing?		✓	
f. Are all URMA signs legible?	✓		
g. How many URMA signs need to be replaced?	0		

6. Use-restricted area (SA-4):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling, erosion (wind or water), or animal burrowing?		✓	
b. Is there evidence of human intrusion into the cover?		✓	
c. Is the cover still mounded such that it prevents ponding on the cover surface?	✓		

Inspection Requirement: Semi-Annual

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

7. General vicinity and site conditions (SA-5-9):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are access roads in good condition? **(If no, see Note A)**	✓		
b. Is there evidence of testing activities in the vicinity of the cover? **(If yes, see Note B)**		✓	
c. Is the berm that surrounds the cover intact? **(If no, see Note C)**	✓		
d. Are there cracks or fissures (wider than 1-inch across) on, adjacent to, or otherwise approaching the cover? **(See Note D for more information)**		✓	
8. Site markers (SA-5-9):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have any posts been damaged or their anchoring weakened?		✓	
b. Are any of the four (4) use restriction signs damaged or missing?		✓	
c. Are all use restriction signs legible?	✓		
d. How many use restriction signs need to be replaced?	0		
e. Are any of the four (4) URMA signs damaged or missing?		✓	
f. Are all URMA signs legible?	✓		
g. How many URMA signs need to be replaced?	0		
9. Use-restricted area (SA-5-9):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of settling, erosion (wind or water), or animal burrowing?		✓	
b. Is there evidence of human intrusion into the cover?		✓	
c. Is the cover still mounded such that it prevents ponding on the cover surface?	✓		
10. General vicinity and site conditions (SA-12-15):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Are access roads in good condition? **(If no, see Note A)**	✓		
b. Is there evidence of testing activities in the vicinity of the cover? **(If yes, see Note B)**		✓	
c. Is the berm that surrounds the cover intact? **(If no, see Note C)**	✓		
d. Are there cracks or fissures (wider than 1-inch across) on, adjacent to, or otherwise approaching the cover? **(See Note D for more information)**		✓	
11. Site markers (SA-12-15):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have any posts been damaged or their anchoring weakened?		✓	
b. Are any of the four (4) use restriction signs damaged or missing?		✓	
c. Are all use restriction signs legible?	✓		
d. How many use restriction signs need to be replaced?	0		
e. Are any of the four (4) URMA signs damaged or missing?		✓	

Inspection Requirement: Semi-Annual

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

11. Site markers (SA-12-15), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
f. Are all URMA signs legible?	✓		
g. How many URMA signs need to be replaced?	0		

12. Use-restricted area ~~(CA-1)~~ SA-12-15:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling, erosion (wind or water), or animal burrowing?		✓	
b. Is there evidence of human intrusion into the cover?		✓	
c. Is the cover still mounded such that it prevents ponding on the cover surface?	✓		

13. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	19		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is there an imminent hazard to the integrity of the site? (Immediate report required)		✓	
Date reported: _____			
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 use restriction signage, radiological postings, and yellow anchored posts for all four Davis Gun sites (CA-1, SA-4, SA-5-9, and SA-12-15) are in excellent condition. There was no evidence of human or animal intrusion except at SA-4. At SA-4, horse tracks were noticed on the soil cover; but was not significant to warrant a corrective action. There were no issues or concerns at either site.

F. CERTIFICATION

I have conducted an inspection of CAS RG-52-007-TAML, Davis Gun Penetrator Test, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/20/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☐ Photos ☑ Field notes

POST-CLOSURE INSPECTION CHECKLIST

CAU 484: SURFACE DEBRIS, WASTE SITES, AND BURN AREA
CAS RG-52-007-TAML, DAVIS GUN PENETRATOR TEST

Notes regarding general vicinity and site conditions:

A – Access roads are not a use restriction compliance issue, but they do affect our ability to get to the sites for required inspections. Some roads used to access CAU 484 use-restricted areas are used only for this purpose. Notify the TTR Range Manager if road repairs and/or re-grading are needed so that roads remain passable for future inspections. Follow up with a notice to the NNSA Task Manager.

B – Testing activities are not a use restriction compliance issue unless they directly impact use-restricted areas. However, base personnel may not be aware that activities are getting close. Notify the TTR Range Manager if testing appears to be getting close to the use restricted areas so that they can make any needed changes. Follow up with a notice to the NNSA Task Manager.

C – Berms were constructed around the covers so that site personnel are more aware of the cover locations and to reduce water erosion on the lakebed surface. Maintenance of the berms is not required for the use restriction; however, it may be a best management practice for protection of the mounded covers. Notify the TTR Range Manager if berm work is desired. Follow up with a notice to the NNSA Task Manager.

D – Cracks and fissures are present on Antelope Lake. Some of the cracks and fissures are very large and may be several feet wide, hundreds of feet long, and dozens of feet deep. Little can be done to prevent these types of fissures. Notify DOE if such fissures or cracks develop on or near the cover, or if they develop elsewhere and appear to be coming in the direction of the cover.

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 487: THUNDERWELL SITE - CAS RG-26-001-RGRV, THUNDERWELL SITE

Inspection Date and Time: 5/21/08 3:22 PM	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/15/07	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glenn Richardson	Title: Task Manager
Assistant Inspector: Brad Jackson	Title: Task Manager

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 provided. 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 photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
5. This unit will be inspected annually with annual formal reporting to the Nevada Division of Environmental Protection. The annual report will include an executive summary, recommendations and conclusions with the following attachments: this checklist, field notes, photographs, and photo log.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Has the Post-Closure Plan been reviewed?	✓		
2. Have the previous inspection reports been reviewed?	✓		
3. Were anomalies or trends detected on previous inspections?		✓	
4. Were maintenance or repairs performed since last inspection?		✓	

C. SITE INSPECTION PREPARATION

Advance coordination with TTR Security is required. Assemble the following, as needed, to conduct inspections:

a. TTR Radio, pager, etc.
b. Camera – requires TTR photo/sensitive equipment pass
c. Previous letter report, inspection checklists, repair records, and as-built plans
d. Other miscellaneous support equipment

D. SITE INSPECTION

1. Site markers (A8 Anomalies Area):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have boundary monuments been disturbed?		✓	
b. Are boundary monuments in good condition?	✓		
c. Are any of the use restriction warning signs damaged or missing?		✓	
d. Are all signs legible?	✓		
e. How many signs need to be replaced?	0		

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 487: THUNDERWELL SITE - CAS RG-26-001-RGRV, THUNDERWELL SITE

2. Use-restricted area (A8 Anomalies Area):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of human intrusion onto the site?		✓	
b. Is there evidence of large animal intrusion into the cover?		✓	
3. Site markers (A17 Anomalies Area):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have boundary monuments been disturbed?		✓	
b. Are boundary monuments in good condition?	✓		
c. Are any of the use restriction warning signs damaged or missing?		✓	
d. Are all signs legible?	✓		
e. How many signs need to be replaced?	0		
4. Use-restricted area (A17 Anomalies):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of human intrusion onto the site?		✓	
b. Is there evidence of large animal intrusion into the cover?		✓	
5. Photograph Documentation (1 photo per site minimum):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have photographs been taken of the sites?	✓		
If yes, how many photos were taken?	2		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log is available on the ER shared drive.

E. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Are more frequent inspections required?		✓	
2. Are existing maintenance/repair actions satisfactory?	✓		
3. Is other maintenance/repair necessary?		✓	

4. Field conclusions/recommendations: The aboveground monuments are erect and in good condition. The use restriction signs are legible and intact. There is no evidence of human intrusion onsite or animal intrusion on the A8 or A17 cover. Overall site conditions are great with no issues or concerns.

F. CERTIFICATION

I have conducted an inspection of CAS RG-26-001-RGRV, Thunderwell Site, in accordance with the procedures of the Post-Closure Plan as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature: /s/ G Richardson	Date: 5/21/08
Printed Name: Glenn Richardson	Title: Task Manager

Attachments (check if attached):

☐ Photos ☑ Field notes

THIS PAGE INTENTIONALLY LEFT BLANK

ATTACHMENT D
FIELD NOTES

THIS PAGE INTENTIONALLY LEFT BLANK

CAU 484 Semi-Annual Post Closure Monitoring Inspection - 3/6/08

Personnel: Glenn Richardson - NSTec Task Manager
Brad Jackson - NSTec Task Manager
Steve Munns - NSTec RCT

Scope: Perform 1st semi-annual inspection of four sites (now placed in post closure status) associated with CAU 484. The inspection will consist of photo documentation, field notes, and completion of site post closure checklist. In addition, radiological surveys will be taken of BDU's currently staged in miscellaneous equipment/debris area on the lake bed.

Equipment: Camera, Radiological Survey/Screening Equipment
Weather Conditions: Sunny, Low 50s
PPE: Standard Level D

CAU 484 - Arrived at the first CAS (CA-1) on the Antelope Lake bed @ 1:12 PM. Inspected the use restriction signage and radiological postings. The signage and yellow anchored posts are in excellent condition. There is no evidence of intrusion on the soil cover. Leaving CA-1 on our way to CAS (SA-4). At CAS (SA-4), we inspected the UR signage and yellow anchored posts, to find them in excellent condition. Also, there is no evidence of human intrusion on the cover. Leaving SA-4 on our way to CAS (SA 5-9). At CAS (SA 5-9), we found the UR signage, URMA postings, and yellow posts to be in

Work continued to Page _____

SIGNATURE /s/ G Richardson			DATE 3/6/08
DISCLOSED TO AND UNDERSTOOD BY	DATE	WITNESS	DATE

Work continued from Page 172

excellent condition. The soil cover is undisturbed and does not show any evidence of erosion. Leaving SA 5-9 on our way to CAS (SA 12-15). At CAS (SA 12-15), the UR signage and yellow anchored posts were in excellent condition. There was no evidence of intrusion or erosion on the soil cover. Based upon our inspection of the 484 CASs, there are no issues or concerns.

- As we are leaving Antelope Lake, we stopped at a miscellaneous equipment stockpile area to get surveys on approx. 6 rocket tips. They are referred to as Bomb Dummy Units (BDUs) or inert units. The inert units were associated with CAU 484. A rad survey report will be completed as well as a rad release form to submit to Sandia for disposal. Completed the inspections and surveys @ approx. 1:55 PM.

3/4/08

/s/ G Richardson

Work continued to Page _____

SIGNATURE			DATE
/s/ G Richardson			3/6/08
DISCLOSED TO AND UNDERSTOOD BY	DATE	WITNESS	DATE

May 20, 2008

Annual TTR Post Closure Inspections + Semi-Annual Inspections (only for CAU 484)

Personnel: Glenn Richardson, Task Manager
Brad Jackson, Task Manager
Steve Munns, RCT

Weather: Cloudy 88°
Very Light Breeze

Equipment: Digital Camera
(Special Permit Provided for use)

Scope: Perform Post Closure site inspections for the following:
400, 404, 407, 423, 424, 426, 427, 453, 484, & 487

Tailgate Briefing: We discussed slips/trips/falls. Buddy system.
Be aware of heat stress even though we are at a higher elevation. Continue to stay hydrated with water.
Driving safety on roads and pathways.
Be aware of biological hazards.
Contact ASI Security for access control in areas with gates and barricades. Picked up TTR radios from ER office trailer.

1:20 PM - Checked in with Jerry (Washington Group P.O.C.) to notify him of our planned inspections and confirm inspection areas are accessible.

1:28 PM - Performed inspection at CAU 427. Surface grade monuments are visible with red rock and appear to be well-maintained. Monument locations appear to be in good condition at the leachfields and the septic tank area. It was noticed that at some monument locations that the lava rock is starting to get displaced because ~~it~~ these areas are in heavy traffic vehicle areas. However, this is not an issue at this time. Required photos were taken at this site. There are no issues at this site warranting a corrective action. As we were preparing

Work continued to Page 180

SIGNATURE /s/ G Richardson | DATE 5/20/08

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

to leave CAU 427, NNSA and NDEP arrived.

2:15 PM - NNSA and NDEP arrived at CAU 427 to accompany us on the remaining TTR PCM inspections. Visiting personnel included: Ted Zaferatos (NDEP) and Kevin Cabble (NNSA).

2:38 PM - Arrived at CAU 484 to perform inspection of 4 sites. Prior to the inspection, a brief tailgate safety mtg. was conducted for the visitors. CA-1 was the first CAU 484 site to be inspected. The use restriction signage, radiological postings, and yellow anchored posts are in excellent condition. There is no evidence of intrusion on the soil cover. Photo documentation was taken. The site had no issues or concerns.

2:49 PM - Arrived at CAU 484 SA-4 to perform inspection. The UR signage, radiological postings, and yellow anchored posts were not damaged and in great condition. Noticed some animal footprints on the soil cover; however, this did not warrant an immediate corrective action. The animal could have been a horse because horse dung was located near the cover surface. This site remains in good condition. Also, the RCT surveyed the shoe soles of those investigating ~~horse~~ pri

2:58 PM - Arrived at CAU 484 SA-5-9 to perform inspection. As with the previous 484 sites, the UR signage, yellow anchored posts, and rad postings are in excellent condition. There is no evidence of human, animal intrusion. There are no issues at this site.

3:13 PM - Arrived at CAU 484 SA-12-15 to perform inspection. This site is in excellent condition with no issues or concerns. Also, photo documentation was taken for SA-12-15, SA-5-9, and SA-4. The semi-annual inspection at the 484 sites is complete. Future inspections of CAU 484 sites will be performed on an annual frequency. Leaving at 3:20 PM.

Work continued to Page 181

SIGNATURE /s/ G Richardson

DATE

In route to CAU 407, at the request of NNSA and NDEP, we passed by a few CAU 408 sites. The 408 sites were only observed on the main road and inside the vehicle.

3:36 PM Arrived at CAU 407 to perform inspection. Noticed a few small & medium size animal burrows on the south side slope of the soil cover. As a result, NSTec will contact ecological services to determine the impact, if any. Barb wire on the south and northwest perimeter fence was loose and should be tightened as a best mgmt practice. Radiological postings were intact and in great condition. NNSA inquired about the native plant species that had grown inside and outside of the fenced area. Follow-up actions will occur at this site. Photo documentation was taken.

3:55 PM Arrived at CAU 404 to perform inspection. The vegetation appeared to be at a very high maturity level. As a result, discussions transpired to potentially consider removing the existing fence and gate. NSTec will follow-up on this after conferring with ecological services and reviewing their vegetation survey report. NNSA inquired again on different plant species and requested to see ecological services 2008 vegetation survey checklist. This site is in great condition with no issues or concerns. Leaving the site at 4:13 PM with photo documentation.

4:33 PM Arrived at CAU 426 to perform inspection. The signage and fencing were in good condition. Small animal burrows at the northeast fence corner; however, the conditions were not significant to warrant a follow-up action. The site has no issues and concerns. Photo documentation was taken before leaving the site.

5:10 PM Ended the inspections on 5/20 to resume the next morning on 5/21/08. Remaining inspections on 5/21 will include: CAUs 400, 423, 424, 453, and 487. Also, additional 408 sites will be observed during travel.

SIGNATURE /s/ G Richardson			DATE 5/20/08
DISCLOSED TO AND UNDERSTOOD BY	DATE	WITNESS	DATE

Continue TTR Post Closure Inspections — May 21, 2008
58° - Windy 40-50mph

- RCT returned to Mercury/Las Vegas on 5/20. (after 5PM)
9:05 AM - Met NNSA and NDEP to discuss commute route for remaining TTR PCM sites. Also, picked up ASI radios at the ER Office Trailer.
9:45 AM - Arrived at CAU 400 - Bomblet Pit to perform inspection. Noticed a few small and one exceptionally large animal burrow at the perimeter fence. We assumed the large burrow could have resulted from a badger. The vegetation appeared very mature and discussions occurred for considering removal of the fence and gate. NSTec will follow up with ecological services to confirm the vegetation has reached a reasonable growth level to remove the fence. Required photos were taken at the site.
Leaving CAU 400 - Bomblet Pit at 9:57 AM. Heading to 5 Pts. Landfill. In route to CAU 400 - 5 Pts. Landfill, we passed by a few CAU 408 sites. All CAU 408 sites were observed from the vehicle while on the main road.
10:28 AM - Arrived at CAU 400 - 5 Pts. Landfill to perform inspection. The fencing was in very good condition. Vegetation is starting to grow back from a previous flood event that killed most of the vegetation. It was determined that the fence needs to remain at this site. Required photos were taken before departing at 10:36 AM.
11:00 AM - Passed another 408 site in route to CAU 453
11:26 AM - Arrived at CAU 453 - Area 9 UXO Landfill to perform inspection. The chain link fencing and UR signage were in excellent condition. The soil cover looked really good with no evidence of subsidence

SIGNATURE /s/ G Richardson
DATE

Work continued from Page 182

or low depression areas. However, a few large burrows were noticed that could have been formed by a badger or equivalent. Follow-up action will occur to backfill large burrows. Required photos were taken before leaving the site at 11:40AM in route to the cafeteria for lunch.

- Break for Lunch and Complete Other ER Project Priorities (i.e. Weekly Status)

2:06 PM - Arrived at CAU 423 to perform inspection. The UR signage and post is in excellent condition. Photo documentation was taken. This site has no issues or concerns.

2:14 PM - Arrived at CAU 424 Landfill Cell A3-1. The aboveground monuments are stable and in good condition. Required photos were taken.

2:21 PM - Arrived at Landfill Cell A3-2. The aboveground monuments are not damaged and in great condition. Required photos were taken.

2:26 PM - Arrived at Landfill Cell A3-3. The surface grade monuments were visible and not damaged. The aboveground monuments remain stable and in great condition. Required photos were taken.

2:31 PM - Arrived at Landfill Cell A3-4. The aboveground monuments are stationary and in good condition. Required photos were taken.

2:35 PM - Arrived at Landfill Cell A3-5. The aboveground monuments are stable and in great condition. There appears to be no damage to the vegetative cover. Photo documentation was taken.

2:46 PM - Arrived at Landfill Cell A3-6. The aboveground monuments are in excellent condition. The vegetative cover looks good and photo documentation was taken at the site.

Work continued to Page 184

SIGNATURE /s/ G Richardson			DATE 5/21/08
DISCLOSED TO AND UNDERSTOOD BY	DATE	WITNESS	DATE

2:50 PM - Arrived at Landfill Cell A3-8. Three out of the four surface grade monuments are visible and in good condition. The fourth surface grade monument was located on the southwes corner of an equipment storage area. The monument could not be ~~inspected~~ located. A significant amount of miscellaneous equip and debris has been removed from the storage area. Photo documentation was taken at the site.

3:22 PM - Arrived at CAU 487 - A-17 to perform inspection. The UR signage and aboveground monuments are erect and in great condition. There are no issues or concerns at this site. Required photos were taken.

3:31 PM - Arrived at CAU 487 - A-8 to perform inspection. The aboveground monuments are erect and in good condition. The UR signage is legible and visible on the monuments. Required photos were taken at this site. No issues or concerns were identified. Headed back to ER Office Trailer and refueled govt. vehicle.

4:30 PM - Returned ASI radios. End of TTR PCM Inspections

5/21/08

/s/ G Richardson

ATTACHMENT E
PHOTOGRAPHS

THIS PAGE INTENTIONALLY LEFT BLANK

PHOTOGRAPH LOG

PHOTOGRAPH	DATE	DESCRIPTION
1	05/21/2008	CAU 400 Bomblet Pit, looking south
2	05/21/2008	CAU 400 Bomblet Pit, looking northwest
3	05/21/2008	CAU 400 Five Points Landfill, looking east
4	05/21/2008	CAU 400 Five Points Landfill, looking northwest
5	05/20/2008	CAU 404, looking east
6	05/20/2008	CAU 407, looking east
7	05/20/2008	CAU 407, looking southwest
8	05/21/2008	CAU 423, looking east
9	05/21/2008	CAU 424, Landfill Cell A3-1, looking southeast
10	05/21/2008	CAU 424, Landfill Cell A3-2, looking north
11	05/21/2008	CAU 424, Landfill Cell A3-3, looking northwest
12	05/21/2008	CAU 424, Landfill Cell A3-4, looking north
13	05/21/2008	CAU 424, Landfill Cell A3-5, looking southeast
14	05/21/2008	CAU 424, Landfill Cell A3-6, looking south
15	05/21/2008	CAU 424, Landfill Cell A3-8, looking west
16	05/20/2008	CAU 426, looking southwest
17	05/20/2008	CAU 427, looking north
18	05/20/2008	CAU 427, looking south
19	05/21/2008	CAU 453, looking northwest
20	03/06/2008	CAU 484, CA1 anomaly, looking east
21	03/06/2008	CAU 484, SA4 anomaly, looking south
22	03/06/2008	CAU 484, SA5-9 anomaly, looking southwest
23	03/06/2008	CAU 484, SA12-15 anomaly, looking northwest
24	05/20/2008	CAU 484, CA1 anomaly, looking west
25	05/20/2008	CAU 484, SA4 anomaly, looking south
26	05/20/2008	CAU 484, SA5-9 anomaly, looking north
27	05/20/2008	CAU 484, SA12-15 anomaly, looking northwest
28	05/21/2008	CAU 487, A-8 anomaly, looking southwest
29	05/21/2008	CAU 487, A-17 anomaly, looking west

THIS PAGE INTENTIONALLY LEFT BLANK

Photograph 1: CAU 400 Bomblet Pit, looking south, 05/21/2008

Photograph 2: CAU 400 Bomblet Pit, looking northwest, 05/21/2008

Photograph 3: CAU 400 Five Points Landfill, looking east, 05/21/2008

Photograph 4: CAU 400 Five Points Landfill, looking northwest, 05/21/2008

Photograph 5: CAU 404, looking east, 05/20/2008

Photograph 6: CAU 407, looking east, 05/20/2008

Photograph 7: CAU 407, looking southwest, 05/20/2008

Photograph 8: CAU 423, looking east, 05/21/2008

Photograph 9: CAU 424, Landfill Cell A3-1, looking southeast, 05/21/2008

Photograph 10: CAU 424, Landfill Cell A3-2, looking north, 05/21/2008

Photograph 11: CAU 424, Landfill Cell A3-3, looking northwest, 05/21/2008

Photograph 12: CAU 424, Landfill Cell A3-4, looking north, 05/21/2008

Photograph 13: CAU 424, Landfill Cell A3-5, looking southeast, 05/21/2008

Photograph 14: CAU 424, Landfill Cell A3-6, looking south, 05/21/2008

Photograph 15: CAU 424, Landfill Cell A3-8, looking west, 05/21/2008

Photograph 16: CAU 426, looking southwest, 05/20/2008

Photograph 17: CAU 427, looking north, 05/20/2008

Photograph 18: CAU 427, looking south, 05/20/2008

Photograph 19: CAU 453, looking northwest, 05/21/2008

Photograph 20: CAU 484, CA1 anomaly, looking east, 03/06/2008

Photograph 21: CAU 484, SA4 anomaly, looking south, 03/06/2008

Photograph 22: CAU 484, SA5-9 anomaly, looking southwest, 03/06/2008

Photograph 23: CAU 484, SA12-15 anomaly, looking northwest, 03/06/2008

Photograph 24: CAU 484, CA1 anomaly, looking west, 05/20/2008

Photograph 25: CAU 484, SA4 anomaly, looking south, 05/20/2008

Photograph 26: CAU 484, SA5-9 anomaly, looking north, 05/20/2008

Photograph 27: CAU 484, SA12-15 anomaly, looking northwest, 05/20/2008

Photograph 28: CAU 487, A-8 anomaly, looking southwest, 05/21/2008

Photograph 29: CAU 487, A-17 anomaly, looking west, 05/21/2008

THIS PAGE INTENTIONALLY LEFT BLANK

ATTACHMENT F
POST-CLOSURE VEGETATION MONITORING REPORT

THIS PAGE INTENTIONALLY LEFT BLANK

POST-CLOSURE VEGETATION MONITORING REPORT FOR CORRECTIVE ACTION UNITS:

400, FIVE POINTS LANDFILL (TTR)

400, BOMBLET PIT (TTR)

404, ROLLER COASTER LAGOONS AND TRENCH (TTR)

407, ROLLER COASTER RADSAFE AREA (TTR)

426, CACTUS SPRING WASTE TRENCHES (TTR)

Field Work Completed
May 19–20, 2008

Report Prepared
by
Dave Anderson
Ecological Services

July 2008

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

FIGURES

TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

1.0 INTRODUCTION

This report documents the methodology and results of monitoring conducted in May 2008 at Corrective Action Units (CAUs) 400, 404, 407, and 426, which are located on the Tonopah Test Range (TTR) in central Nevada (Figure 1). The status of the vegetation is described and compared with adjacent undisturbed areas. Concerns and issues are identified, and remedial actions are recommended to ensure that a viable vegetative cover is maintained at each site.

In the fall of 1997, CAUs 400 (Bomblet Pit and Five Points Landfill), 404 (Roller Coaster Lagoons and Trench), and 426 (Cactus Spring Waste Trenches) were seeded with a mix of native shrubs and grasses. Each site was mulched with straw, and the straw was crimped into the soil. The sites have been protected from grazing animals (e.g., horses and rabbits) since that time with 4-foot-high perimeter barbed wire fences and 2-foot-high chicken wire along the base of the fences. In the fall of 2000, the cover at CAU 407 (Roller Coaster RadSafe Area) was revegetated using similar revegetation techniques.

Remedial revegetation has occurred at two of the sites. A flash flood swept through the center of the CAU 400 Five Points Landfill site in the summer of 2003. The perimeter fence was damaged, and much of the vegetation through the center of the site was lost. The fence was repaired, and the site was reseeded in the fall of 2004. The site was flooded again in 2006, covering much of the lower portions of the site with several inches of sediment. No remedial action has been taken since 2004.

After CAU 407 was revegetated in 2000, cover repairs resulted in the loss of the vegetation that had become established. In the fall of 2004, erosion channels on the cover were repaired, and the site was reseeded. An erosion blanket was used to minimize erosion.

Each site has been monitored periodically since revegetation occurred to document the success of reclamation efforts and identify any problems. The first year of monitoring was designed to determine if germination of seeded plant species had occurred and included plant density estimates and photographic documentation. Monitoring in subsequent years evaluated plant establishment and long-term vegetation survival, and compared plant cover and density with adjacent reference areas (undisturbed sites).

2.0 OBJECTIVES

The primary objective of monitoring each of the CAUs is to document the success of the revegetation effort and to identify issues that may need to be addressed to maintain the integrity of the sites. The primary objective of revegetating a disturbed site is to accelerate the time required for the reestablishment of native plants on the areas and return the site to pre-disturbance conditions. Native vegetation affords protection from the erosive forces of wind and water, thus maintaining the integrity of the site. It also impedes the establishment of noxious, weedy species and provides cover and food for local wildlife.

TONOPAH TEST RANGE

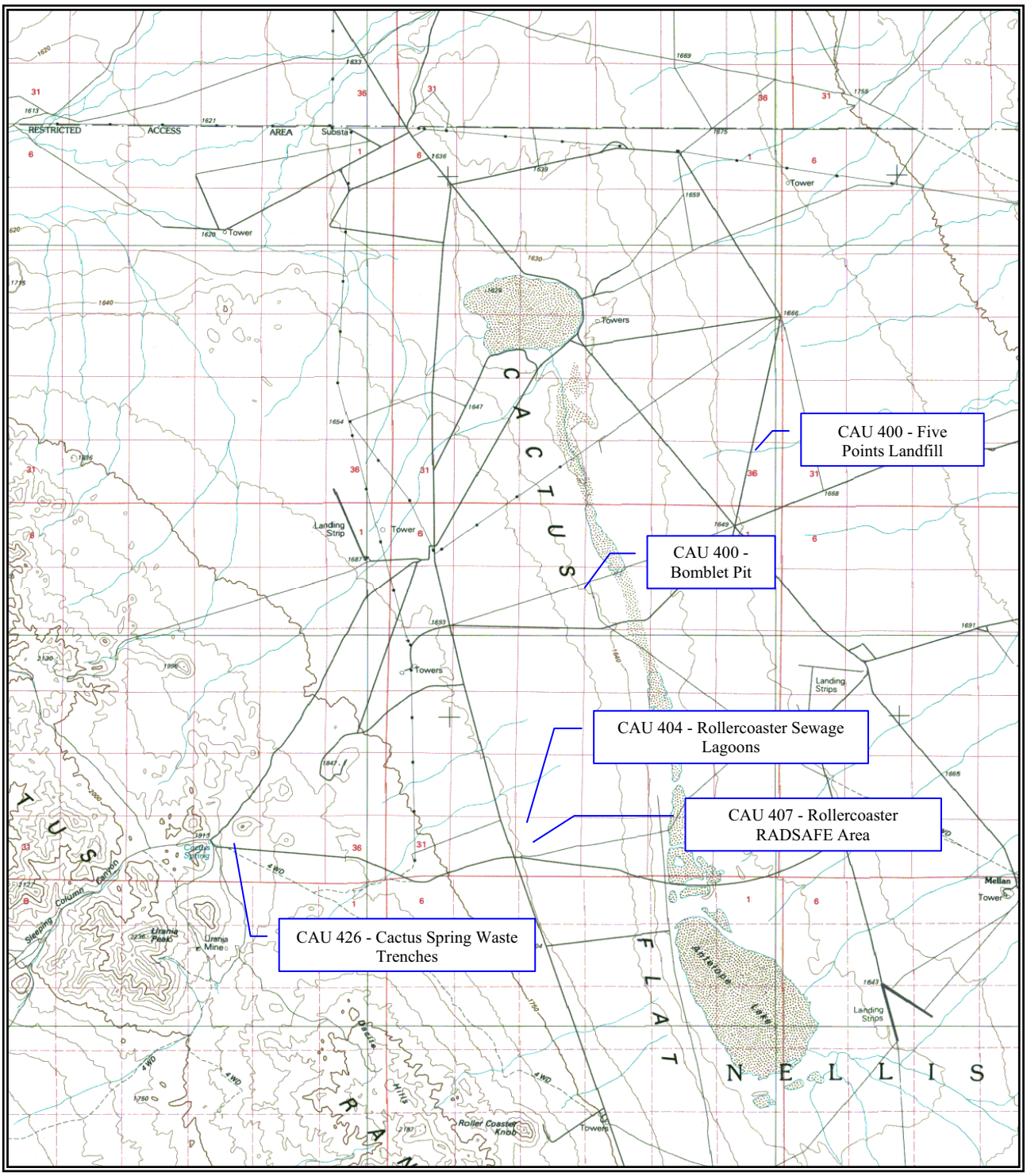


Figure 1. Location of CAUs 400 (2 sites), 404, 407, and 426 on the Tonopah Test Range

3.0 METHODS

Ecological Services staff scientists inspected the sites May 19–20, 2008. Plant cover and density estimates were made, wildlife usage was noted, and soil erosion conditions were evaluated. Plant cover was estimated using an optical point projection device, or cover scope. Cover sample points were taken at given intervals along a permanently placed linear transect. Cover was recorded by species. Plant density was estimated using 1-square meter (m^2) quadrats, which are located at given intervals along each transect. The total number of individual plants located within the boundaries of the quadrat was recorded. The data were averaged over all quadrats to obtain average plant densities (plants per m^2).

Plant diversity was calculated from density data. The number of different plant species within each quadrat was averaged over all quadrats sampled to determine the average number of different species present on the site. This information provides some indication of the diversity or heterogeneity of the plant community that is establishing on the site.

Revegetation is typically considered successful when a pre-determined percentage of plant cover and perennial plant density is achieved. These pre-determined amounts of density and cover are typically a percentage of the plant density and cover on an adjacent area that represents an undisturbed plant community that is similar to the one disturbed. A percentage has not been established for these sites; however, a typical percentage used to determine reclamation success is 70 percent. The time needed for reestablishment of a native plant community on a disturbed location varies depending on such factors as degree of disturbance, soil types, and climate conditions such as precipitation amounts, patterns, and temperature extremes. Revegetation success is achieved after several consecutive years of meeting, or exceeding, success criteria.

Wildlife usage at each site was determined primarily from circumstantial evidence, such as the presence of animal burrows or scat, plants being browsed by animals, or the observation of animals during sampling activities.

Erosion can be difficult to measure without extensive effort. Erosion on these sites was measured using the modified Bureau of Land Management erosion condition classification. Erosion status was objectively measured using several factors, which included pedestalling of soils, movement of surface litter, and rilling or gullying on the soil surface. These factors, combined, provide an objective characterization of erosion on a site.

4.0 RESULTS

This section provides results of the 2008 survey. Plant density and cover estimate data are summarized and are compared to data collected from previous years and from adjacent reference areas. The sites are considered successfully reclaimed if the perennial plant density and cover in the revegetated area has attained 70 percent of that on the reference areas.

4.1 CAU 400, FIVE POINTS LANDFILL

In 2008, six transects (two on the section that was revegetated in the fall of 2000, three in the area that was revegetated in the fall of 2004 and subsequently flooded, and one on the reference

area) were sampled. Plant cover, density, and diversity were averaged over the respective transects. Data presented in Tables 1, 2, and 3 are from the two transects in the area that was not flooded. Table 4 represents an average of the three transects in the flooded area.

4.1.1 Vegetation Monitoring Results

4.1.1.1 Plant Cover

Overall plant cover this year was the highest since 2002. Only about 8 percent of the total cover (Table 1) was from perennial plants. The other 18.8 percent was from annual plants. The annual plant cover was more than double the previous high of 9 percent annual plant cover that was present in 2005. All of the perennial cover was shrubs, and only one species of shrubs, fourwing saltbush, was present. This was the first year that there was not any perennial grass cover on the staging area at the CAU 400 Five Points Landfill site. Perennial grass cover has fluctuated from 1 percent grass cover in 2005, to a 5-year high of 6 percent in 2006 (Table 1). Forb cover was the highest in 2008 than it has ever been, and was primarily from a carpet of Steve's pincushion. Three other forbs were present, but Steve's pincushion accounted for 90 percent of all forb cover.

TABLE 1. PLANT COVER (%) ON CAU 400, FIVE POINTS LANDFILL, STAGING AREA

	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	2.5	8.3	9.2	8.1	9.0	13.8	10.6	8.1	5.8	4.1
Grasses	10.0	22.5	10.0	3.7	1.3	5.6	3.8	0.0	2.5	1.8
Forbs/Annuals	3.3	1.7	0.0	2.2	9.0	3.8	0.0	18.8	9.2	6.4
Total Plant Cover	**15.8**	**32.5**	**19.2**	**14.0**	**19.3**	**23.2**	**14.4**	**26.9**	**17.5**	**12.3**
Bare Ground	66.6	50	57.5	59.6	69.3	48.1	57.5	56.3	74.2	
Litter	17.5	17.5	23.3	26.5	11.5	28.8	28.1	16.9	8.3	

Of the 27 percent total plant cover this year, only 30 percent was from perennial plants.

Except for 2005, the amount of litter this year was the lowest recorded since the site was revegetated. The low amount of litter may be a result of a lack of plant production due to poor growing conditions over the last few years.

4.1.1.2 Plant Density

Total plant density this year was the third highest plant density recorded to date. However, if the density of forbs is removed from the analysis and only perennial plant density is considered, the staging area had the lowest plant density recorded in 2008. Shrub density was at an all-time low in 2007 (Table 2), but increased this year. Fourwing saltbush continued to be not only the most dominant, but also the only shrub present at this site. Occasionally, bud sagebrush has been present, but not in 2008.

TABLE 2. PLANT DENSITY (PLANTS PER M^2) ON CAU 400, FIVE POINTS LANDFILL STAGING AREA

		2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	Bud Sagebrush	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	--
	Fourwing Saltbush	0.7	1.0	1.4	1.1	1.4	1.0	0.5	1.0	0.03	--
	Greene's Rabbitbrush	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	--
	Winterfat	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	--
Total Shrubs		**0.7**	**1.1**	**1.5**	**1.1**	**1.4**	**1.6**	**0.6**	**1.0**	**0.6**	**0.4**
Grasses	Squirreltail	2.2	0.3	0.8	0.4	0.1	1.5	0.4	0.0	0.0	--
	Galleta	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	--
	Indian Ricegrass	4.8	3.2	2.1	1.0	0.4	0.6	1.0	0.2	1.4	--
Total Grasses		**7.0**	**3.5**	**2.9**	**1.5**	**0.5**	**2.1**	**1.5**	**0.2**	**1.4**	**1.0**
Total Forbs/Annuals		**10.2**	**0.4**	**1.3**	**13.5**	**56.4**	**42.0**	**0.0**	**39.5**	**30.7**	**21.5**
Total Plant Density		**17.9**	**5.0**	**5.7**	**16.1**	**58.3**	**45.7**	**2.1**	**40.7**	**32.7**	**22.9**
Wildlife Use		--	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	--	--
Erosion Classification		--	Stable	Stable	Critical	Critical	Stable	Stable	Stable/Severe	--	--

Note: Scientific names of plants are listed in Appendix F-1.
Note: Erosion Classification Chart included in Appendix F-2.

Grass density was lower in 2008 than it has ever been. The decrease was pronounced, dropping from 1.5 grasses/m^2 in 2007 to 0.2 grasses/m^2 in 2008 (Table 2).

Forb density increased in 2008 (Table 2). There were eight different species of forbs in 2008. Steve's pincushion was the most abundant forb in the staging area and, like at other sites this year on the TTR, accounted for the majority of the annual plant density.

4.1.1.3 Plant Diversity

Plant diversity decreased this year to the lowest recorded at this site. However, the diversity of grasses, which has ranged from 1.4 species/m^2 in 2003 to 0.5 species/m^2 in 2005, decreased to just 0.1 species/m^2 this year. This was just 10 percent of what it was last year.

The number of species of annual forbs in 2008 was higher than last year (Table 3). The 2.0 forb species/m^2 is not the lowest number encountered nor is it the highest.

TABLE 3. DIVERSITY OF PERENNIAL PLANT SPECIES ON CAU 400, FIVE POINTS LANDFILL STAGING AREA

Lifeform	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	0.4	0.5	0.6	0.6	0.7	0.9	0.4	0.6	0.5	0.4
Grasses	1.8	1.2	1.4	0.6	0.5	1.0	0.9	0.1	0.7	0.5
Total Number of Perennial Species per m^2	**2.2**	**1.7**	**2.0**	**1.2**	**1.2**	**1.9**	**1.3**	**0.7**	**1.2**	**0.9**
Forbs/Annuals	3.0	0.2	0.7	3.8	6.0	1.4	0.0	2.0	3.4	2.4

4.1.2 Revegetation Success

Using 70 percent of the plant cover and plant density on the reference area as a standard for successful revegetation, the CAU 400 Five Points Landfill site exceeded success standards in 2008 (Tables 1 and 2) except for grasses. Shrub cover was almost double the cover standard. There was no grass cover in 2008, but annual forbs more than made up for the loss of grass cover at about three times the standard for forb cover. Precipitation patterns this year did not favor perennial plant growth.

Total plant density shows a pattern similar to plant cover. Overall plant density exceeded the revegetation success standards this year. Shrub density not only exceeded, but was more than double the shrub density standard for revegetation success (Table 2). The loss of vegetation in the flooded area impacted grasses the most. The area lost to flooding typically supported higher amounts of grasses, both in density and cover. Grass density was less than the standard; however, except for 2005 and 2008, grass density exceeded the grass density revegetation success standard.

Forb density, like shrub density, was almost double the revegetation success standard in 2008 (Table 2). The similarity of the flora (shrubs, grasses, and forbs) between the staging area and the reference area indicates that the vegetation that has established on the CAU 400 Five Points Landfill site is a stable plant community.

Based on plant cover, the staging area at the Five Points Landfill not only exceeded the standard for plant cover, but also exceeded the total amount of cover on the reference area in four out of the last 8 years. The amount of plant cover for the staging area exceeded the standard for revegetation success established for this site every year since 2000 (Table 1 and Figure 2).

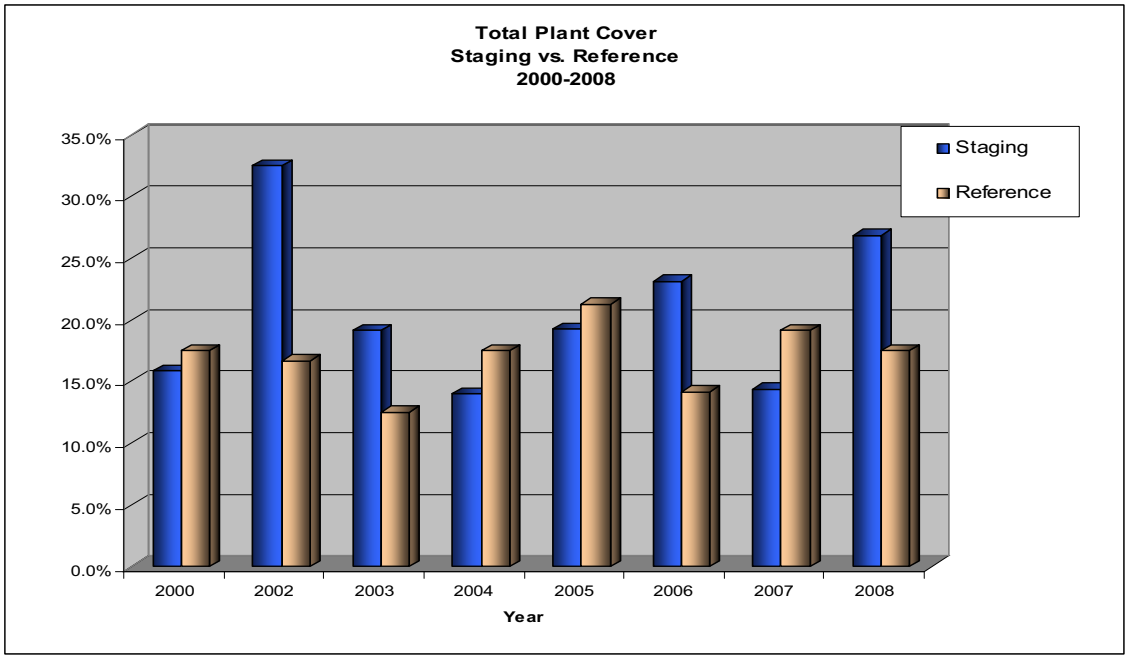


Figure 2. Plant cover on the staging area compared to reference area on CAU 400 Five Points Landfill from 2000 to 2008.

4.1.3 Wildlife Use

A moderate number of small mammal burrows were located throughout the site, but most were in the southeastern section of the site. No excessive browsing of shrubs was evident. The integrity of the perimeter fence, although temporarily compromised during the flash flood in 2003, appeared to be effective in keeping large animals, such as horses and antelope, off of the site.

4.1.4 Soil Erosion

There was no evidence of an erosion problem until 2003, when a flash flood resulted in the loss of all the vegetation (Table 4). The lower areas of the site were flooded again in 2006 (Figure 3), and it was noted in 2007 that many of the plants that had reestablished since the 2003 flood had died (Table 4). However, both shrubs and grasses (primarily perennial grasses) were again establishing on the flooded area.

TABLE 4. PLANT DENSITY (SPECIES/M^2) ON CAU 400, FIVE POINTS LANDFILL FLOODED AREA

		2005	2006	2007	2008
Shrubs	Bud Sagebrush	0.0	0.0	0.0	0.0
	Fourwing Saltbush	1.6	0.9	0.0	0.04
	Greene's Rabbitbrush	0.0	0.0	0.0	0.0
	Winterfat	1.0	0.8	0.0	0.0
Total Shrubs		**2.6**	**1.7**	**0.0**	**0.04**
Grasses	Squirreltail	8.6	1.7	0.1	0.03
	Galleta	0.0	0.0	0.0	0.0
	Indian Ricegrass	0.1	0.6	0.2	1.4
Total Grasses		**8.7**	**2.3**	**0.3**	**1.43**
Total Forbs/Annuals		**18.1**	**68.2**	**0.0**	**0.3**
Total Plant Density		**29.4**	**72.2**	**0.3**	**1.8**

Figure 3. Flooded bottom area at the CAU 400 Five Points Landfill

The check dams upstream were in place in 2008; however, their effectiveness against a flash flood is unknown. In 2008, there were no signs of heavy water movement through the channel that traverses the site. There was a layer of silts/sands in the bottom areas suggesting some overland erosion, but deep gullies did not appear to be forming. The southeastern section of the site represents the "uplands" on the site, and soil in this area appeared stable.

4.1.5 Summary/Recommendations

The overall status of that portion of the CAU 400 Five Points Landfill site that has not been flooded was good. The objectives of revegetation have essentially been achieved in that a native plant community has established on the non-flooded areas. There was a decrease in both perennial grass cover and density in 2008, but it is anticipated that, when more favorable growing conditions occur, both grass cover and density will increase. Native shrubs have established on the site from earlier revegetation efforts and native forbs have invaded the site from adjacent undisturbed habitat.

The area that has been flooded, which is approximately 40 to 50 percent of the area, does not support a viable native plant community at this point. The first years following the remedial revegetation efforts in 2004, many native shrubs and grasses reappeared, only to be lost to flooding and the associated deposition of sediment in 2006 and 2007. This area will continue to be susceptible to flooding and sedimentation without major recontouring at the site. Removal of the perimeter fence and allowing unrestricted access to the site may result in a "dust bowl" condition in the flooded areas. The soils in the flooded area were mostly clays and finer textured soils that, when impacted by something such as an animal's hooves, may create a fine dust. Under these conditions, native perennial plants do not establish and the area becomes a dust bowl. Animals may also be drawn to this site because of the abundant shrub growth around the periphery of the flooded area (Figure 3).

CAU 400, FIVE POINTS LANDFILL, PHOTOGRAPHIC REFERENCE

JUNE 1998

JUNE 2000

JUNE 2002

SEPTEMBER 2003

JUNE 2004

JUNE 2005

JUNE 2006

MAY 2007

MAY 2008

4.2 CAU 400, BOMBLET PIT

The Bomblet Pit was seeded in the fall of 1997. The site was heavily disturbed and dominated by halogeton prior to restoration efforts. The revegetated area and the undisturbed area directly east of the site were sampled in 2007 as has been done in previous years. Sampling at this site consists of two transects: one located in the revegetated area and another in the reference area directly east of the site.

4.2.1 Vegetation Monitoring Results

4.2.1.1 Plant Cover

There was a major decrease in the amount of total plant cover in 2008 compared to the previous 2 years. Shrub cover in 2008 was about half of what it was last year (Table 5). Approximately 70 percent of the total plant cover was from native shrubs, and the remaining 30 percent was from annual forbs. Grasses have had a hard time establishing on the revegetated area and, as with the previous 6 years, did not contribute to overall plant cover. Annual forbs have only contributed to overall plant cover in 2008 and in 2005. The amount of forb cover was 5 percent in 2008, compared to almost 4 percent in 2005 (Table 5). Forbs contributing to total plant cover were all native forbs, with no noxious weeds such as halogeton.

The amount of litter in 2008 was the lowest recorded to date. This may be an indication of the poor growing conditions experienced over the last several years, which in turn has resulted in less plant litter.

TABLE 5. PLANT COVER (%) ON CAU 400, BOMBLET PIT

	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	15.8	18.8	10.0	7.5	8.8	17.5	22.5	11.3	7.5	5.3
Grasses	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.9
Forbs/Annuals	0.0	0.0	0.0	0.0	3.8	0.0	0.0	5.0	5.0	3.5
Total Plant Cover	**18.4**	**18.8**	**10.0**	**7.5**	**12.6**	**17.5**	**22.5**	**16.3**	**13.8**	**9.7**
Bare Ground	63.2	61.3	73.8	78.8	72.5	62.5	60.0	73.8	66.3	--
Litter	18.4	20.0	16.3	13.8	15.0	20.0	17.5	10.0	20.0	--

4.2.1.2 Plant Density

Overall plant density in 2008 was the highest ever recorded, primarily due to the highest forb density recorded at this site since it was revegetated in 2000. Approximately 92 percent of the plants found at the site were annual forbs, 8 percent were shrubs, and less than 1 percent was perennial grasses. Grasses have not successfully established on the site. There were a few plants of Indian ricegrass this year, which was an improvement over last year and was as high as it has been over the last 5 years.

Shrub density was the same as it was last year (Table 6), and the composition of the shrub density was about the same as it has been the last 3 years. Shadscale was the most abundant

TABLE 6. PLANT DENSITY (PLANTS PER M^2) ON CAU 400, BOMBLET PIT

		2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	Bud Sagebrush	3.8	2.5	2.6	0.8	0.9	1.7	1.8	1.7	2.5	--
	Fourwing Saltbush	0.5	0.3	0.2	0.2	0.1	0.0	0.1	0.1	0.0	--
	Shadscale	6.8	6.5	6.4	5.3	4.7	4.8	3.7	3.8	1.1	--
	Winterfat	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	--
Total Shrubs		**11.4**	**9.3**	**9.3**	**6.3**	**5.7**	**6.5**	**5.6**	**5.6**	**4.0**	**2.7**
Grasses	Squirreltail	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
	Galleta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
	Indian Ricegrass	2.5	0.2	0.4	0.0	0.0	0.1	0.0	0.1	0.1	--
Total Grasses		**5.6**	**0.2**	**0.4**	**0.0**	**0.0**	**0.1**	**0.0**	**0.1**	**0.1**	**0.1**
Total Forbs/Annuals		**5.4**	**0.3**	**0.1**	**1.1**	**56**	**0.0**	**0.0**	**67.7**	**70.6**	**49.4**
Total Plant Density		**22.4**	**9.8**	**9.8**	**7.4**	**61.7**	**6.6**	**5.6**	**73.4**	**74.6**	**52.2**
Wildlife Use		Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	--	--
Erosion Classification		--	Stable	Stable	Stable	Stable	Stable	Stable	Stable	--	--

Note: Scientific names of plants are listed in Appendix F-1.
Note: Erosion Classification Chart included in Appendix F-2.

shrub, followed by bud sagebrush and fourwing saltbush. The average shrub density since 2004 was approximately 6 shrubs/m^2, which was slightly more than was recorded this year for the site.

As is the case on most of the CAUs this year, annual forb density was the highest ever recorded. Steve's pincushion was the most abundant of the three annual forbs found on the site. Halogeton has not been present since 2004.

4.2.1.3 Plant Diversity

Perennial plant diversity has ranged from a high of 1.8 species/m^2 in 2007 to a low of 1.7 species/m^2 in 2004, 2005, 2006, and 2008 (Table 7). The diversity of grasses was low, usually from no species to just one species per 10 m^2. Forbs fluctuate with growing conditions, primarily precipitation, and in good years there have been on average 1 to 2 species/m^2.

TABLE 7. DIVERSITY OF PERRENIAL PLANT SPECIES ON CAU 400, BOMBLET PIT

Lifeform	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	2.5	2.1	1.9	1.7	1.7	1.6	1.8	1.6	1.8	1.3
Grasses	1.6	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.0
Total Number of Perennial Species per m^2	**4.1**	**2.2**	**2.1**	**1.7**	**1.7**	**1.7**	**1.8**	**1.7**	**1.9**	**1.3**
Forbs/Annuals	1.3	0.2	0.1	0.5	1.5	0.0	0.0	1.7	1.6	1.1

4.2.2 Revegetation Success

The objectives of revegetation have been met at this site. The vegetation at this site became established early during the revegetation process (Figure 4). Total plant cover at this site has exceeded total plant cover on the reference site 6 of the 8 years that vegetation data has been collected. For the last 3 years, total plant cover has been significantly higher on the revegetated area than on the adjacent undisturbed native plant community. Native species are established, and the invasion of non-native noxious weedy species has been avoided. Revegetation success standards have been achieved and exceeded.

4.2.3 Wildlife use

The site is relatively flat; therefore, few small mammal burrows were noticed. The majority of the small mammal activity was along the perimeter fence, where soils have accumulated and provide a better burrowing medium. There was no evidence of excessive browsing of shrubs. The most abundant shrubs on site were those native to the area, shadscale and bud sagebrush, both of which have developed mechanisms to survive in this environment.

4.2.4 Soil Erosion

There was no evidence of erosion on this site.

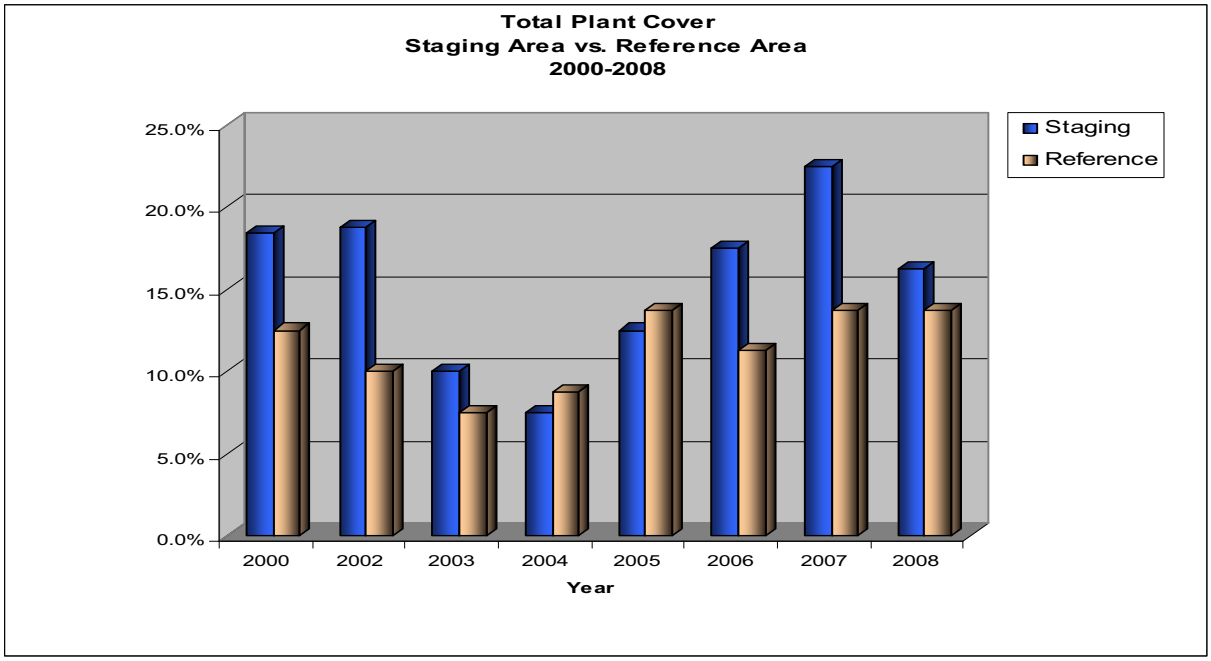


Figure 4. Plant cover on the CAU 400 Bomblet Pit staging area compared with reference area from 2000 to 2008

4.2.5 Summary/Recommendations

The goals of revegetation have been accomplished at the CAU 400 Bomblet Pit site. Native species are established and contribute significantly to overall plant cover and density. Revegetation success standards have been exceeded. The contribution of native perennial grasses to overall plant cover and density was lower than expected, but grasses did not contribute significantly in the native plant community either.

The potential for the invasion of non-native species, specifically halogeton, was a concern at the onset of revegetation activities. Halogeton was present the first couple years after revegetation but has not been encountered on the site since.

Fence removal should not have a negative impact on the vegetation that has established at this site. With the exception of the lacking perennial grasses, the revegetated area was quite similar to the native vegetation and probably would not offer wildlife or grazing animals anything that is not already provided by the native community. It is unlikely, therefore, that the site would be adversely impacted by removal of the perimeter fence.

CAU 400, BOMBLET PIT, PHOTOGRAPHIC REFERENCE

JUNE 1998

JUNE 2000

JUNE 2002

JUNE 2003

JUNE 2004

JUNE 2005

JUNE 2006

MAY 2007

MAY 2008

4.3 CAU 404, ROLLER COASTER LAGOONS AND TRENCH

This site is located midslope between the playa bottoms and the foothills of the Cactus Range, just east of Main Road and Rollercoaster Spring. Approximately 75 percent of CAU 404 is the staging area used during remediation activities, and was revegetated along with the cover in the fall of 1997. The cover over the remediated sewage lagoons is about a meter higher than the staging area. Three transects on the staging area, three on the cover, and three on the reference area were sampled this year. The reference area is located northwest of the main gate to the CAU 404 site.

4.3.1 Vegetation Monitoring Results, Staging Area

4.3.1.1 Plant Cover

In 2008, the 30 percent plant cover on the staging area was the highest recorded to date. Unlike other CAUs, about 66 percent of the total plant cover was from perennial species in 2008, not annual forbs. Grass cover increased from 0 percent in 2007 to 1 percent in 2008, and forb cover was 9 percent, the highest forb cover recorded to date (Table 8).

TABLE 8. PLANT COVER (%) ON CAU 404, STAGING AREA

	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	9.0	18.5	13.5	17.0	19.5	19.4	16.7	20.0	9.7	6.8
Grasses	3.5	0.5	0.5	0.0	0.5	1.1	0.0	1.0	0.0	0.0
Forbs/Annuals	0.0	0.0	0.5	0.0	3.5	1.1	0.6	9.2	8.2	5.7
Total Plant Cover	**12.5**	**19.0**	**14.5**	**17.0**	**23.5**	**21.6**	**17.3**	**30.2**	**17.9**	**12.5**
Bare Ground	56.5	53.0	69.0	61.5	69.0	56.1	61.7	50.8	68.3	--
Litter	31.0	28.0	16.5	21.5	7.5	22.2	21.1	19.0	13.8	--

Shrub cover increased to 20 percent in 2008, up from 17 percent in 2007. The 20 percent shrub cover was slightly higher than previous highs in 2005 and 2006. Shadscale accounted for approximately 80 percent of the shrub cover, bud sagebrush contributed another 19 percent, and the remaining was from winterfat. This was the first time that winterfat has contributed to total plant cover since 2004. The amount of cover contributed by shadscale was a good indication that this plant has successfully established on the site. Bud sagebrush increased from about 1 percent cover the last couple years to more than 3 percent in 2008. Bud

Figure 5. Bud sagebrush in full flower and early seed on the staging area of the CAU 404 staging area

sagebrush was flowering and setting seed during the 2008 monitoring (Figure 5).

Since 2002, grass cover has varied from 0.5 percent to 1.1 percent. The amount of cover from perennial grasses rebounded from 0 percent in 2007 to 1 percent in 2008 (Table 8). Galleta was the most common grass and has consistently occurred on the site.

The 9 percent cover from forbs in 2008 was almost three times the previous high of 3.5 percent in 2005 (Table 8). As at other sites, Steve's pincushion was the most abundant species. All forbs at the site were native forbs. None were weedy or noxious plant species.

4.3.1.2 Plant Density

Plant density was the highest it has ever been. Forbs were the most abundant. Steve's pincushion was the most abundant forb on the site in 2008. Common pepperweed, hoary macarantha, and desert globemallow were present, but only a few plants of each species were encountered. In 2008, shrubs and grasses comprised approximately 13 percent of the density, and annual forbs made up the rest (Table 9).

The density of shrubs in 2008 was less than in 2007, primarily due to a decrease in the density of bud sagebrush. Plant density for shadscale, the other shrub present on site, increased slightly. Galleta was the only perennial grass present on the staging area this year. Indian ricegrass density has been 0.1 plants/m^2 since 2003 and was not present on the site in 2008.

4.3.1.3 Plant Diversity

Perennial plant diversity in 2008 declined, although the decline from 2007 was minor. Shrubs declined from 1.6 to 1.4 shrubs/m^2, and grass diversity remained the same. There were 1.1 forb species/m^2, which was the highest diversity for forbs recorded since 2005 (Table 10).

4.3.2 Vegetation Monitoring Results, Cover

4.3.2.1 Plant Cover

Plant cover was 25 percent in 2008. Overall plant cover has not changed significantly over the last 3 years. This year's plant cover did not represent the lowest plant cover nor was it the highest. Grass cover on the cover cap increased from 2004 to 2007, but decreased from 2007 to 2008 by nearly 40 percent. All of the grass cover on the cover cap was from galleta. Forb cover was 5 percent this year, the second highest forb cover recorded at this site. All of the forb cover was from Steve's pincushion.

Shrub cover decreased from 2005 through 2007 (Table 11). The increase this year was the result of an increase in fourwing saltbush cover. Bud sagebrush was a common shrub on the adjacent undisturbed plant community and was commonly found on the staging area, but did not significantly contribute to shrub cover on the cover cap.

TABLE 9. PLANT DENSITY (PLANTS PER M^2) ON CAU 404, STAGING AREA

		2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	Bud Sagebrush	1.7	1.2	0.8	0.6	0.6	1.6	1.4	1.0	2.8	--
	Fourwing Saltbush	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	--
	Shadscale	10.0	6.9	5.5	5.4	5.4	5.3	3.9	4.2	0.7	--
	Winterfat	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	--
Total Shrubs		**12.0**	**8.4**	**6.5**	**6.2**	**6.2**	**7.0**	**5.3**	**5.2**	**3.5**	**2.5**
Grasses	Low Woolygrass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	--
	Squirreltail	6.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
	Galleta	0.8	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.2	--
	Indian Ricegrass	2.5	0.5	0.0	0.1	0.0	0.1	0.1	0.0	0.3	--
Total Grasses		**9.5**	**0.9**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.1**	**0.8**	**0.6**
Total Forbs/Annuals		**3.5**	**0.7**	**0.7**	**1.9**	**25.3**	**0.8**	**0.0**	**37.1**	**32.6**	**22.8**
Total Plant Density		**25.0**	**10.0**	**7.4**	**8.3**	**31.7**	**8.0**	**5.5**	**42.4**	**36.9**	**25.9**
Wildlife Use		Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	--	--
Erosion Classification		Stable	Slight	Slight	Stable	Stable	Stable	Stable	Stable	--	--

Note: Scientific names of plants are listed in Appendix F-1.
Note: Erosion Classification Chart included in Appendix F-2.

TABLE 10. DIVERSITY OF PERENNIAL PLANT SPECIES ON CAU 404, STAGING AREA

Lifeform	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	2.0	1.7	1.6	1.5	1.4	1.8	1.6	1.4	1.6	1.1
Grasses	2.2	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.2
Total Number of Perennial Species per m^2	**4.2**	**2.3**	**1.8**	**1.7**	**1.5**	**1.9**	**1.7**	**1.5**	**1.9**	**1.3**
Forbs/Annuals	0.6	0.4	0.2	0.6	1.3	0.4	0.0	1.1	1.2	0.8

TABLE 11. PLANT COVER (%) ON CAU 404, COVER AREA

	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	6.3	10.0	12.5	10.0	18.8	13.4	10.0	11.7	9.7	6.8
Grasses	12.5	16.3	10.0	3.8	10.0	12.2	13.3	8.3	0.0	0.0
Forbs/Annuals	0.0	0.0	0.0	1.3	7.5	0.0	0.0	5.0	8.2	5.7
Total Plant Cover	**18.8**	**26.3**	**22.5**	**15.1**	**36.3**	**25.6**	**23.3**	**25.0**	**17.9**	**12.5**
Bare Ground	73.8	65.0	71.3	77.5	57.5	65.9	67.5	62.5	68.3	--
Litter	7.5	8.8	6.3	7.5	6.3	8.4	9.2	12.5	13.8	--

4.3.2.2 Plant Density

Overall plant density was the highest recorded to date. Like most other CAUs this year, the density of forbs was at an all time high. Steve's pincushion was the most abundant forb. Perennial shrubs and grasses accounted for more than 90 percent of total plant density in the last 2 years; however, perennial plant density was only 16 percent of the total plant density in 2008 (Table 12).

Shrub density decreased from 2007 to 2008, mainly as a result of a 50 percent decrease in the density of bud sagebrush. The density of shadscale was about the same as last year, but fourwing saltbush increased from just 0.3 plants/m^2 in 2007 to 2.0 plants/m^2 in 2008.

Prior to 2008, the density of grasses declined each year since this site was revegetated, reaching a low of 3.0 grasses/m^2 in 2007. Grass density in 2008 was 3.7 grasses/m^2, which represented a 23 percent increase over last year. For the first time since the site was revegetated, there was no Indian ricegrass. Galleta continued to be the most abundant perennial grass on the site since 2000 (Table 12).

TABLE 12. PLANT DENSITY (PLANTS PER M^2) ON CAU 404, COVER AREA

		2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	Bud Sagebrush	2.1	1.7	1.2	1.0	0.9	0.8	0.8	0.4	2.8	--
	Fourwing Saltbush	0.9	0.6	0.3	0.5	0.6	0.3	0.3	2.0	0.0	--
	Shadscale	10.9	7.0	7.0	5.9	6.6	5.1	3.0	2.9	0.7	--
	Winterfat	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	--
Total Shrubs		**14.2**	**9.4**	**8.5**	**7.4**	**8.1**	**6.3**	**4.1**	**5.3**	**3.6**	**2.5**
Grasses	Low Woolygrass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	--
	Squirreltail	10.8	1.6	0.1	0.0	0.1	0.0	0.0	0.0	0.0	--
	Galleta	8.6	4.7	4.9	5.2	5.1	4.4	2.8	3.7	0.2	--
	Indian Ricegrass	3.8	2.8	1.1	0.6	0.2	0.3	0.3	0.0	0.3	--
Total Grasses		**23.2**	**9.1**	**6.1**	**5.8**	**5.4**	**4.7**	**3.0**	**3.7**	**0.8**	**0.6**
Total Forbs/Annuals		**0.5**	**0.3**	**0.2**	**1.9**	**31.5**	**0.5**	**0.1**	**38.5**	**32.6**	**22.8**
Total Plant Density		**37.9**	**18.8**	**14.8**	**15.1**	**45.0**	**11.5**	**7.2**	**47.5**	**37.0**	**25.9**
Wildlife Use		--	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	--	--
Erosion Classification		--	Stable	Stable	Stable	Stable	Stable	Stable	Stable	--	--

Note: Scientific names of plants are listed in Appendix F-1.
Note: Erosion Classification Chart included in Appendix F-2.

4.3.2.3 Plant Diversity

Overall perennial plant diversity has gradually declined over the years to a low of 1.7 plant species/m^2 (Table 13). The first 4 years after the site was revegetated, plant diversity declined by 13 to 17 percent each year. In 2005 and 2006, plant diversity declined by 3 and 6 percent, respectively. The last 2 years, diversity of perennial plant species has decreased by 26 percent each year.

TABLE 13. DIVERSITY OF PERENNIAL PLANT SPECIES ON CAU 404, COVER

Lifeform	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	2.5	2.1	2.2	2.0	2.0	1.8	1.4	1.0	1.5	1.1
Grasses	3.0	2.7	1.8	1.4	1.3	1.3	0.9	0.7	0.3	0.2
Total Number of Perennial Species per m^2	**5.5**	**4.8**	**4.0**	**3.4**	**3.3**	**3.1**	**2.3**	**1.7**	**1.8**	**1.3**
Forbs/Annuals	0.4	0.3	0.2	0.6	1.7	0.2	0.1	0.8	0.2	0.1

The diversity of shrubs has declined from a high in 2000 to 1.0 shrub species/m^2 in 2008 (Table 13). The decrease from 2007 to 2008 was mainly due to lower density of bud sagebrush. Grass diversity has decreased from a high in 2000 to 0.7 grass species/m^2 in 2008. This decline was due the absence of Indian ricegrass.

4.3.3 Revegetation Success

The revegetation success standards established for CAU 404 were exceeded in 2008 on both the staging area and the cover cap (see Tables 8–13). On the staging area, total plant cover was more than double the success standard of 12.5 percent total plant cover (Table 8). The amount of cover contributed by shrubs and forbs exceeded the revegetation success standard. Shrub cover was three times the standard. Because there was no grass cover on the reference area in 2008, the 1 percent grass cover on the staging area obviously exceeded the revegetation success standard. The 9 percent forb cover on the staging area exceeded the 6 percent revegetation success standard for forb cover.

Plant density was 42 plants/m^2 on the staging area in 2008, compared to a revegetation success standard of 26 plants/m^2 (Table 9). The 2008 shrub density was double the revegetation success standard. Grass density was lower. There were 0.1 grasses/m^2 on the staging area, compared to the revegetation success standard of 0.6 grasses/m^2 (Table 9). This was the only revegetation success standard that was not exceeded in 2008. Native forbs have successfully established on the site. Forb density was the highest it has ever been on both the staging area and the reference area. There were 37 forbs/m^2, compared to the revegetation standard of 23 forbs/m^2.

On the cover, revegetation success standards were exceeded by all life forms except forbs based on both plant cover and plant density. Shrub cover on the cover cap was 12 percent, compared to a standard of 7 percent (Table 11). Grass cover was 8 percent, compared to the revegetation success standard of 0 percent. Total plant cover this year was double the standard of 12.5 percent.

On the cover, shrub density was 50 percent higher than the standard for shrub density, and the density of grasses was 6 times the standard (Table 12). The density of forbs this year was close to 70 percent greater than the revegetation success standard of 23 forbs/m^2.

With the exception of the first year after revegetation, when newly establishing plants were small and did not provide much plant cover, total plant cover at this site exceeded the amount of plant cover on the reference area cover every year (Figure 6). Overall, plants were well established on both the staging area and cover. Plant diversity on the staging area and cover declined over the years; nevertheless, total perennial plant diversity on both the staging and the cover exceeded the revegetation success standard for plant diversity (Tables 10 and 13).

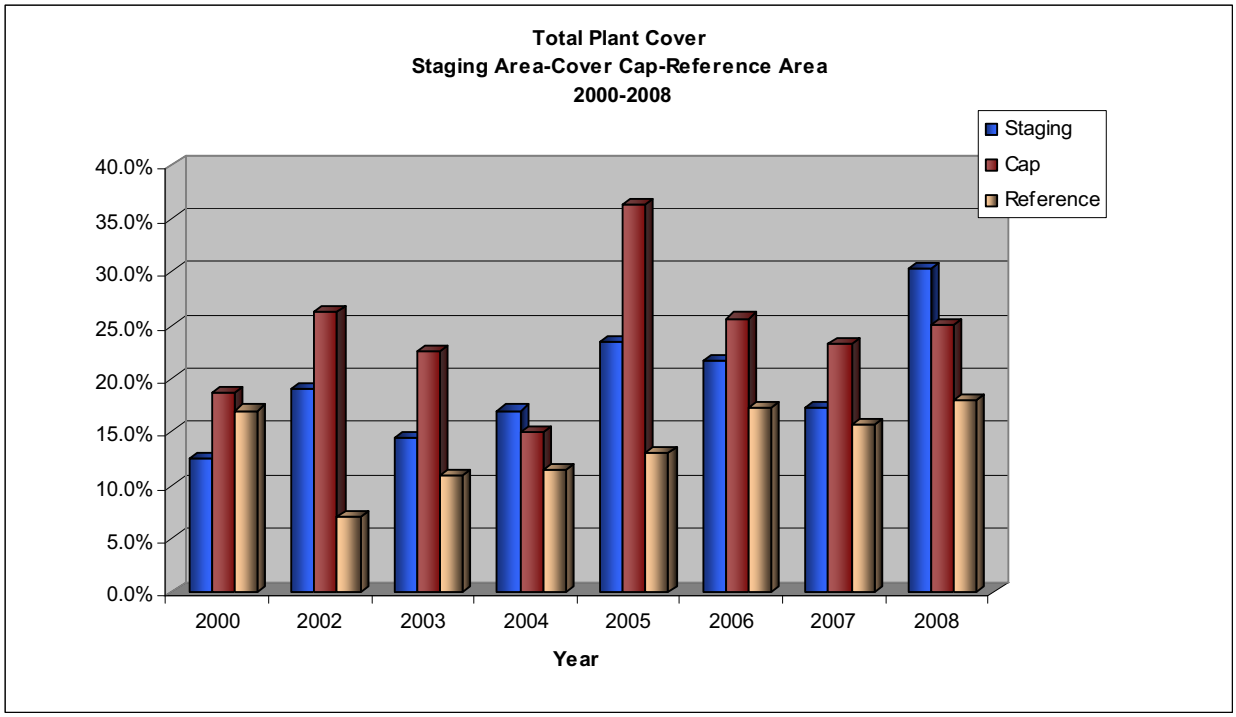


Figure 6. Comparison of plant cover on the staging area, cover cap and reference area on CAU 404 Rollercoaster Sewage Lagoons site from 2000 to 2008

4.3.4 Wildlife Use

There were no signs of heavy use of plants by browsing animals, such as small mammals. The fence surrounding the area has protected it from large grazing animals, such as horses and antelope. The slopes of the cover were the most heavily used portion of the site by wildlife. Small mammals have constructed numerous burrows on the slopes of the cover (Figure 7).

Figure 7. Small mammal burrows along west facing slope of cover

4.3.5 Soil Erosion

There were no serious soil erosion issues at this site. Over the years, there has been some surface erosion near the entrance gate near the southwestern portion of the site. During periods of heavy precipitation, water has moved down the site access road and onto the revegetated area, creating a few small erosion channels.

4.3.6 Summary/Recommendations

Overall plant cover and plant density on revegetated areas at the CAU 404 site exceeded the revegetation success standards. The diversity of plants has declined over the years, but still exceeded the diversity on the adjacent reference area. In 2008, forbs were abundant and, equally important, were all native to the area. No noxious weeds have established on the site. In general, it appeared that a native plant community has established on the staging area and the cover in a timely manner as a result of revegetation efforts completed in the fall of 2000.

The decline of two plant species common to the area was of concern. The density of Indian ricegrass and bud sagebrush, important species in the native plant communities, has declined over the last few years. This may be a result of the less than favorable growing conditions during this same timeframe, but the contribution of these two species to both overall plant cover and density is important. Other than the concern for these two species, overall plant cover, density, and the diversity of plant species were good in comparison to the adjacent undisturbed plant community.

Removal of the perimeter fence should not have a negative impact on the vegetation that has established at this site. The revegetated area was similar to the native vegetation. The presence of grasses on the staging area and cover cap may attract wildlife or grazing animals to the site because there are no grasses in the adjacent plant community. If the perimeter fence is removed, it would be important to continue to monitor the vegetation to determine if grasses or other important species are negatively impacted.

CAU 404, ROLLER COASTER LAGOONS AND TRENCH, STAGING AREA, PHOTOGRAPHIC REFERENCE

JUNE 1998

JUNE 2000

JUNE 2002

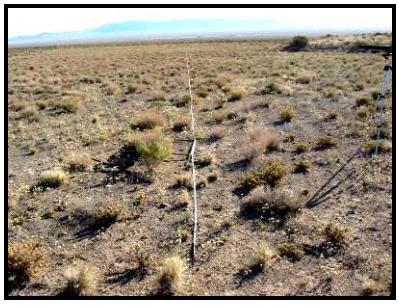
SEPTEMBER 2003

JUNE 2004

JUNE 2005

JUNE 2006

MAY 2007



MAY 2008

CAU 404, ROLLER COASTER LAGOONS AND TRENCH, COVER, PHOTOGRAPHIC REFERENCE

JUNE 1998

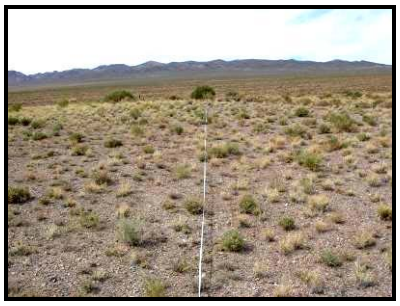
JUNE 2000

JUNE 2002

JUNE 2003

JUNE 2004

JUNE 2005



JUNE 2006

MAY 2007

MAY 2008

4.4 CAU 407, ROLLER COASTER RADSAFE AREA

The Roller Coaster RadSafe site was originally reseeded in 2000. Subsequent work on the cover resulted in the loss of most of the vegetation on the cover cap. Without a protective cover of vegetation, erosion gullies formed on the slopes of the cover. Action was taken in 2004 to fill the areas that had eroded, after which the site was reseeded (in the fall of 2004), and erosion netting was installed to reduce the potential of additional erosion that could compromise the integrity of the site. The site was irrigated during the fall of 2004 and spring of 2005 to improve seed germination and plant establishment (Hall and Anderson 1999). Three transects were sampled on the cover cap in 2008.

4.4.1 Vegetation Monitoring Results

4.4.1.1 Plant Cover

Plant cover data was not recorded in 2008 at CAU 407. Plant cover is typically first recorded the fifth year after revegetation is completed, which will be in 2009.

4.4.1.2 Plant Density

Total plant density has declined dramatically over the last couple of years. This was not unexpected. The seeding rate was relatively high for this site, to increase good seed germination and establishment as quickly as possible. The use of irrigation increased the percentage of the seeds that germinated, so plant densities were expected to be abnormally high the first couple years (Table 14).

The density of shrubs increased slightly from 2007 to 2008 (Table 14). The increase can be attributed to an increase in the density of shadscale. All other shrubs experienced a decrease in density. Of the species of shrubs present on the site, shadscale was most likely the species best adapted to the dry conditions experienced the last few years. Its density and overall vigor have remained high even during less than favorable growing conditions (Figure 8). Bud sagebrush, fourwing saltbush, winterfat, and especially rubber rabbitbrush were not as well adapted to the drier conditions, and the density of these species has declined the last couple of years (Table 14).

Figure 8. Fourwing saltbush, foreground, and shadscale, background, were the most common shrubs at CAU 407

The decrease in the density of grasses was the most pronounced. Squirreltail grass decreased from 22.3 plants/m^2 in 2007 to just 2 plants/m^2 in 2008. Of some concern was the complete absence of Indian ricegrass. In 2007, there were more than 5 plants/m^2, but this year no Indian ricegrass was found.

Steve's pincushion was the most abundant annual forb. Hoary macaranthera was occasionally encountered.

TABLE 14. PLANT DENSITY (PLANTS PER M^2) ON CAU 407

		2005	2006	2007	2008	Reference
Shrubs	Bud Sagebrush	2.9	1.3	1.3	0.5	2.8
	Fourwing Saltbush	2.3	3.2	2.4	1.8	0.0
	Shadscale	17.5	17.9	14.2	18.1	0.7
	Rubber Rabbitbrush	0.0	0.3	0.0	0.0	0.0
	Winterfat	0.7	2.0	1.2	0.7	0.1
Total Shrubs		**23.4**	**24.7**	**19.1**	**21.1**	**3.6**
Grasses	Squirreltail	42.9	53.3	22.3	2.0	0.0
	Galleta	0.0	0.0	0.0	0.0	0.2
	Indian Ricegrass	16.4	1.1	5.4	0.0	0.3
	Low Woolygrass	0.0	0.0	0.0	0.0	0.3
Total Grasses		**59.3**	**54.4**	**27.7**	**2.0**	**0.8**
Total Forbs/Annuals		**1.4**	**7.3**	**0.0**	**13.7**	**32.6**
Total Plant Density		**84.1**	**86.4**	**46.8**	**36.8**	**37.0**

Note: Scientific names of plants are listed in Appendix F-1.

4.4.1.3 Plant Diversity

The diversity of perennial plants species peaked in 2006, at 5 plant species/m^2. Over the last 2 years, perennial plants have decreased to a low of 1.5 plant species/m^2 in 2008 (Table 15).

TABLE 15. DIVERSITY OF PERENNIAL PLANT SPECIES ON CAU 407

Lifeform	2005	2006	2007	2008	Reference	Standard
Shrubs	2.5	3.4	2.2	1.4	1.6	1.1
Grasses	1.1	1.6	1.3	0.1	0.3	0.2
Total Number of Perennial Species per m^2	**3.6**	**5.0**	**3.5**	**1.5**	**1.9**	**1.3**
Forbs/Annuals	0.8	0.4	0.0	1.1	1.2	0.8

4.4.2 Revegetation Success

Collection of plant cover data and comparison of cover and density data with a revegetation success standard will begin in 2009.

4.4.3 Wildlife Use

There were a number of burrows along the side slopes of the cover. The burrows appeared to be shallow, and the soil that had been moved to the surface appeared to be fill material used in the construction of the cover (Figure 9).

Figure 9. Small mammal burrows on west facing slope of cover at CAU 407. Arrows indicate where cover fill material has been moved to surface.

4.4.4 Soil Erosion

After the site was reseeded, an erosion blanket was used instead of using straw mulch and crimping it. After 4 years, there was still evidence of the erosion blanket (Figure 9). The soil on the cover appeared stable and compacted.

4.4.5 Summary/Recommendations

There was no evidence that water moving off the cover was creating erosion gullies. Some burrowing was evident along the edges of the cover; however, the volume and characteristics of the excavated soil suggested the burrows were shallow. The young shrubs and grasses that were found on the cover were protected from large grazing animals by the perimeter fence. It is recommended that this fence remain in place until plants have a chance to become better established.

CAU 407, ROLLER COASTER RADSAFE AREA, PHOTOGRAPHIC REFERENCE

JUNE 2002

SEPTEMBER 2003

JUNE 2004

JUNE 2005

JUNE 2006

MAY 2007

MAY 2008

4.5 CAU 426, CACTUS SPRING WASTE TRENCHES

The CAU 426 staging area and waste trench cover were revegetated in the fall of 1997. The two areas are sampled separately because the nature of the disturbance is different. A single transect is sampled in each revegetated area as well as in a reference area directly north of the site.

4.5.1 Vegetation Monitoring Results, Staging Area

4.5.1.1 Plant Cover

Total plant cover in 2008 was almost three times what it was in 2007 and the second highest amount of plant cover since the site was revegetated (Table 16). The increase in plant cover was due to the increase in the amount of forb cover. Perennial shrub and grass cover, combined, was higher than it was in 2007, but well below the average perennial plant cover from 2004 to 2006, (Table 16). Shrubs accounted for 20 percent of the total plant cover, grasses 17 percent, and forbs the remaining 63 percent.

TABLE 16. PLANT COVER (%) ON CAU 426, STAGING AREA

	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	0.8	5.0	2.5	3.3	5.1	5.0	2.5	5.0	7.5	5.3
Grasses	5.8	12.5	6.7	10.8	17.1	10.8	5.0	4.2	0.0	0.0
Forbs/Annuals	0.0	1.7	5.0	2.5	10.3	1.7	0.0	15.8	4.2	2.9
Total Plant Cover	**6.6**	**19.2**	**14.2**	**16.6**	**32.5**	**17.5**	**7.5**	**25.0**	**11.7**	**8.2**
Bare Ground	50.0	42.5	50.0	59.2	47.0	50.0	67.5	46.7	82.5	--
Litter	43.3	38.3	35.8	24.2	20.5	32.5	25.0	28.3	5.8	--

The 5 percent shrub cover in 2008 represented the highest shrub cover experienced at this site since 2005 (Table 16). Most of the cover was from Nevada jointfir, although Nevada ephedra plants were establishing and contributing more. Forb cover was the highest ever recorded at this site. About two-thirds was from filaree, and the other third from Steve's pincushion.

The 4.2 percent grass cover represented the lowest amount of grass cover at this site. In previous years, squirreltail grass has contributed as much as 50-percent cover. It contributed very little to grass cover in 2008. Indian ricegrass accounted for approximately 17 percent of the grass cover in 2008. Grass cover has ranged from 7 to 17 percent between 2002 and 2006. The greatest grass cover was recorded in 2005, but there has been a progressive decline since then.

4.5.1.2 Plant Density

Total plant density was the highest recorded to date (Table 17). The majority of the density was annual forbs. Perennial plants only accounted for 3 percent of the total plant density. Although perennial species did not contribute significantly to overall plant density, the number of shrubs

TABLE 17. PLANT DENSITY (PLANTS PER M^2) ON CAU 426, STAGING AREA

		2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	Black Sagebrush	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	1.1	--
	Bud Sagebrush	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	--
	Fourwing Saltbush	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	--
	Shadscale	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.2	--
	Douglas' Rabbitbrush	0.1	0.1	0.2	0.1	0.2	0.1	0.0	0.0	0.2	--
	Nevada Jointfir	0.3	0.2	0.3	0.1	0.3	0.4	0.4	0.6	0.1	
	Rubber Rabbitbrush	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	
	Winterfat	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	--
Total Shrubs		**0.7**	**0.5**	**0.6**	**0.4**	**0.7**	**0.7**	**0.6**	**1.0**	**2.0**	**1.4**
Grasses	Squirreltail	5.2	2.9	0.6	1.9	5.1	3.1	2.1	0.5	0.0	--
	Galleta	0.2	0.1	0.0	0.3	0.0	0.2	0.1	0.0	0.9	--
	Indian Ricegrass	1.4	0.6	0.7	0.4	1.3	0.6	0.2	0.1	0.0	--
Total Grasses		**6.8**	**3.6**	**1.3**	**2.6**	**6.4**	**3.9**	**2.4**	**0.6**	**0.9**	**0.6**
Total Forbs/Annuals		**16.9**	**1.8**	**3.9**	**3.2**	**16.6**	**7.3**	**0.1**	**42.4**	**16.2**	**11.4**
Total Plant Density		**24.4**	**5.9**	**5.8**	**6.2**	**23.7**	**11.9**	**3.1**	**44.0**	**19.1**	**13.3**
Wildlife Use		--	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	--	--
Erosion Classification		--	Stable	Stable	Stable	Stable	Stable	Stable	Stable	--	--

Note: Scientific names of plants are listed in Appendix F-1.
Note: Erosion Classification Chart included in Appendix F-2.

increased from 2007 to 2008 and represented the greatest shrub density at the site. Five different species contributed to shrub density in 2008. Black sagebrush was encountered the first time since 2002. Shadscale and winterfat have been found sporadically over the years.

The density of perennial grasses decreased to the lowest ever. Grass density was only one-fourth what it was in 2007. It peaked at 6.4 plants/m^2 in 2005, and has declined every year since (Table 17).

There was a good mix of forbs on the staging area in 2008. Of the eight species of forbs that were present, filaree was the most abundant; however, several other species were common and contributed to the dominance of annuals at the site in 2008.

4.5.1.3 Plant Diversity

Although overall plant diversity did not change much from last year, the composition of plant diversity did. Shrub diversity increased from 0.4 species/m^2 in 2007 to 0.8 species/m^2 in 2008. There were five different species of shrubs found on the staging area in 2008 (Table 18).

TABLE 18. DIVERSITY OF PERENNIAL PLANT SPECIES ON CAU 426, STAGING AREA

Lifeform	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	0.6	0.4	0.5	0.4	0.2	0.5	0.4	0.8	1.1	0.8
Grasses	1.2	0.9	0.6	0.9	0.4	1.3	1.1	0.3	0.3	0.2
Total Number of Perennial Species per m^2	**1.8**	**1.3**	**1.1**	**1.3**	**0.6**	**1.8**	**1.5**	**1.1**	**1.4**	**1.0**
Forbs/Annuals	0.9	0.4	1.1	1.3	1.1	1.3	0.1	4.0	3.1	2.1

Grass diversity decreased from 1.1 species/m^2 in 2007 to 0.3 species/m^2 in 2008. Just as shrub diversity was the highest ever recorded, grass diversity was the lowest.

Annual forb diversity in 2008 was the highest ever recorded at the site. There were almost four times as many species of forbs in 2008 than in 2004 and 2006, when previous high diversities were reported (Table 18).

4.5.2 Vegetation Monitoring Results, Cover

4.5.2.1 Plant Cover

Overall plant cover on the CAU 426 cover area has been consistent over the last 4 years, when it has ranged from 20 to 23 percent and averaged about 21 percent (Table 19). Shrub cover decreased from 20 percent in 2007, which was the highest plant cover recorded to date, to about 17 percent in 2008.

There was no perennial grass cover in 2008. This marks the second time that there has not been any grass cover at the site. The 2 years prior to 2008, grass cover was greater than 3 percent.

TABLE 19. PLANT COVER (%) ON CAU 426, COVER

	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	0.0	6.7	15.0	10.0	10.0	16.7	20.0	16.7	7.5	5.3
Grasses	3.3	8.3	1.7	6.7	0.0	3.3	3.3	0.0	0.0	0.0
Forbs/Annuals	0.0	0.0	0.0	0.0	10.0	0.0	0.0	3.3	4.2	2.9
Total Plant Cover	**3.3**	**15.0**	**16.7**	**16.7**	**20.0**	**20.0**	**23.3**	**20.0**	**11.7**	**8.2**
Bare Ground	85.0	78.3	80.0	80.0	75.0	76.7	66.7	71.7	82.5	--
Litter	11.7	6.7	3.3	3.3	5.0	3.3	10.0	8.3	5.8	--

There was 3 percent annual forb cover in 2008. Forbs have only contributed to total plant cover 2 years since this site was revegetated. Two pincushion plants, Steve's and red root, made up all of the forb cover on the trench cover. Filaree was abundant on both the staging area and the reference area, but none were encountered on the trench cover.

4.5.2.2 Plant Density

As with several of the CAUs this year, plant density was the highest ever recorded; however, this was not because of an increase in the density of perennial shrubs and grasses. More than 90 percent of the density on the CAU 426 site was from forbs. Although shrub density did increase from 2007 to 2008, it was only by 0.4 plants/m^2 (Table 20). The increase in shrub density was primarily due to an increase in the density of Nevada jointfir, which also accounted for much of the plant cover. Nevada jointfir was abundant on the trench cover, and most individual plants were flowering and setting seed in 2008 (Figure 10). Two other important species were Douglas' rabbitbrush and rubber rabbitbrush. Both of these species have occurred on the site every year since it was revegetated. The density of rubber rabbitbrush declined in 2008 for the third year in a row.

Figure 10. Nevada jointfir in full flower on the cover at CAU 426

Grass density decreased to 0.3 plants/m^2. Indian ricegrass experienced a 50 percent decrease, and 2008 marks the third consecutive year that the density of this species has declined. On the positive side, galleta was again found on site. The density of galleta grass has varied over the years, but it has never been abundant and has occasionally been absent.

TABLE 20. PLANT DENSITY (PLANTS PER M^2) ON CAU 426, COVER

		2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	Black Sagebrush	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	--
	Bud Sagebrush	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	--
	Shadscale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	--
	Douglas' Rabbitbrush	1.0	1.3	1.3	1.5	1.3	1.0	0.9	0.1	0.2	--
	Nevada Jointfir	0.1	0.1	0.1	0.1	0.3	0.2	0.3	1.6	0.1	
	Rubber Rabbitbrush	0.1	1.1	0.5	0.9	1.5	0.8	0.2	0.1	0.0	
	Winterfat	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Total Shrubs		**1.3**	**2.5**	**1.9**	**2.5**	**3.1**	**2.0**	**1.4**	**1.8**	**2.0**	**1.4**
Grasses	Squirreltail	1.0	0.2	0.3	0.3	1.0	0.7	0.0	0.0	0.0	--
	Galleta	1.4	0.7	0.4	0.0	0.3	0.4	0.0	0.1	0.9	--
	Indian Ricegrass	1.3	0.7	0.6	0.7	2.0	1.4	0.4	0.2	0.0	--
Total Grasses		**3.7**	**1.6**	**1.3**	**1.0**	**3.3**	**2.5**	**0.4**	**0.3**	**0.9**	**0.6**
Total Forbs/Annuals		**0.1**	**1.1**	**0.3**	**0.0**	**2.9**	**0.6**	**0.0**	**19.0**	**16.2**	**11.3**
Total Plant Density		**5.1**	**5.2**	**3.5**	**3.5**	**9.3**	**5.1**	**1.9**	**21.1**	**19.1**	**13.4**
Wildlife Use		Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	Small mammal, rabbits	--	--
Erosion Classification		--	Stable	Stable	Stable	Stable	Stable	Stable	Stable	--	--

Note: Scientific names of plants are listed in Appendix F-1.
Note: Erosion Classification Chart included in Appendix F-2.

The density of annual forbs was the highest ever recorded at the site. It was more than six times the previous high of 3 plants/m^2 in 2005. Annual forbs accounted for 90 percent of total plant density this year. The two most abundant forbs were Steve's pincushion and birdnest buckwheat. For the second time since this site was revegetated, cheatgrass, a weedy annual grass, was found on the site. It was more abundant than any of the perennial grass species.

4.5.2.3 Plant Diversity

Perennial plant diversity in 2008 represented a gradual decline over the past several years (Table 21). The decrease in diversity was the result of less rabbitbrush and Indian ricegrass. Similar to other CAU sites, forbs experienced the highest diversity recorded on the trenches cover in 2008. Seven different species of forbs were encountered.

TABLE 21. DIVERSITY OF PERENNIAL PLANT SPECIES ON CAU 426, COVER

Lifeform	2000	2002	2003	2004	2005	2006	2007	2008	Reference	Standard
Shrubs	0.9	1.5	1.1	1.4	1.6	1.4	1.2	1.1	1.1	0.8
Grasses	1.1	0.6	0.5	0.3	0.7	0.8	0.4	0.3	0.3	0.2
Total Number of Perennial Species per m^2	**2.0**	**2.1**	**1.6**	**1.7**	**2.3**	**2.2**	**1.6**	**1.4**	**1.4**	**1.0**
Forbs/Annuals	0.1	0.7	0.2	0.0	1.1	0.5	0.0	2.7	3.1	2.1

4.5.3 Revegetation Success

The standard for successful revegetation was exceeded for the staging area and the trench cover based on total plant cover and total plant density. Total plant cover on the staging area was more than three times the revegetation standard. Shrub cover was slightly less than the standard, but perennial grass and forbs more than made up the difference (Table 16). Shrub cover on the staging area was 5 percent, compared to the standard of 5.3 percent. Perennial grass cover on the staging area was 4 percent where, because there was no perennial grass cover on the reference area, the standard was 0 percent. The amount of forb cover on the staging area was more than five times the revegetation success standard.

Total plant density on the staging area was more than three times the revegetation success standard. When considering revegetation standards by lifeform, shrub density was only 80 percent of the shrub density standard (Table 17), grass density was the same as the standard, and forb density was nearly four times the revegetation success standard.

Total plant cover on the trench cover was more than double the standard for revegetation success. By life form, shrub cover was more than three times the standard (Table 19). There was no grass cover on the trench cover or the reference area in 2008, so the standard was zero. Just like on the staging area, forb cover on the trench cover was higher than the revegetation success standard.

Total plant density on the trench cover exceeded the standard for reclamation success (Table 20). Shrub density was 1.8 plants/m^2 on the trench cover, compared to the revegetation success standard of 1.3 plants/m^2. The density of grasses on the cover cap was half the success standard

of 0.6 plants/m^2. The density of annual forbs was at an all-time high this year and was almost double the revegetation success standard (Table 20).

Except for 2007, plant cover on both the staging area and the trench cover has exceeded that on the reference area since 2002 (Figure 11). In 2007, plant cover on the trench cover exceeded the amount of plant cover on the reference area; however, cover on the staging area was less than on the reference area. The failure to meet revegetation success criteria in 2007 was probably the result of a minimal amount of growth by grasses and shrubs, specifically shadscale and fourwing saltbush.

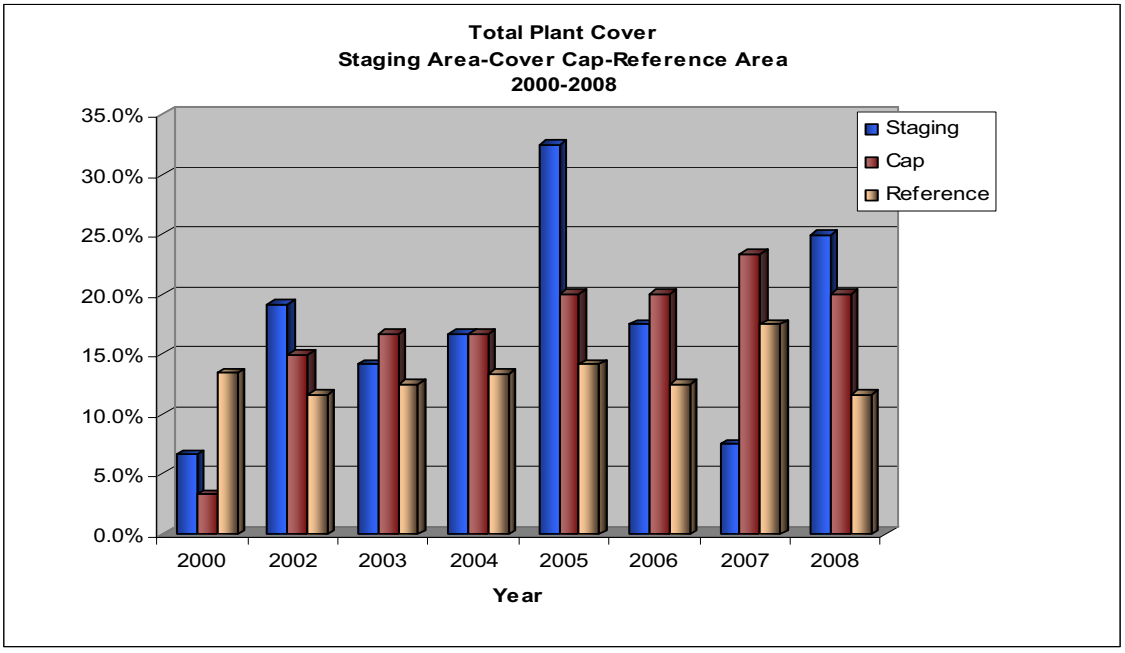


Figure 11. Comparison of plant cover on the staging area, trench cover, and reference area at CAU 426 from 2000 to 2008

4.5.4 Wildlife Use

There were a few small mammal burrows on the CAU 426 site and, in previous years, browsing by rabbits has been noted. The site is near Cactus Springs, where a water trough has been constructed and is frequented by wild horses, big horn sheep, and possibly antelope. The close proximity of the site to an area that is used heavily by wildlife may explain the lack of grasses on the reference site. There did not appear to be any detrimental effects caused by wildlife inside the fenced area.

4.5.5 Soil Erosion

There was no evidence of erosion at the site in 2008. The area upslope from the site has been disturbed over the years, and there was little permanent vegetation in this area. A high intensity precipitation event or a long duration precipitation event could cause some surface soil erosion.

4.5.6 Summary/Recommendations

Based on the amount of plant cover and the density of plants on both the staging area and the trench cover, revegetation success standards were achieved at CAU 426 in 2008. A plant community composed of native shrubs, grasses, and forbs has established on the site. Although plant diversity was low on both the staging area and the trench cover in 2008, perennial plant diversity was higher than the revegetation success standards (Tables 18 and 21). There were no signs of excessive use of the site by local wildlife within the fenced area, and there did not appear to be any severe erosion problems.

As has been mentioned in previous years' reports and in this report, the area adjacent to the site is heavily used by wild horses and other wildlife that frequent Cactus Springs. It is uncertain what the impact will be on the vegetation that has established on this site if animals are allowed access to the site.

CAU 426, CACTUS SPRING WASTE TRENCHES, STAGING AREA, PHOTOGRAPHIC REFERENCE

JUNE 1998

JUNE 2000

JUNE 2002

SEPTEMBER 2003

JUNE 2004

JUNE 2005

JUNE 2006

MAY 2007

MAY 2008

CAU 426, CACTUS SPRING WASTE TRENCHES, COVER, PHOTOGRAPHIC REFERENCE

JUNE 1998

JUNE 2000

JUNE 2002

SEPTEMBER 2003

JUNE 2004

JUNE 2005

JUNE 2006

MAY 2007

MAY 2008

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX F-1

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

	Scientific Name	Common Name
Shrubs	*Artemisia nova*	Black sagebrush
	Atriplex canescens	Fourwing saltbush
	Atriplex confertifolia	Shadscale saltbush
	Chrysothamnus greenei	Greene's rabbitbrush
	Chrysothamnus viscidiflorus	Low rabbitbrush
	Ephedra nevadensis	Nevada jointfir
	Ericameria nauseosa	Rubber rabbitbrush
	Gutierrezia sarothrae	Broom snakeweed
	Hymenoclea salsola	White burrobrush
	Krascheninnikovia lanata	Winterfat
	Menodora spinescens	Spiny menodora
	Opuntia pulchella	Sand cholla
	Picrothamnus desertorum	Bud sagebrush
	Sarcobatus vermiculatus	Black greasewood
Grasses	*Achnatherum hymenoides*	Indian ricegrass
	Bromus tectorum	Cheatgrass
	Dasyochloa pullchella	Low woollygrass
	Elymus elymoides	Bottlebrush squirreltail
	Pleuraphus jamesii	Galleta grass
	Sporobolus airoides	Alkali sacatoon
	Sporobolus cryptandrus	Sand dropseed
Forbs/Annuals	*Ambrosia* species	Ragweed
	Astragalus lentiginosa var. *fremontii*	Fremont's milkvetch
	Astragalus species	Milkvetch
	Camissonia boothii	Booth's suncup
	Camissonia species	Suncup
	Chaneactis xantiana	Xantus pincushion
	Chenactis steviodes	Steve's pincushion
	Chenopodium album	Lambsquarters
	Cryptantha circumscissa	Cushion cryptantha
	Cryptantha micrantha	Red root cyrptantha
	Cryptantha species	Cryptantha
	Cymopterus species	Springparsley
	Descurania pinnata	Pinnate tansymustard
	Descurania sophia	Herb sophia
	Eriastrum eremicum	Desert woolstar
	Eriastrum sparsiflorum	Fewflower woolstar
	Eriogonum deflexum	Flatcrown buckwheat

	Scientific Name	Common Name
Forbs/Annuals (continued)	*Eriogonum nidularium*	Birdnest buckwheat
	Erodium cicutarium	Filaree
	Gilia nyensis	Nye gilia
	Gilia species	Gilia
	Halogeton glomeratus	Halogeton
	Ipomopsis polycladon	Manybranched gilia
	Lepedium densiflorum	Common pepperweed
	Lepedium flavum	Yellow pepperweed
	Lepedium fremontii	Desert pepperweed
	Lepedium lasiocarpum	Shaggyfruit pepperweed
	Lepedium montanum	Mountain pepperweed
	Lepedium species	Pepperweed
	Lupinus species	Lupine
	Macheranthera canescens	Hoary macharanthra
	Molacothrix sonchoides	Sowthistle desert dandelion
	Mentzelia albomarginatus	White blazingstar
	Mirabilus biglovei	Bigelow's four-o'clock
	Oenothera caespitosa	Tufted evening primrose
	Oxytheca perfoliata	Roundleaf oxytheca
	Phacelia crenulata	Cleftleaf wildheliotrope
	Phacelia species	Phacelia
	Salsola tragus	Prickly Russian thistle
	Sphaeralcea ambigua	Desert globemallow
	Stephanomeria exigua	Small wirelettuce
	Tiquilia plicatas	Fanleaf tiquilia

APPENDIX F-2

Erosion Condition Classification							
Surface Litter		**Pedestalling**		**Rills <9″**		**Rills >9″**	
1	Accumulating in Place	1	No Visual Evidence	1	No Visual Evidence	1	No Visual Evidence
2	Slight Movement	2	Slight Pedestalling	2	Rills at Intervals >10′	2	Rills at Intervals >10′
3	Moderate Movement	3	Small Rock and Plant Pedestalling	3	Rills at 10′ Intervals	3	Rills at 10′ Intervals
4	Extreme Movement	4	Pedestalling Plants; Roots Exposed	4	Rills at 5–10′ Intervals	4	Rills at 5–10′ Intervals
5	Very Little Remaining Litter	5	Most Plants and Rocks Pedestalled; Roots Exposed	5	Rills at Intervals <5′	5	Rills at Intervals <5′
Rating: ___		Rating: ___		Rating: ___		Rating: ___	
						Total: ___	

Numerical Rating Total	Erosion Condition Class
0.0 to 4.0	Stable
4.1 to 8.0	Slight
8.1 to 12.0	Moderate
12.1 to 16.0	Critical
16.1 to 20.0	Severe

THIS PAGE INTENTIONALLY LEFT BLANK

LIBRARY DISTRIBUTION LIST

THIS PAGE INTENTIONALLY LEFT BLANK

LIBRARY DISTRIBUTION LIST

U.S. Department of Energy National Nuclear Security Administration Nevada Site Office Technical Library P.O. Box 98518, M/S 505 Las Vegas, NV 89193-8518	1 (Uncontrolled, electronic copy)
U.S. Department of Energy Office of Scientific and Technical Information P.O. Box 62 Oak Ridge, TN 37831-0062	1 (Uncontrolled, electronic copy)
Southern Nevada Public Reading Facility c/o Nuclear Testing Archive P.O. Box 98521, M/S 400 Las Vegas, NV 89193-8521	2 (Uncontrolled, electronic copies)
Manager, Northern Nevada FFACO Public Reading Facility c/o Nevada State Library & Archives Carson City, NV 89701-4285	1 (Uncontrolled, electronic copy)

THIS PAGE INTENTIONALLY LEFT BLANK