Nevada
Environmental
Restoration
Project

DOE/NV--1442

National Nuclear Security Administration

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

For Calendar Year 2010

Controlled Copy No.:_____

Revision: 0

March 2011

Environmental Restoration
Project

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

DISCLAIMER

DOE/NV--1442

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

FOR CALENDAR YEAR 2010

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

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

FOR CALENDAR YEAR 2010

/s/: Tiffany Lantow for Kevin J. Cabble

Approved By: _____ Date: 3/21/2011

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

Approved By: /s/: Robert F. Boehlecke Date: 3/21/2011

Robert F. Boehlecke
Federal Project Director
Environmental Restoration Project

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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
TTR	Tonopah Test Range

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EXECUTIVE SUMMARY

This report provides the results of the annual post-closure inspections conducted at the closed Corrective Action Units (CAUs) located on the Tonopah Test Range (TTR), Nevada. This report covers calendar year 2010 and includes inspection and repair activities completed at the following seven CAUs:

- CAU 400: Bomblet Pit and Five Points Landfill (TTR)
- CAU 407: Roller Coaster RadSafe Area (TTR)
- CAU 424: Area 3 Landfill Complexes (TTR)
- CAU 426: Cactus Spring Waste Trenches (TTR)
- CAU 453: Area 9 UXO Landfill (TTR)
- CAU 484: Surface Debris, Waste Sites, and Burn Area (TTR)
- CAU 487: Thunderwell Site (TTR)

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 are included in Attachment C, field notes are included in Attachment D, and photographs taken during inspections are included in Attachment E.

The annual post-closure inspections were conducted May 11–12, 2010. Maintenance was performed at CAU 453. Animal burrows observed during the annual inspection were backfilled, and debris was removed for disposal as sanitary waste on July 14, 2010.

Vegetation monitoring was performed at the CAU 400 Five Points Landfill and CAU 407 in June 2010, and the vegetation monitoring report is included in Attachment F.

Previously, vegetation monitoring was performed at five sites, including the CAU 400 Bomblet Pit, the CAU 400 Five Points Landfill, CAU 404, CAU 407, and CAU 426. The CAU 400 Bomblet Pit and CAU 426 have been successfully revegetated, and it was recommended in the post-closure report for calendar year 2009 to discontinue vegetation monitoring at these sites. This request was approved by the Nevada Division of Environmental Protection on July 15, 2010. Vegetation surveys were also discontinued in 2010 at CAU 404, which was changed to an administrative use restriction with no inspections required. This change to the use restriction for CAU 404 was approved in an addendum to the Closure Report in February 2009.

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1.0 INTRODUCTION

1.1 SCOPE AND OBJECTIVES

This report includes inspection results, maintenance and repair activities, and recommendations for calendar year 2010 for seven 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
- **CAU 407: Roller Coaster RadSafe Area (TTR)**
  - CAS TA-23-001-TARC: Roller Coaster RadSafe Area
- **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 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

Inspection requirements for each CAU are included in Attachment B. Inspections consist of the following activities to evaluate and document the condition of the units:

- Photographs to document current 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

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2.0 POST-CLOSURE INSPECTIONS

Inspections were conducted on May 11 and 12, 2010. The post-closure inspection plans as previously published in the applicable Closure Report (CR) for each CAU are included in Attachment B. The inspection checklists are included in Attachment C, field notes are included in Attachment D, and photographs taken during inspections are included in Attachment E.

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

2.1.1 Introduction

There are no post-closure requirements for CAU 400, Bomblet Pit and Five Points Landfill (TTR). However, the Bomblet Pit (CAS TA-55-001-TAB2, Ordnance Disposal Pit) and Five Points Landfill (CAS TA-19-001-05PT, Ordnance Disposal Pit) were vegetated in 1997 under the *Tonopah Test Range Closure Sites Revegetation Plan* (U.S. Department of Energy, Nevada Operations Office [DOE/NV], 1997), and fencing was installed to allow plants to become established. Fencing was required for a minimum of 5 years, and visual inspections of the fencing were conducted as a best management practice.

Vegetation monitoring was conducted at the Five Points Landfill in June 2010, and the results are included in Attachment F. Visual inspections of this site were conducted as a best management practice to ensure that the fence is in good repair.

Discontinuation of vegetation surveys and removal of fencing at the Bomblet Pit, which has been successfully revegetated, was recommended in the post-closure report for calendar year 2009, and this request was approved by the Nevada Division of Environmental Protection (NDEP) on July 15, 2010. With the approval to discontinue vegetation monitoring and remove fencing at the Bomblet Pit, visual inspections are no longer required.

2.1.2 CAU 400 Inspection Results

The Five Points Landfill is shown in Figure 2 of Attachment A. The annual inspection was conducted on May 12, 2010. Fencing was in good condition, and the vegetation appeared healthy. No issues or concerns were noted.

2.1.3 CAU 400 Maintenance and Repairs

Maintenance and repairs were not required.

2.1.4 CAU 400 Conclusions and Recommendations

The site was in good condition. Inspections at the Five Points Landfill should continue as scheduled. Vegetation at the Five Points Landfill is stable and meets revegetation standards in the area that was not flooded; however, the potential for flooding persists and may result in additional plant death; therefore, vegetation monitoring of this site should continue.

2.2 CAU 407: ROLLER COASTER RADSAFE AREA (TTR)

2.2.1 Introduction

CAU 407, Roller Coaster RadSafe Area (TTR), consists of one CAS (CAS TA-23-001-TARC, Roller Coaster RadSafe Area). Requirements are described in the CR (DOE/NV, 2001a). Inspections are conducted according to the post-closure plan (Attachment B). The site is shown in Figure 3 of Attachment A. In addition to inspections, vegetation monitoring was conducted in June 2010, and the results are included in Attachment F.

2.2.2 CAU 407 Inspection Results

The annual inspection was conducted on May 11, 2010. The signs, fencing, and cover were in good condition, and the vegetation appeared healthy. No issues or concerns were noted.

2.2.3 CAU 407 Maintenance and Repairs

Maintenance and repairs were not required.

2.2.4 CAU 407 Conclusions and Recommendations

The site was in good condition. Vegetation is healthy and exceeds revegetation standards; however, future monitoring should focus on the re-establishment of perennial grasses and the potential dominance of invasive weeds, and remedial action may be recommended in the future. Inspections should continue as scheduled, and vegetation monitoring should continue.

2.3 CAU 424: AREA 3 LANDFILL COMPLEXES (TTR)

2.3.1 Introduction

CAU 424, Area 3 Landfill Complexes (TTR), consists of eight CASs. Seven CASs (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) require post-closure inspections. Requirements are described in the CR (DOE/NV, 1999a). Inspections are conducted according to the post-closure plan (Attachment B). The landfill locations are shown in Figure 4 of Attachment A.

2.3.2 CAU 424 Inspection Results

The annual inspection was conducted on May 11, 2010.

Landfill Cell A3-1 (CAS 03-08-001-A301): The signs, survey markers, monuments, and cover were in good condition. No issues or concerns were noted.

Landfill Cell A3-2 (CAS 03-08-002-A302): The signs, brass survey markers, concrete monuments, and landfill cover were in good condition. No issues or concerns were noted.

Landfill Cell A3-3 (CAS 03-08-002-A303): The monuments, brass survey markers, signs, and cover were in good condition. No issues or concerns were noted.

Landfill Cell A3-4 (CAS 03-08-002-A304): The monuments, brass survey marker, and signs were in good condition. No issues or concerns were noted.

Landfill Cell A3-5 (CAS 03-08-002-A305): The monuments and attached signs, brass survey markers, and cover were in good condition. No issues or concerns were noted.

Landfill Cell A3-6 (CAS 03-08-002-A306): The monuments and attached signs, brass survey markers, and cover were in good condition. No issues or concerns were noted.

Landfill Cell A3-8 (CAS 03-08-002-A308): The brass markers and cover were in good condition. No issues or concerns were noted.

2.3.3 CAU 424 Maintenance and Repairs

Maintenance and repairs were not required.

2.3.4 CAU 424 Conclusions and Recommendations

The sites were in good condition. Inspections should continue as scheduled.

2.4 CAU 426: CACTUS SPRING WASTE TRENCHES (TTR)

2.4.1 Introduction

CAU 426, Cactus Spring Waste Trenches (TTR), consists of one CAS (CAS RG-08-001-RGCS, Waste Trenches). Requirements are described in the CR (DOE/NV, 1998). Inspections are conducted according to the post-closure plan (Attachment B). The site is shown in Figure 5 of Attachment A. Discontinuation of vegetation surveys at CAU 426, which has been successfully revegetated, was recommended in the post-closure report for calendar year 2009, and this request was approved by NDEP on July 15, 2010.

2.4.2 CAU 426 Inspection Results

The annual inspection was conducted on May 11, 2010. The signs, fencing, and cover were in good condition, and the vegetation appeared healthy. No issues or concerns were noted.

2.4.3 CAU 426 Maintenance and Repairs

Maintenance and repairs were not required.

2.4.4 CAU 426 Conclusions and Recommendations

The site was in good condition. The post-closure plan states the following:

> 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.

Vegetation monitoring has been performed since 1998, and maintenance has not been required since 2006, when the fencing adjacent to the gate was tightened. Remedial revegetation has not been required at this site. Discontinuation of vegetation monitoring was recommended in the post-closure report for calendar year 2009, and NDEP approved this request. Therefore, removal of the fencing and discontinuation of annual visual inspections is recommended at this site.

2.5 CAU 453: AREA 9 UXO LANDFILL (TTR)

2.5.1 Introduction

CAU 453, Area 9 UXO Landfill (TTR), consists of one CAS (CAS 09-55-001-0952, Area 9 Landfill). Requirements are described in the CR (DOE/NV, 1999b). Inspections are conducted according to the post-closure plan (Attachment B). The site is shown in Figure 6 of Attachment A.

2.5.2 CAU 453 Inspection Results

The annual inspection was conducted on May 12, 2010. The fence, signs, and monuments were in good condition. There was evidence of animal burrowing, and debris was present on the cover.

2.5.3 CAU 453 Maintenance and Repairs

Animal burrows observed during the annual inspection were backfilled, and debris was removed for disposal as sanitary waste on July 14, 2010.

2.5.4 CAU 453 Conclusions and Recommendations

Inspections should continue as scheduled.

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

2.6.1 Introduction

CAU 484, Surface Debris, Waste Sites, and Burn Area (TTR), consists of six CASs. One CAS (CAS RG-52-007-TAML, Davis Gun Penetrator Test) requires post-closure inspections. Requirements are described in the CR (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2007). Inspections are conducted according to the post-closure plan (Attachment B). The site is shown in Figure 7 of Attachment A.

2.6.2 CAU 484 Inspection Results

The annual inspection was conducted on May 11, 2010. The signs and covers were in good condition. No issues or concerns were noted.

2.6.3 CAU 484 Maintenance and Repairs

Maintenance and repairs were not required.

2.6.4 CAU 484 Conclusions and Recommendations

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

2.7 CAU 487: THUNDERWELL SITE (TTR)

2.7.1 Introduction

CAU 487, Thunderwell Site (TTR), consists of one CAS (CAS RG-26-001-RGRV, Thunderwell Site). Requirements are described in the Corrective Action Decision Document (CADD)/CR

(DOE/NV, 2001b) and Record of Technical Change (NNSA/NSO, 2004). Inspections are conducted according to the post-closure plan (Attachment B). The site is shown in Figure 8 of Attachment A.

2.7.2 CAU 487 Inspection Results

The annual inspection was conducted on May 12, 2010. The signs and monuments were in good condition. No issues or concerns were noted.

2.7.3 CAU 487 Maintenance and Repairs

Maintenance and repairs were not required.

2.7.4 CAU 487 Conclusions and Recommendations

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

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3.0 SUMMARY

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

The Five Points Landfill was in good condition. No maintenance or repairs were required. Inspections should continue as scheduled. An ecological specialist should continue to evaluate the vegetation at the Five Points Landfill, especially in the area that experienced flooding.

3.2 CAU 407: ROLLER COASTER RADSAFE AREA (TTR)

The site was in good condition. No maintenance or repairs were required. Inspections should continue as scheduled, and an ecological specialist should continue to evaluate the vegetation.

3.3 CAU 424: AREA 3 LANDFILL COMPLEXES (TTR)

The sites were in good condition. No maintenance or repairs were required. Inspections should continue as scheduled.

3.4 CAU 426: CACTUS SPRING WASTE TRENCHES (TTR)

The site was in good condition. No maintenance or repairs were required. Removal of fencing and discontinuation of annual visual inspections is recommended.

3.5 CAU 453: AREA 9 UXO LANDFILL (TTR)

Animal burrows observed during the annual inspection were backfilled, and debris was removed for disposal as sanitary waste on July 14, 2010. Inspections should continue as scheduled.

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

The site was in good condition. No maintenance or repairs were required. Inspections should continue as scheduled.

3.7 CAU 487: THUNDERWELL SITE (TTR)

The site was in good condition. No maintenance or repairs were required. Inspections should continue as scheduled.

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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. 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, 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. 1998. *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 424: Area 3 Landfill Complexes, Tonopah Test Range, Nevada*, DOE/NV/11718--283. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999b. *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.

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ATTACHMENT A
FIGURES

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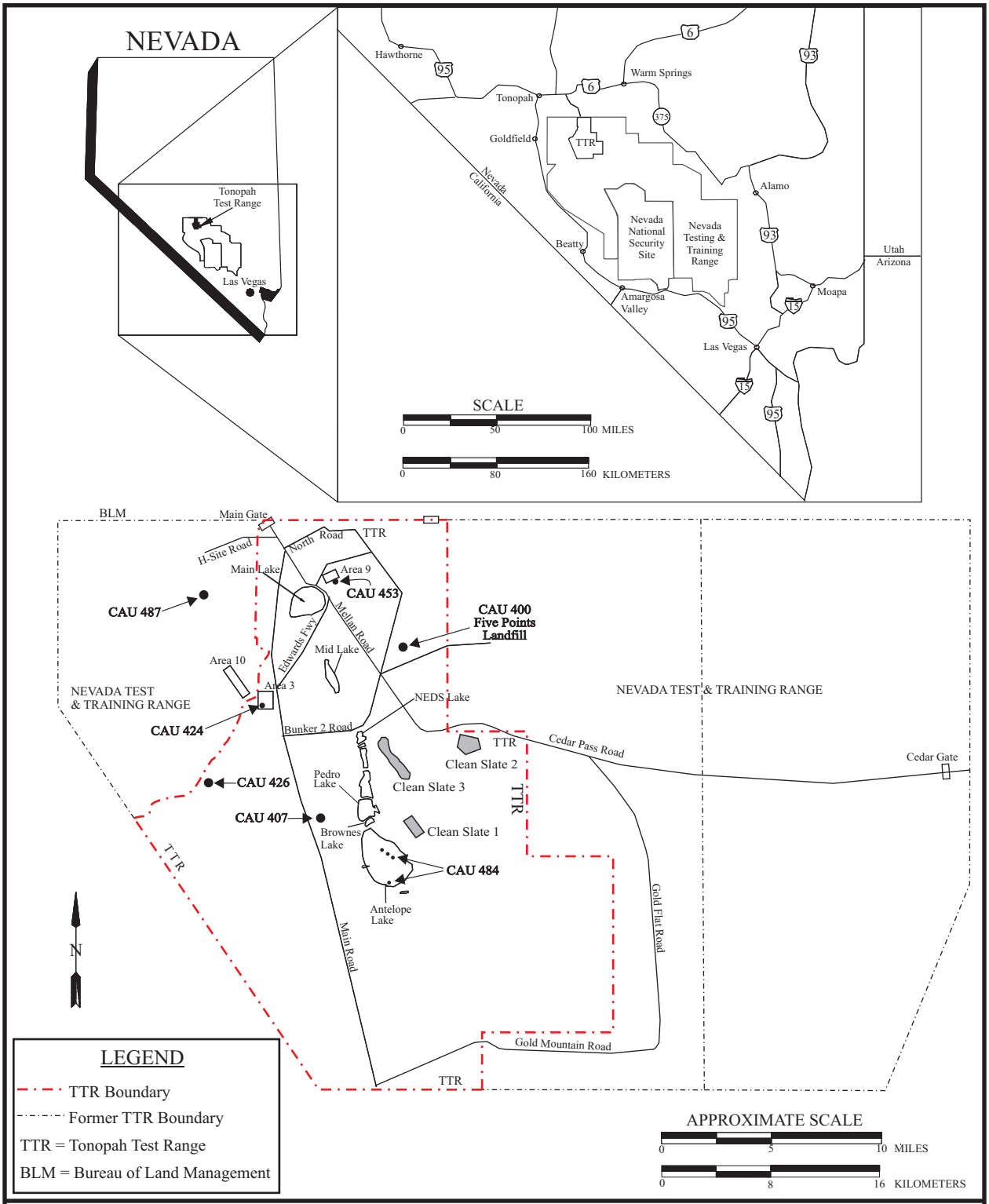

FIGURE 1
TONOPAH TEST RANGE
POST-CLOSURE MONITORING SITES LOCATION MAP

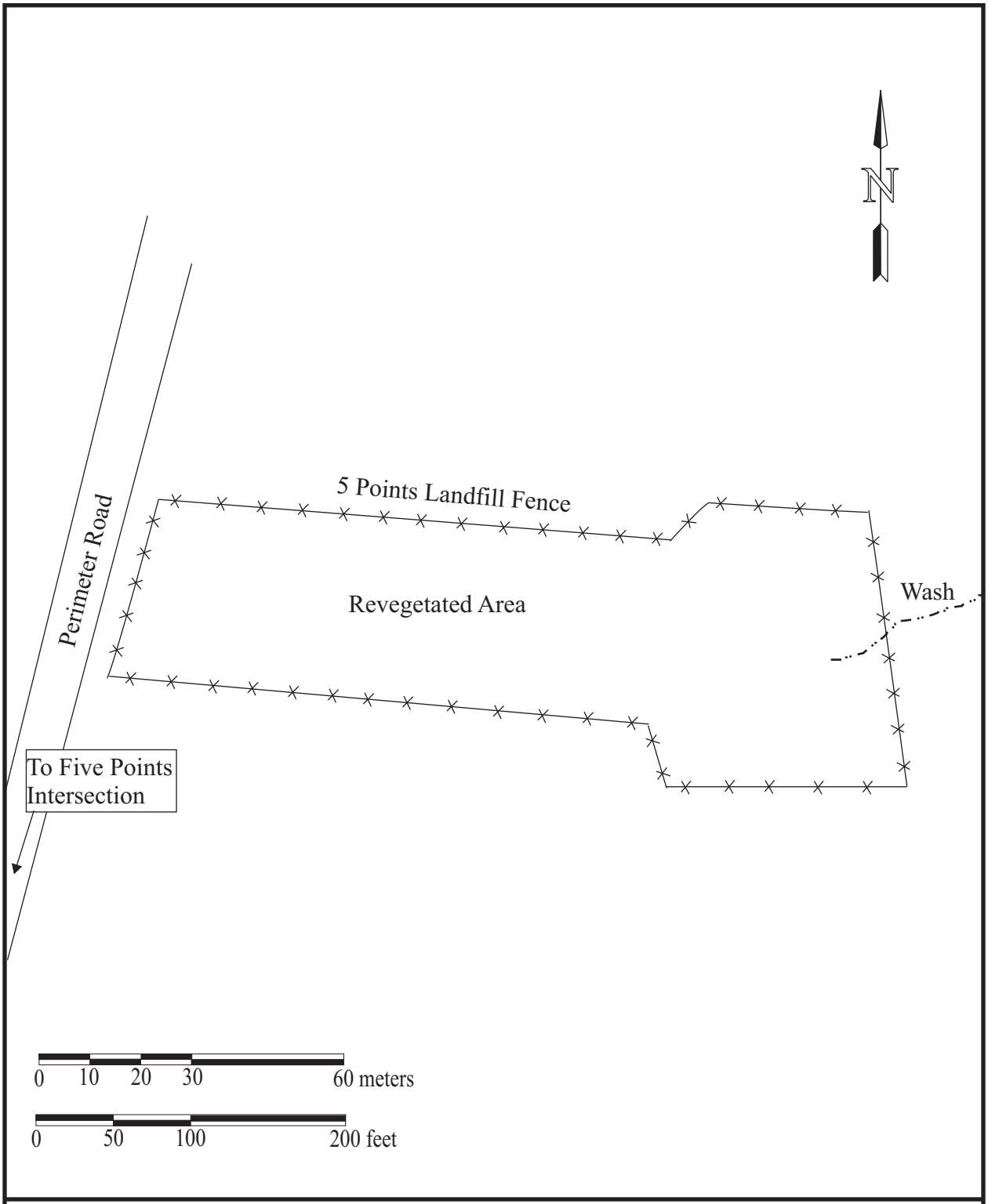

FIGURE 2
CAU 400 FIVE POINTS LANDFILL LOCATION MAP

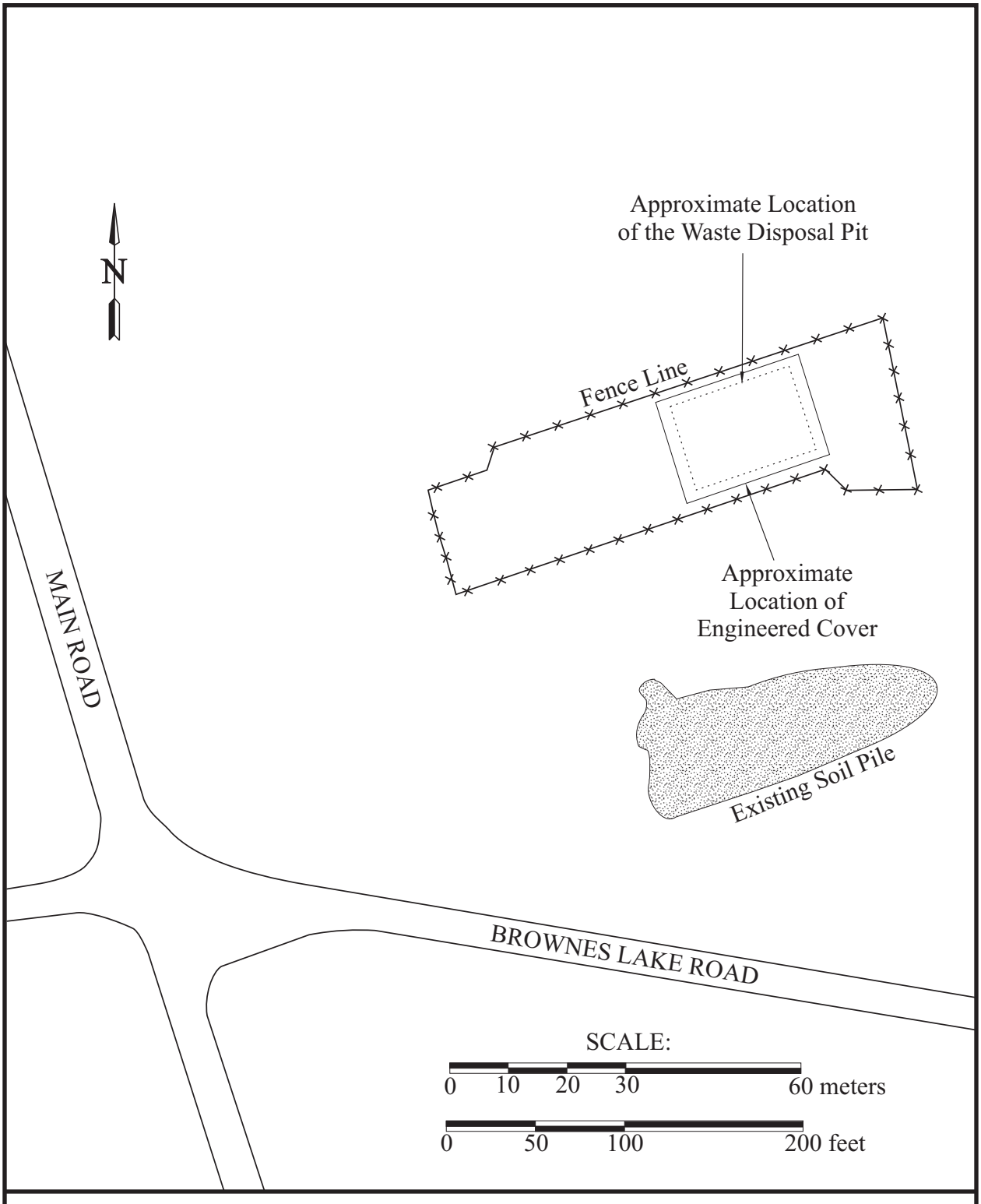

FIGURE 3
CAU 407 ROLLER COASTER RADSAFE AREA LOCATION MAP

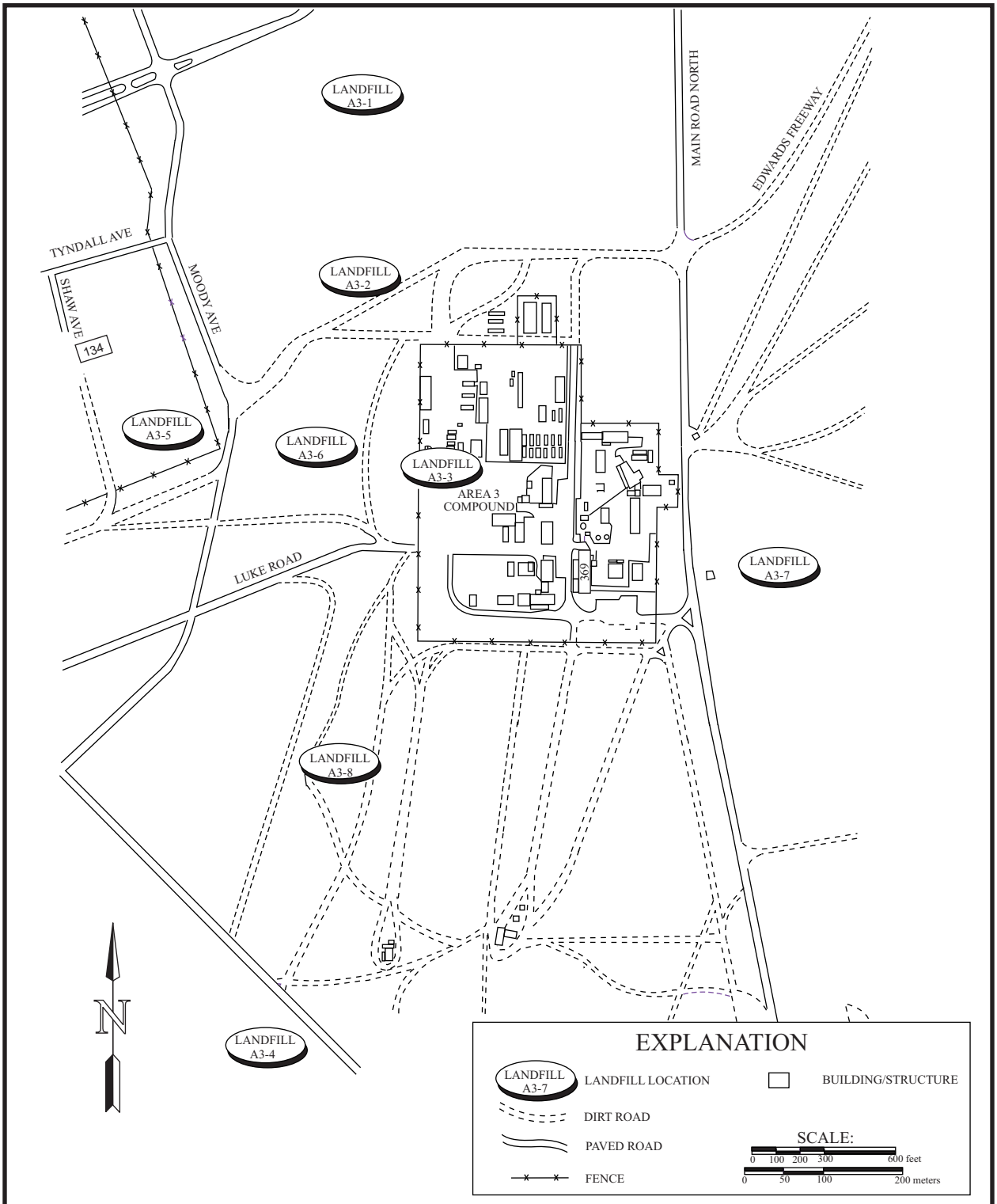

FIGURE 4
CAU 424 AREA 3 LANDFILL COMPLEXES LOCATION MAP

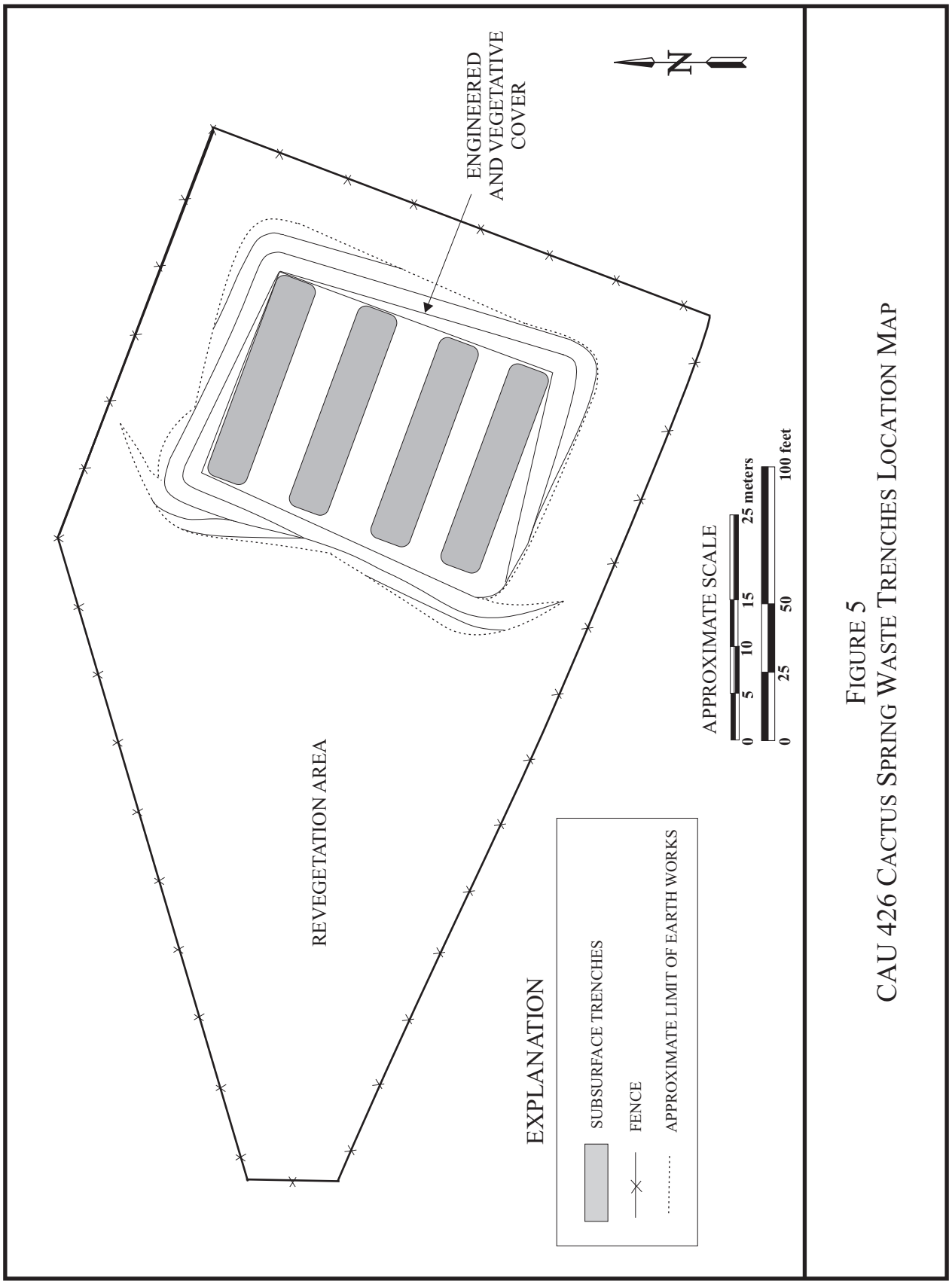

FIGURE 5
CAU 426 CACTUS SPRING WASTE TRENCHES LOCATION MAP

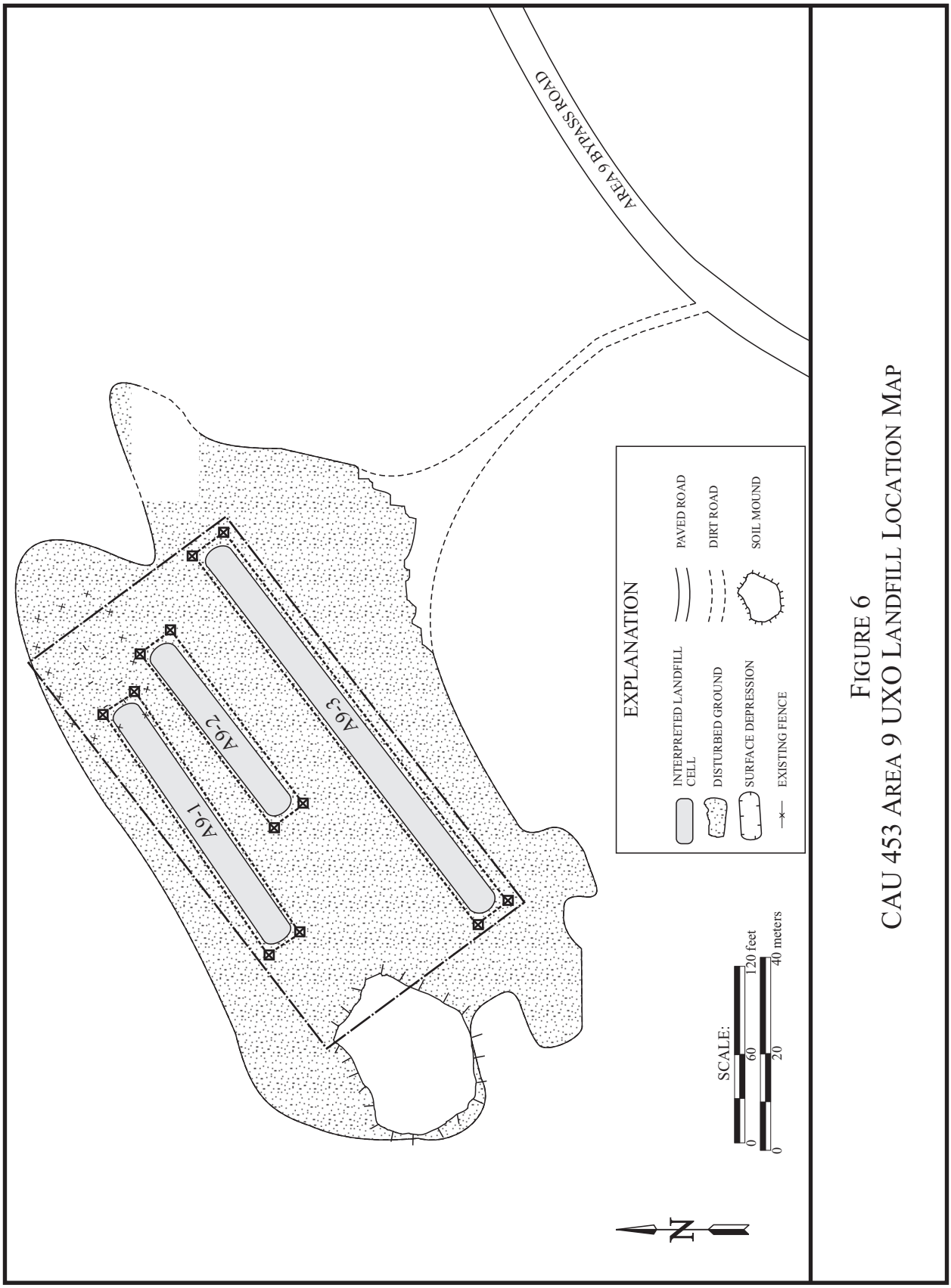

FIGURE 6
CAU 453 AREA 9 UXO LANDFILL LOCATION MAP

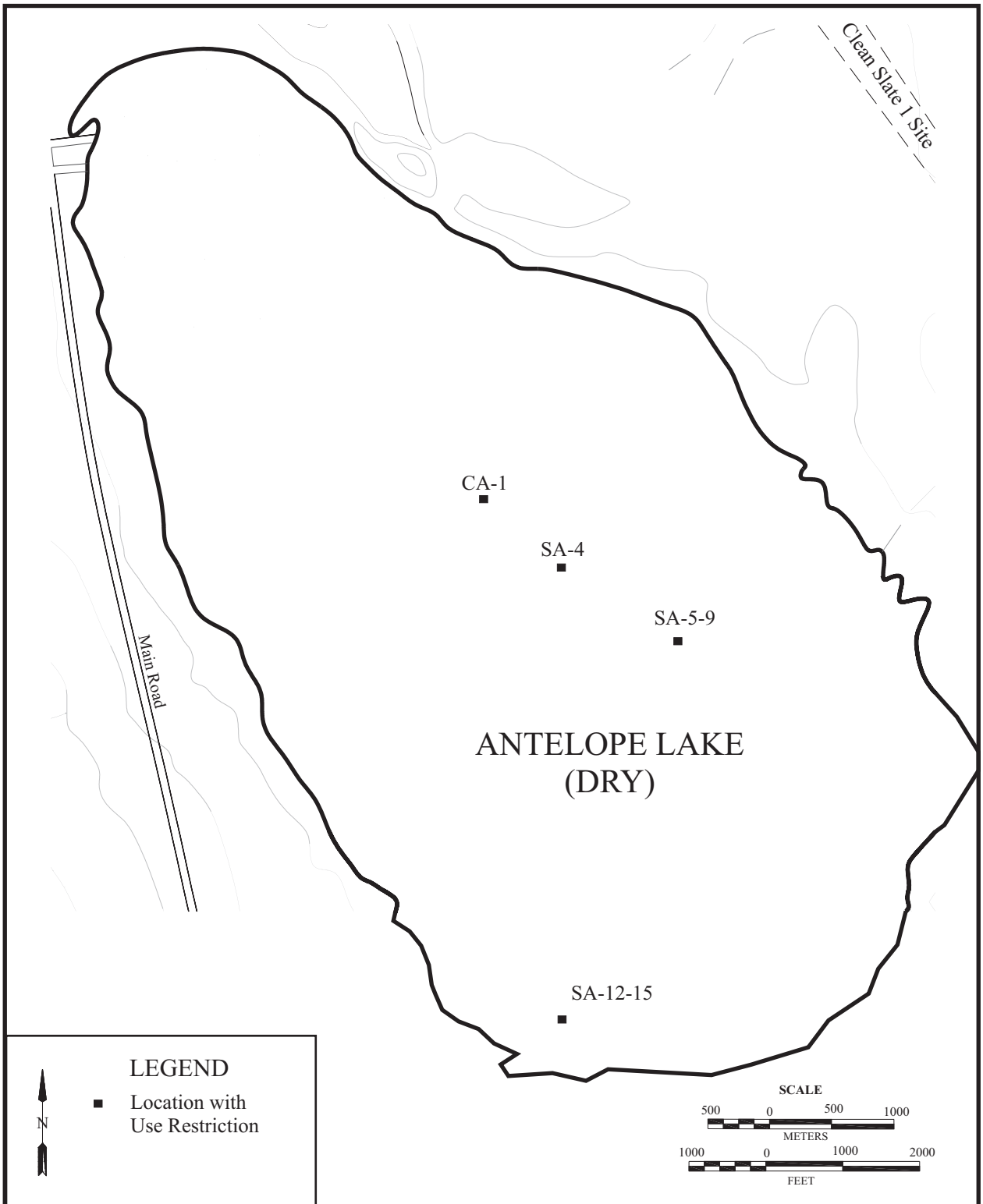

FIGURE 7
CAU 484 SURFACE DEBRIS, WASTE SITES, AND BURN AREA (TTR)
LOCATION MAP

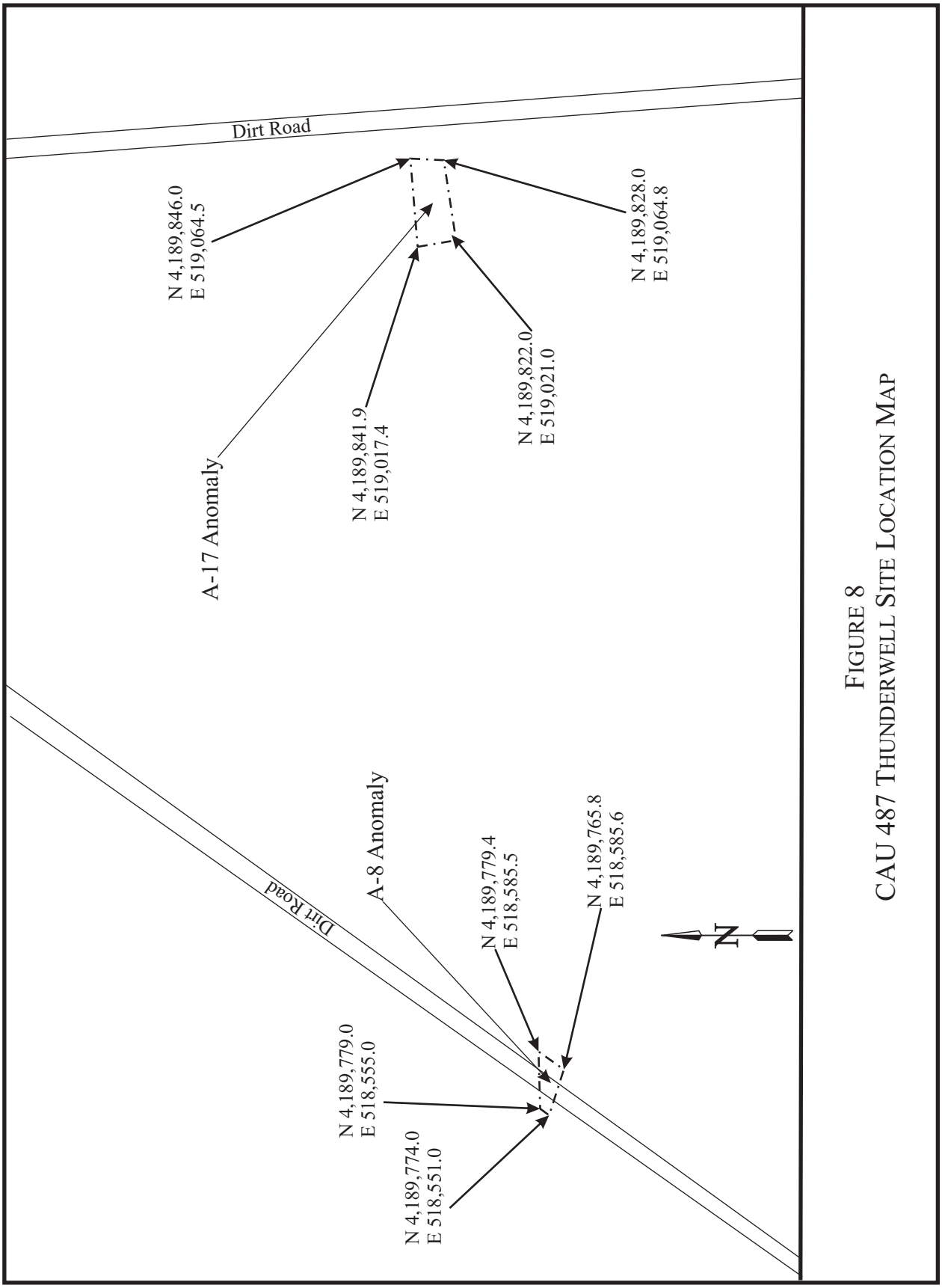

FIGURE 8
CAU 487 THUNDERWELL SITE LOCATION MAP

ATTACHMENT B
POST-CLOSURE INSPECTION PLANS

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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*.

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.

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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*.

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*.

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 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*.

Post-closure inspection of the Area 9 UXO Landfill 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 (twice per year) visual inspections of:

- The cell soil cover for indications of subsidence, erosion, unauthorized excavation, 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 closure activities have completed, 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*.

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.

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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*.

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.*

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ATTACHMENT C
POST-CLOSURE INSPECTION CHECKLISTS

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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: 5/12/10 09:55 am	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/5/09	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: Curtis Obi	Title: Senior Scientist

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information regarding what was found and/or appropriate references to other documents that have the information (e.g., Maintenance Order Form for CAS 05-16-01 dated 2/15/2008).
- All documentation must be legible and clear.

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 for access to the site. Assemble the following, as needed, to conduct inspections:

a. TTR radio, pager, etc.
b. Camera (requires TTR Photo/sensitive equipment pass), digital storage drive, and extra batteries
c. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
d. Tape measure
e. Other miscellaneous support equipment

D. SITE INSPECTION

- ***The annual inspection is to document vegetation growth and inspect the integrity of the fence. The inspection can be conducted from outside the perimeter fence.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. Information can take the form of written narrative, sketches, measurements, and annotated site maps, all of which should be placed on additional attachments (if needed) and cross-reference appropriately. Attach the additional pages and number all pages upon completion of the inspection. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

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?		✓	

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)
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?	✓		
e. Is there evidence of plant mortality?		✓	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Take two photos from the approximate location where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the post-closure annual report.
- Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Other photographs are optional.
- A photograph log entry will be made for each photograph taken.

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?	9		
If yes, has a photographic log been prepared?	✓		An electronic photo log will be available on the ER shared drive (CAU 400)

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. Are maintenance/repair actions necessary?		✓	If "yes", describe in field conclusions/recommendations
4. Is there an imminent hazard to the integrity of the landfill cover?		✓	If "yes", describe below and the Task Manager must complete the "Follow-up Actions" (not part of checklist)

5. Field conclusions/recommendations: The fencing at the site remains in great condition. The new vegetation (5/12/10 KK) on the cover is continuing to grow in the areas previously impacted by flood (5/12/10 KK) conditions approx. three years ago. The vegetation will continue to be monitored by NSTec plant and ecological services. There are no issues or concerns warranting a follow-up corrective action.

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

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

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/: Glenn Richardson	Date: 5/12/10
Printed Name: Glenn Richardson	Title: Task Manager

Required Attachments:

- Field Notes (if any)
- Photos (or note File Location: S:\NTS\ER Share\Photos\TTR PCM Inspections\2010\05-12-2010)

Distribution: Original – Industrial Sites Project Manager
Copy – Task Manager

G. VERIFICATION

I have reviewed this checklist and attachments and have verified that it is complete.

Signature: /s/: Reed Poderis	Date: 5/27/10
Printed Name: Thomas A. Thiele (or designee)	

Distribution: Original – Task Manager

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: 5/11/10 15:45 pm	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/5/09	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: Curtis Obi	Title: Senior Scientist

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information regarding what was found and/or appropriate references to other documents that have the information (e.g., Maintenance Order Form for CAS 05-16-01 dated 2/15/2008).
- All documentation must be legible and clear.

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 for access to the site. Assemble the following, as needed, to conduct inspections:

a. TTR radio, pager, etc.
b. Camera (requires TTR Photo/sensitive equipment pass), digital storage drive, and extra batteries
c. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
d. Tape measure
e. Other miscellaneous support equipment

D. SITE INSPECTION

- ***The site inspection is a walking inspection of the perimeter fencing, viewing the entire site. Inspections consist of visually inspecting the cover for signs of erosion, animal burrows, cracks, water ponding, vegetation, and inspecting the fencing and postings.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. Information can take the form of written narrative, sketches, measurements, and annotated site maps, all of which should be placed on additional attachments (if needed) and cross-reference appropriately. Attach the additional pages and number all pages upon completion of the inspection. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is the perimeter (barbed wire) fence damaged?		✓	

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)
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?	✓		
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 around 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 small animal burrows were noticed on the south slope of the cover. The burrows will be inspected by NSTec ecological services, but no corrective actions are necessary.
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?		✓	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Take two photos from the approximate location where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the post-closure annual report.
- Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Other photographs are optional.
- A photograph log entry will be made for each photograph taken.

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?	✓		An electronic photo log will be available on the ER shared drive (CAU 407)

POST-CLOSURE INSPECTION CHECKLIST

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

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. Are maintenance/repair actions necessary?		✓	If "yes", describe in field conclusions/recommendations
4. Is there an imminent hazard to the integrity of the landfill cover?		✓	If "yes", describe below and the Task Manager must complete the "Follow-up Actions" (not part of checklist)

5. Field conclusions/recommendations: The fencing and radiological signage are in excellent condition. There appears to be no evidence of erosion or settling on the vegetative cover. However, a few small animal burrows were noticed on the south slope of the cover. The vegetation appears to be in good condition, but will continue to be monitored by NSTec plant and ecological services. Also, the animal burrows will be inspected, but no corrective actions are warranted at this time.

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/: Glenn Richardson	Date:	5/11/10
Printed Name:	Glenn Richardson	Title:	Task Manager

Required Attachments:

- Field Notes (if any)
- Photos (or note File Location: S:\NTS\ER Share\Photos\TTR PCM Inspections\2010\5-11-2010)

Distribution: Original – Industrial Sites Project Manager
Copy – Task Manager

G. VERIFICATION

I have reviewed this checklist and attachments and have verified that it is complete.

Signature:	/s/: Reed Poderis	Date:	5/27/10
Printed Name:	Thomas A. Thiele (or designee)		

Distribution: Original – Task Manager

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**

Inspection Date and Time: 5/11/10 16:30 pm	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/6/09	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada Test Site, Mercury, Nevada	
Chief Inspector: Glen Richardson	Title: Task Manager
Assistant Inspector: Curtis Obi	Title: Senior Scientist

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information regarding what was found and/or appropriate references to other documents that have the information (e.g., Maintenance Order Form for CAS 05-16-01 dated 2/15/2008).
- All documentation must be legible and clear.

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, at which sites?	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 for access to the site. Assemble the following, as needed, to conduct inspections:

a. TTR radio, pager, etc.
b. Camera (requires TTR Photo/sensitive equipment pass), digital storage drive, and extra batteries
c. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
d. Tape measure
e. Other miscellaneous support equipment

D. SITE INSPECTION

- ***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.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. Information can take the form of written narrative, sketches, measurements, and annotated site maps, all of which should be placed on additional attachments (if needed) and cross-reference appropriately. Attach the additional pages and number all pages upon completion of the inspection. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

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**

D. SITE INSPECTION (continued)

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?		✓	
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?		✓	

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):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any of the three (3) 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		
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?	✓		

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)
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. 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?	✓		

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 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		

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?	✓		
b. Are all brass survey markers in good condition?	✓		
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?		✓	

Photograph Instructions:

- ***A standard set of photographs is required. Take a minimum of one photograph at each site from the approximate locations where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the post-closure annual report.
- Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Other photographs are optional.
- A photograph log entry will be made for each photograph taken.

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

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?	13		
If yes, has a photographic log been prepared?	✓		Log number: An electronic photo log will be 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. Are maintenance/repair actions necessary?		✓	If "yes", describe in field conclusions/recommendations
4. Is there an imminent hazard to the integrity of the landfill cover?		✓	If "yes", describe below and the Task Manager must complete the "Follow-up Actions" (not part of checklist)

5. Field conclusions/recommendations: The overall site conditions at each Landfill A3 Cell are good. All aboveground & surface monuments are intact and stable. The signage is visible and has no evidence of fading or damage. There is no evidence of settling or cracking at any Landfill A3 Cell. None of these Landfill A3 sites had issues or concerns.

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/: Glenn Richardson	Date: 5/11/10
Printed Name: Glenn Richardson	Title: Task Manager

Required Attachments:
- Field Notes (if any)
- Photos (or note File Location: S:\NTS\ER Share\Photos\TTR PCM Inspections\2010\5-11-2010)

Distribution: Original – Industrial Sites Project Manager
Copy – Task Manager

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**

G. VERIFICATION

I have reviewed this checklist and attachments and have verified that it is complete.

Signature: /s/: Reed Poderis

Date: 5/27/10

Printed Name: Thomas A. Thield (or designee)

Distribution: Original – Task Manager

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

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

Inspection Date and Time: 5/11/10 16:00 pm	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/5/09	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: Curtis Obi	Title: Senior Scientist

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information regarding what was found and/or appropriate references to other documents that have the information (e.g., Maintenance Order Form for CAS 05-16-01 dated 2/15/2008).
- All documentation must be legible and clear.

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, 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 for access to the site. Assemble the following, as needed, to conduct inspections:

a. TTR radio, pager, etc.
b. Camera (requires TTR Photo/sensitive equipment pass), digital storage drive, and extra batteries
c. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
d. Tape measure
e. Key to gate
f. Other miscellaneous support equipment

D. SITE INSPECTION

- ***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.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. Information can take the form of written narrative, sketches, measurements, and annotated site maps, all of which should be placed on additional attachments (if needed) and cross-reference appropriately. Attach the additional pages and number all pages upon completion of the inspection. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

POST-CLOSURE INSPECTION CHECKLIST

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

D. SITE INSPECTION (continued)

1. Site markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there damage to the gate?		✓	
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. Are "vegetation" signs damaged or missing (located on each corner and in middle of fence side)?		✓	
f. Are the signs legible?	✓		
g. 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)?	✓		Plant cover is maturing and well established.
e. Is remedial action needed to establish a vegetative cover?		✓	
f. Is there evidence of human intrusion onto the site?		✓	
g. Is there evidence of animal burrowing?		✓	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Take one photo from the approximate location where the photo was taken the previous year (as found in the previous year's post-closure report).***
- Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the post-closure annual report.
- Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Other photographs are optional.
- A photograph log entry will be made for each photograph taken.

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?	2		
If yes, has a photographic log been prepared?	✓		

POST-CLOSURE INSPECTION CHECKLIST

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

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. Are maintenance/repair actions necessary?		✓	If "yes", describe in field conclusions/recommendations
4. Is there an imminent hazard to the integrity of the landfill cover?		✓	If "yes", describe below and the Task Manager must complete the "Follow-up Actions" (not part of checklist)

5. Field conclusions/recommendations: The signage and fencing were in excellent condition. There is no evidence of animal intrusion at the site. The vegetation appears to have reached optimum level of maturity. There are no issues or concerns at this site.

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/: Glenn Richardson	Date:	5/11/10
Printed Name:	Glenn Richardson	Title:	Task Manager

Required Attachments:

- Field Notes (if any)
- Photos (or note File Location: S:\NTS\ER Share\Photos\TTR PCM Inspections\2010\5-11-2010

Distribution: Original – Industrial Sites Project Manager
Copy – Task Manager

G. VERIFICATION

I have reviewed this checklist and attachments and have verified that it is complete.

Signature:	/s/: Reed Poderis	Date:	5/27/10
Printed Name:	Thomas A. Thiele (or designee)		

Distribution: Original – Task Manager

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: 5/12/10 09:20 am	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/6/09	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: Curtis Obi	Title: Senior Scientist

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information regarding what was found and/or appropriate references to other documents that have the information (e.g., Maintenance Order Form for CAS 05-16-01 dated 2/15/2008).
- All documentation must be legible and clear.

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?	✓		Animal burrows were noticed during the May 2009 inspection.
4. Were maintenance or repairs performed since last inspection?	✓		The animal burrows were backfilled in July 2009.

C. SITE INSPECTION PREPARATION

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

a. TTR radio, pager, etc.
b. Camera (requires TTR Photo/sensitive equipment pass), digital storage drive, and extra batteries
c. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
d. Tape measure
e. Other miscellaneous support equipment

D. SITE INSPECTION

- ***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.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. Information can take the form of written narrative, sketches, measurements, and annotated site maps, all of which should be placed on additional attachments (if needed) and cross-reference appropriately. Attach the additional pages and number all pages upon completion of the inspection. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

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?		✓	

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)
d. Have any posts been damaged or their anchoring weakened?		✓	
e. Have boundary monuments been disturbed?		✓	
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?		✓	There is no evidence of erosion, but exposed debris was noticed on the surface of the landfill cover.
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?	✓		Animal burrows were noticed in the general area near Trenches A9-1 and A9-2.

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Take one photo from the approximate location where the photo was taken the previous year (as found in the previous year's post-closure report).***
- Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the post-closure annual report.
- Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Other photographs are optional.
- A photograph log entry will be made for each photograph taken.

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?	✓		

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. Are maintenance/repair actions necessary?	✓		If "yes", describe in field conclusions/recommendations
4. Is there an imminent hazard to the integrity of the landfill cover?		✓	If "yes", describe below and the Task Manager must complete the "Follow-up Actions" (not part of checklist)

POST-CLOSURE INSPECTION CHECKLIST

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

E. FIELD CONCLUSIONS (continued)

5. Field conclusions/recommendations: The use restriction signs, chain-link fencing, and aboveground monuments are in excellent condition. There was no evidence of settling or erosion, but debris was noticed on the surface of the landfill cover. Animal burrows were also noticed near Trenches A9-1 and A9-2. A follow-up corrective action will be necessary to backfill the animal burrows with native fill (soil).

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/: Glenn Richardson	Date:	5/12/10
Printed Name:	Glenn Richardson	Title:	Task Manager

Required Attachments:

- Field Notes (if any)
- Photos (or note File Location: S:\NTS\ER Share\ Photos\TTR PCM Inspections\2010\5-12-2010)

Distribution: Original – Industrial Sites Project Manager
Copy – Task Manager

G. VERIFICATION

I have reviewed this checklist and attachments and have verified that it is complete.

Signature	/s/: Reed Poderis	Date:	5/27/10
Printed Name:	Thomas A. Thiele (or designee)		

Distribution: Original – Task Manager

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:	5/11/10 13:35 pm	Reason for Inspection:	Annual
Date of Last Post-Closure Inspection:	5/6/09	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:	Curtis Obi	Title:	Senior Scientist

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information regarding what was found and/or appropriate references to other documents that have the information (e.g., Maintenance Order Form for CAS 05-16-01 dated 2/15/2008).
- All documentation must be legible and clear.

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 for access to the site. Assemble the following, as needed, to conduct inspections:

a. TTR radio, pager, etc.
b. Camera (requires TTR Photo/sensitive equipment pass), digital storage drive, and extra batteries
c. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
d. Tape measure
e. Other miscellaneous support equipment

D. SITE INSPECTION

- ***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.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. Information can take the form of written narrative, sketches, measurements, and annotated site maps, all of which should be placed on additional attachments (if needed) and cross-reference appropriately. Attach the additional pages and number all pages upon completion of the inspection. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

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)**	✓		

POST-CLOSURE INSPECTION CHECKLIST

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

1. General vicinity and site conditions (CA-1), continued:	YES	NO	EXPLANATION (required if shaded box is checked)
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?		✓	
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		

POST-CLOSURE INSPECTION CHECKLIST

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

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?	✓		
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?		✓	

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)
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		

12. Use-restricted area (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?	✓		

Photograph Instructions:

- Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the post-closure annual report.
- Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Other photographs are optional.
- A photograph log entry will be made for each photograph taken.

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?	9		
If yes, has a photographic log been prepared?	✓		

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. Are maintenance/repair actions necessary?		✓	If "yes", describe in field conclusions/recommendations

4. Field conclusions/recommendations: The UR signage, radiological postings, and yellow anchored posts are in excellent condition at all four Davis Gun sites. There was no evidence of cracking or settling on the soil covers. The four sites had no issues or concerns.

POST-CLOSURE INSPECTION CHECKLIST

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

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/: Glenn Richardson	Date:	5/11/10
Printed Name:	Glenn Richardson	Title:	Task Manager

Required Attachments:

- Field Notes (if any)
- Photos (or note File Location: S:\NTS\ER Share\Photos\TTR PCM Inspections\2010\5-11-2010)

Distribution: Original – Industrial Sites Project Manager
Copy – Task Manager

G. VERIFICATION

I have reviewed this checklist and attachments and have verified that it is complete.

Signature:	/s/: Reed Poderis	Date:	5/27/10
Printed Name:	Thomas A Thiele (or designee)		

Distribution: Original – Task Manager

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

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

Inspection Date and Time:	5/12/10 08:30 am	Reason for Inspection:	Annual
Date of Last Post-Closure Inspection:	5/6/09	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:	Curtis Obi	Title:	Senior Scientist

A. GENERAL INSTRUCTIONS

- Complete all checklist items.
- If a SHADED BOX is checked, provide detailed information regarding what was found and/or appropriate references to other documents that have the information (e.g., Maintenance Order Form for CAS 05-16-01 dated 2/15/2008).
- All documentation must be legible and clear.

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 for access to the site. Assemble the following, as needed, to conduct inspections:

a. TTR radio, pager, etc.
b. Camera (requires TTR Photo/sensitive equipment pass), digital storage drive, and extra batteries
c. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
d. Tape measure
e. Other miscellaneous support equipment

D. SITE INSPECTION

- ***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.*** The checklist should be completed during the site inspection.
- If a shaded box is checked, add detailed comments to document the results of the site inspection. Information provided should be of sufficient detail to enable reconstruction of observations regarding field conditions. Information can take the form of written narrative, sketches, measurements, and annotated site maps, all of which should be placed on additional attachments (if needed) and cross-reference appropriately. Attach the additional pages and number all pages upon completion of the inspection. The completed checklist is part of the field record of the inspection.
- Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes, and additional field notes are not required if the checklist and associated attachments adequately describe site conditions.

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?		✓	

POST-CLOSURE INSPECTION CHECKLIST

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

1. Site markers (A8 Anomalies Area):	YES	NO	EXPLANATION (required if shaded box is checked)
d. Are all signs legible?	✓		
e. How many signs need to be replaced?	0		

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?		✓	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Take two photos – one from each site – at the approximate locations where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should be taken to document maintenance/repair needs at the site. These will be used to plan maintenance/repair activities and are not intended for use in the post-closure annual report.
- Anomalous features or new features (such as changes in adjacent area land use) should be photographed.
- Other photographs are optional.
- A photograph log entry will be made for each photograph taken.

5. 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?	5		
If yes, has a photographic log been prepared?	✓		L

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. Are maintenance/repair actions necessary?		✓	If "yes", describe in field conclusions/recommendations

POST-CLOSURE INSPECTION CHECKLIST

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

E. FIELD CONCLUSIONS (continued)

4. Field conclusions/recommendations: Overall site conditions are good at the A-8 and A-17 anomaly sites. The UR signage is legible and intact on the aboveground monuments. There was no evidence of animal intrusion. The aboveground monuments are not damaged and remain upright. There are no issues or concerns warranting an immediate corrective action at these sites.

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/: Glenn Richardson	Date:	5/12/10
Printed Name:	Glenn Richardson	Title:	Task Manager

Required Attachments:

- Field Notes (if any)
- Photos (or note File Location: S:\NTS\ER Share\Photos\TTR PCM Inspections\2010\5-12-2010)

Distribution: Original – Industrial Sites Project Manager
Copy – Task Manager

G. VERIFICATION

I have reviewed this checklist and attachments and have verified that it is complete.

Signature:	/s/: Reed Poderis	Date:	5/27/10
Printed Name:	Thomas A. Thiele (or designee)		

Distribution: Original – Task Manager

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ATTACHMENT D
FIELD NOTES

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May 11, 2010

Annual TTR Post Closure Inspections

NSTec Personnel: Glenn Richardson, Task Manager — NNSA: Kevin Cabble
Curtis Obi, Sr. Scientist — NDEP: Ted Zaferatos
Dominic Cotroneo III, RCT

Weather: Cloudy, Very Windy, High 40s - Low 50s (30 mph winds)
Equipment: Digital Camera (Special Permit Provided for use)

Scope: Perform Post Closure site inspections for the following: 400, 407, 424, 426, 453, 484, 487, and inspect 404 as a best management practice.

1:00 PM - Met with NNSA and NDEP to start site inspections at CAU 484 sites. Prior to the inspections, a brief tailgate safety mtg. was conducted by Navarro Nevada Environmental Services (NNES). Since NNES has other field activities being executed within the general area of the 484 sites, an escort was provided for the inspections on Antelope Lake.

1:20 PM - Arrived at CAU 484 CA-1. 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. No issues/concerns.

(Note: Since the conditions were very windy on Antelope Lake we were directed by the RCT to remain upwind for all photo documentation.)

1:25 PM - Arrived at CAU 484 ~~SA-5-9~~ SA-4. The UR signage, radiological postings, and yellow anchored posts are in excellent condition. There is no evidence of human or animal intrusion.

Work continued to Page 2

SIGNATURE /s/: Glenn Richardson DATE 5/11/10

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Photos were taken upwind for documentation. There are no follow-up actions necessary at this site.

1:30 PM - Arrived at CAU 484 SA-5-9. The UR signage, radiological postings, and yellow anchored posts were not damaged and in great condition. There is no evidence of settling or erosion on the soil cover. This site has no issues or concerns. Photo documentation was taken while standing upwind.

1:35 PM - Arrived at CAU 484 SA-12-15. Overall site conditions are excellent. The UR signage, radiological postings, and yellow anchored posts are intact and well-maintained. Photos were taken for documentation. No corrective actions are required at this site.

1:40 PM - NNSA and NDEP left Antelope Lake to attend a priority meeting. Inspections will continue at the CAU 424 Landfill Cells. NNSA & NDEP will rejoin the TTR inspections immediately after their meeting. RCT support is no longer necessary. The RCT departed for the NTS.

2:20 PM - Arrived at CAU 424 Landfill Cell A3-1. The aboveground monuments are stable and in excellent condition. The brass markers are intact on the monuments and the site is well-maintained. Required photos were taken.

2:30 PM - Arrived at Landfill Cell A3-2. The aboveground monuments are erect and in excellent condition. Required photos were taken.

2:35 PM - Arrived at Landfill Cell A3-3. The surface grade monuments remain visible and are in great condition. Also, the aboveground monuments are not damaged and remain sturdy. Required photos were taken for documentation.

2:50 PM - Arrived at Landfill Cell A3-6. The aboveground monuments show no evidence of damage around the brass markers or ground surface. They remain stationary in place and in great condition. Required photos

were taken of the site.

2:55 PM - Arrived at Landfill Cell A3-5. The aboveground monuments are stable and in great condition. The landfill cover shows no evidence of settling or subsidence. Required photos were taken.

3:05 PM - Arrived at Landfill Cell A3-4. The aboveground monuments are in excellent condition. The vegetative cover appears to be in good condition. No evidence of settling or erosion. Required photos were taken.

3:25 PM - Arrived at Landfill Cell A3-8. All four surface grade monuments are visible and in good condition. Photo documentation was taken at the site.

PM - Met back up with NNSA & NDEP to perform site inspections for the remainder of the work day.

3:45 PM - Arrived at CAU 404 to perform an inspection as a best management practice. CAU 404 currently has an administrative use restriction and inspections are no longer required. The signage and fencing are in excellent condition. The vegetation on the cover appears to have reached a very high maturity level. There appears to be no evidence of intrusion at the site. The task of removing the existing fence and gate did come up, but a final decision is pending further discussions and consideration. Photos were taken of the fencing for information.

3:50 PM - Arrived at CAU 407 to perform inspection. The radiological postings and barb wire fencing were in great condition. A few small and one medium size animal burrow(s) were noticed on the south side slope of the cover. NSTec ecological services will be contacted to determine if there is a significant

Work continued to Page 4

SIGNATURE /s/: Glenn Richardson
DATE 5/11/10

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

impact to warrant a follow-up action. The vegetation growth on the cover appears to be maturing and in good condition. Photos were taken at this site.

4:10 PM - Arrived at CAU 426 to perform inspection. The vegetation on the cover is in great condition. The signage and fencing are well maintained and remain in good condition. There was no evidence of animal intrusion (burrows, etc.). Photo documentation was taken before leaving the site. There are no issues or concerns.

4:45 PM - Ended the inspections on 5/11 to resume the next morning on 5/12/10. Remaining inspections on 5/12 will include: CAUs 400, 453, and 487.

5/11/10

/s/: Glenn Richardson

Continue TTR Post Closure Inspections

8:20 RM - Arrived at CAU 487 to perform inspection. Inspected aboveground monuments at A-8 anomaly site to find them intact, stable, and in great condition. The UR signage is legible and visible on the monuments; however, the red "warning" label is beginning to fade. If fading of the label persists during the year, a follow-up action could be warranted during the next annual inspection period. Also, inspected aboveground monuments at A-17 anomaly site to find them intact and in excellent condition. There was no evidence of cracking or damage that warranted a corrective action. As with the A-8 site, noticed the red "warning" label beginning to fade. There is no immediate action at this time, but there could be during the next annual inspection period. Photos were taken at A-8 and A-17. There ~~were~~ was no evidence of intrusion. RM 5/12/10

9:20 RM - Arrived at CAU 453 to perform inspection with NNSA & NDEP. Met up with NNSA & NDEP at approx. 9AM to perform inspections remaining for the day. Opened the combination lock to access the UXO Landfill. The signage and chain-link fencing were in excellent condition. There were large animal burrows that will require backfilling as a corrective action. Also, there was metallic debris dispersed in different areas on the landfill surface. The exposed surface debris appears to be associated with the contents of the landfill; however, further evaluation and discussion is necessary to confirm. A corrective action will be recommended and implemented (per

Work continued to Page 6

SIGNATURE /s/: Glenn Richardson DATE 5/12/10

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

client approval) within 90 days. The aboveground monuments remain undamaged and in great condition. Photos were taken at the site.

9:55 AM - Arrived at CAU 400 5 Pts. Landfill to perform inspection. The site fencing is in great condition. The vegetation is flourishing in the area previously impacted by flood conditions approx. three years ago. Vegetation monitoring surveys will be performed in June 2010 by NSTec plant & ecological services. Overall site conditions are good with no follow-up corrective actions. Photo documentation was taken at this site.

10:20 AM - Arrived at CAU 400 Bomblet Pit to perform inspection. The barbed-wire fencing and chicken wire fencing were in excellent condition. There was no evidence of human or animal intrusion to warrant a follow-up corrective action. Overall site conditions are good with vegetation growth at an optimum level for consideration of removing the gate and fencing. However, if any field activities are performed as a BMP, a UXO sweep will be performed. There are no issues or concerns at this site. Photo documentation was taken.

10:35 AM - NNSA & NDEP departed the site. Planning to return to NLV after lunch.

11:00AM - End of inspections at TTR. Returned ASI radios.

11:35 AM - Heading to lunch at TTR Cafeteria.

5/12/10

/s/: Glenn Richardson

SIGNATURE /s/: Glenn Richardson

Work continued to Page

DATE

ATTACHMENT E
PHOTOGRAPHS

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PHOTOGRAPH LOG

PHOTOGRAPH	DATE	DESCRIPTION
1	05/12/2010	CAU 400 Five Points Landfill, looking west
2	05/12/2010	CAU 400 Five Points Landfill, looking south
3	05/11/2010	CAU 407, looking east
4	05/11/2010	CAU 407, looking west
5	05/11/2010	CAU 424, Landfill Cell A3-1, looking southeast
6	05/11/2010	CAU 424, Landfill Cell A3-2, looking north
7	05/11/2010	CAU 424, Landfill Cell A3-3, looking northwest
8	05/11/2010	CAU 424, Landfill Cell A3-4, looking north
9	05/11/2010	CAU 424, Landfill Cell A3-5, looking southeast
10	05/11/2010	CAU 424, Landfill Cell A3-6, looking east
11	05/11/2010	CAU 424, Landfill Cell A3-8, looking west
12	05/11/2010	CAU 426, looking east
13	05/12/2010	CAU 453, Surface Debris
14	05/11/2010	CAU 484, CA1 anomaly, looking east
15	05/11/2010	CAU 484, SA4 anomaly, looking southwest
16	05/11/2010	CAU 484, SA5-9 anomaly, looking east
17	05/11/2010	CAU 484, SA12-15 anomaly, looking southwest
18	05/12/2010	CAU 487, A-8 anomaly, looking north
19	05/12/2010	CAU 487, A-17 anomaly, looking west

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Photograph 1: CAU 400 Five Points Landfill, looking west, 05/12/2010

Photograph 2: CAU 400 Five Points Landfill, looking south, 05/12/2010

Photograph 3: CAU 407, looking east, 05/11/2010

Photograph 4: CAU 407, looking west, 05/11/2010

Photograph 5: CAU 424, Landfill Cell A3-1, looking southeast, 05/11/2010

Photograph 6: CAU 424, Landfill Cell A3-2, looking north, 05/11/2010

Photograph 7: CAU 424, Landfill Cell A3-3, looking northwest, 05/11/2010

Photograph 8: CAU 424, Landfill Cell A3-4, looking north, 05/11/2010

Photograph 9: CAU 424, Landfill Cell A3-5, looking southeast, 05/11/2010

Photograph 10: CAU 424, Landfill Cell A3-6, looking east, 05/11/2010

Photograph 11: CAU 424, Landfill Cell A3-8, looking west, 05/11/2010

Photograph 12: CAU 426, looking east, 05/11/2010

Photograph 13: CAU 453, Surface Debris, 05/12/2010

Photograph 14: CAU 484, CA1 anomaly, looking east, 05/11/2010

Photograph 15: CAU 484, SA4 anomaly, looking southwest, 05/11/2010

Photograph 16: CAU 484, SA5-9 anomaly, looking east, 05/11/2010

Photograph 17: CAU 484, SA12-15 anomaly, looking southwest, 05/11/2010

Photograph 18: CAU 487, A-8 anomaly, looking north, 05/12/2010

Photograph 19: CAU 487, A-17 anomaly, looking west, 05/12/2010

ATTACHMENT F
POST-CLOSURE VEGETATION MONITORING REPORT

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POST-CLOSURE VEGETATION MONITORING REPORT

CORRECTIVE ACTION UNITS 400, FIVE POINTS LANDFILL (TTR)

CORRECTIVE ACTION UNITS 407, ROLLER COASTER RADSAFE AREA (TTR)

Field Work Completed
June 8–9, 2010

Report Prepared
by
David C. Anderson, Sr. Scientist
Ecological Services

August 2010

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TABLE OF CONTENTS

TABLES

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1.0 INTRODUCTION

This report documents methods and results of monitoring conducted in June 2010 at Corrective Action Units (CAUs) 400 and 407 on the Tonopah Test Range (TTR). The status of vegetation is described and compared to adjacent undisturbed areas. Concerns and issues are identified, and remedial actions are recommended to ensure the cover is maintained.

In 1997, CAU 400 was seeded with a mix of native shrubs and grasses. The site was mulched with straw that was crimped into the soil. The site was protected from grazing animals (e.g., horses and rabbits) with a 4-foot barbed wire fence and 2 feet of chicken wire along the base of the fence. In 2000, CAU 407 was revegetated using similar techniques.

Remedial revegetation has been completed at these sites. A flash flood swept through CAU 400, Five Points Landfill, in 2003. The 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 2004. The site flooded again in 2006, and much of the lower portions of the site were covered with several inches of sediment. No remedial action was taken. After CAU 407 was revegetated in 2000, cover repairs resulted in the loss of vegetation. In 2004, erosion channels on the cover were repaired, and the site was reseeded. An erosion blanket was used to minimize erosion.

2.0 OBJECTIVES

The objective of revegetation is to accelerate the reestablishment of native plants and return the site to pre-disturbance conditions. Vegetation affords protection from wind and water erosion to maintain the integrity of the site. It also impedes noxious, weedy species and provides cover and food for wildlife. The objective of monitoring is to document the success of revegetation and to identify any issues that may need to be addressed to maintain the integrity of the sites.

3.0 METHODS

Monitoring was performed on June 8–9, 2010. Plant cover and density were recorded, wildlife usage was noted, and erosion was evaluated. Plant cover was estimated using an optical point projection device. Samples were taken at intervals along a permanent linear transect. Cover was recorded by species. Density was estimated using 1-square meter (m^2) quadrats at intervals along each transect. The total number of individual plants within each quadrat was recorded. The data were averaged over all quadrats. Species richness was calculated from density data. The number of different plant species within each quadrat was averaged over all quadrats. This provides indication of the diversity or heterogeneity of the plant community. Wildlife usage was determined from the presence of animal burrows or scat, browsing by animals, and the observation of animals. Erosion was measured by observing pedestalling of soils, movement of surface litter, and rilling or gullying on the surface.

Revegetation is considered successful when a pre-determined percentage of plant cover and density on an adjacent area that represents an undisturbed plant community is acheived. A typical percentage used to determine success is 70 percent. The time needed for reestablishment of a native plant community on a disturbed location ranges from 5 to 10 years; however, this depends on factors such as degree of disturbance, soil types, climate conditions, precipitation amounts and patterns, and temperature extremes. Revegetation success is achieved after several consecutive years of meeting, or exceeding, success criteria.

4.0 RESULTS

This section provides results of the 2010 survey.

4.1 CAU 400, FIVE POINTS LANDFILL

In 2010, six transects were sampled, two in the area that had not flooded, three in the area that was revegetated in 2004, and one in the reference area.

4.1.1 Vegetation Monitoring Results

4.1.1.1 Plant Cover

Plant cover on the staging area was 24 percent and was a mix of perennials and annuals (Table 1). Fourwing saltbush was the only perennial species and made up one third of total cover. Perennial grasses did not contribute to plant cover. Annual forbs, mainly Esteve's pincushion and western blazingstar, made up two thirds of plant cover. Small amounts of flatcrown buckwheat and cushion cryptantha were present.

Plant cover on the reseeded area was 23 percent and, like the staging area, included perennials and annuals. Total perennial plant cover was over 3 percent, with fourwing saltbush making up three fourths of the total and squirreltail grass making up the other fourth. Annual forbs made up the majority of the plant cover on the re-seeded area and mainly included western tansymustard. There was a small amount of prickly Russian thistle, an invasive species.

Plant cover on the reference area was higher than the staging and reseeded areas. Forb cover was less than the other two areas; however, shrub and grass cover was markedly higher. Shrub cover was 9 percent, and was mostly Greene's rabbitbrush, with some fourwing saltbush, the sole contributor to shrub cover on the staging and reseeded areas. The most notable difference between the reference area and the other two areas was grass cover. Indian ricegrass accounted for 5 percent cover. Western blazingstar and Esteve's pincushion made up most of the forb cover, like the staging area. Nye gilia, cushion cryptantha, and lupine made up the rest of the forb cover. Weedy species did not contribute to total plant cover on the reference area.

TABLE 1. PLANT COVER (%) ON CAU 400, FIVE POINTS LANDFILL, 2010

	Staging	Reseeded	Reference	Standard
Shrubs				
Fourwing saltbush (*Atriplex canescens*)	8.13	2.50	2.50	
Greene's rabbitbrush (*Chrysothamnus greenei*)	0.00	0.00	6.67	
Total Shrub Cover	**8.13**	**2.50**	**9.17**	**6.42**
Grasses				
Indian ricegrass (*Achnatherum hymenoides*)	0.00	0.00	5.00	
Squirreltail grass (*Elymus elymoides*)	0.00	0.83	0.00	
Total Grass Cover	**0.00**	**0.83**	**5.00**	**3.50**
Forbs/Annuals				
Esteve's pincushion (*Chaenactis steviodes*)	8.75	0.00	3.33	
Flatcrown buckwheat (*Eriogonum deflexum*)	1.25	0.00	0.00	
Lupine (*Lupine* species)	0.00	0.00	0.83	
Nye gilia (*Aliciella nyensis*)	0.00	0.00	1.67	
Cushion cryptantha (*Cryptantha circumscissa*)	1.25	0.00	0.83	
Western blazingstar (*Mentzelia albicaulis*)	4.38	0.00	5.83	
Western tansymustard (*Descurania pinnata*)	0.00	16.67	0.00	
Prickly Russian thistle (*Salsola iberica*)*	0.00	0.83	0.00	
Total Forb Cover	**15.63**	**17.5**	**12.49**	**8.74**
TOTAL PLANT COVER	**23.76**	**20.83**	**26.66**	**18.66**
Bare Ground	61.25	65.84	60.83	
Litter	15.00	13.33	12.50	

* Invasive Species

4.1.1.2 Plant Density

Annual forbs made up 58 of the 59 plants per m^2 (Table 2). The combined density of fourwing saltbush and bud sagebrush, the only two shrubs on the staging area, was 0.7 plants per m^2. The combined density of Indian ricegrass, galleta, and squirreltail was 0.2 plants per m^2.

The forbs with the highest density were Esteve's pincushion, flatcrown buckwheat, whitestem blazingstar, and cushion cryptantha. These four forbs accounted for over 90 percent of the total forb density on the staging area. Prickly Russian thistle was the only noxious species found on the staging area, and its density was 0.2 plants per m^2.

Total density on the reseeded area was 4.1 plants plants per m^2. Shrub density was the lowest of the three lifeforms at only 0.1 plants per m^2. Grass density was higher than on the staging area; however, it was only 0.3 plants per m^2. Forb density was only 2.4 plants per m^2, substantially lower than on the staging area, which was 58.2 plants per m^2. The most common forb was an invasive species, prickly Russian thistle. Although the density of prickly Russian thistle was higher, the reseeded area appeared to be dominated by western tansymustard. Prickly Russian thistle plants were small seedlings, whereas western tansymustard plants were large and robust.

Total plant density on the reference area was 47.6 plants per m^2, which was lower than the staging area but over ten times the reseeded area. Greene's rabbitbrush had the highest shrub density, followed by fourwing saltbush and winterfat. Grass density was 1.2 plants per m^2 and was mostly Indian ricegrass. There were isolated squirreltail plants present. Forb density was 45.1 plants per m^2.

TABLE 2. PLANT DENSITY (PLANTS PER M^2) ON CAU 400, FIVE POINTS LANDFILL, 2010

	Staging	Reseeded	Reference	Standard
Shrubs				
Bud sagebrush (*Picrothamnus desertorum*)	0.05	0.00	0.00	
Fourwing saltbush (*Atriplex canescens*)	0.63	0.06	0.17	
Greene's rabbitbrush (*Chrysothamnus greenei*)	0.00	0.00	0.30	
Winterfat (*Krascheninnikovia lanata*)	0.00	0.00	0.07	
Total Shrub Density	**0.68**	**0.06**	**0.54**	**0.38**
Grasses				
Indian ricegrass (*Achnatherum hymenoides*)	0.13	0.27	1.13	
James' Galleta (*Pleuraphus jamesii*)	0.03	0.00	0.00	
Squirreltail (*Elymus elymoides*)	0.03	0.06	0.03	
Total Grass Density	**0.19**	**0.33**	**1.16**	**0.81**
Forbs				
Cushion cryptantha (*Cryptantha circumscissa*)	3.93	0.01	9.73	
Desert wollystar (*Eriastrum eremicum*)	0.83	0.00	1.27	
Eggleaf fiddleleaf (*Nama pusillum*)	1.68	0.00	1.97	
Esteve's pincushion (*Chaenactis steviodes*)	27.23	0.08	11.77	
Flatcrown buckwheat (*Eriogonum deflexum*)	15.85	0.03	1.13	
Herb Sophia (*Descurania sophia*)	0.00	0.03	0.07	
Hoary tansyaster (*Macheranthera canescens*)	0.00	0.00	0.20	
Lambsquarter (*Chenopodium album*)	0.00	0.15	0.00	
Lupine (*Lupinus* species)	0.00	0.00	1.27	
Nye gilia (*Aliciella nyensis*)	2.05	0.00	12.13	
Prickly Russian thistle (*Salsola iberica*)*	0.20	1.31	0.80	
Ragweed (*Ambrosia* species)	0.0	0.37	0.23	
Halogeton (*Halogeton glomeratus*)*	0.0	0.02	0.00	
Sowthistle desertdandelion (*Malacothrix sonchoides*)	0.23	0.00	0.27	
Western tansymustard (*Descurania pinnata*)	0.0	0.98	0.23	
Whitestem blazingstar (*Mentzelia albicaulis*)	6.43	0.73	4.83	
Total Forb Density	**58.23**	**2.38**	**45.10**	**31.57**
Total Invasive (Forb) Density	**0.20**	**1.33**	**0.80**	
TOTAL PLANT DENSITY	**59.30**	**4.10**	**47.60**	**32.76**

* Invasive Species

4.1.1.3 Species Richness

Species richness varies from year to year as a result of the timing and amounts of precipitation. This year's precipitation amounts were close to average, but higher amounts were received during the early spring months, which resulted in more forb species. On the staging area, there was an average of six different species found, and most of them were forbs. Two shrubs, fourwing saltbush and bud sagebrush, were common. There were three species of perennial grasses, but none were very common, including the most common species, Indian ricegrass. Over the years the same species of forbs have been found on the staging area, but abundance, as measured by cover and density, varies from year to year. This year there was an average of 5.5 species of forbs per m^2 (Table 3).

Species richness on the reseeded area was 3.9 species per m^2. Several species have re-established on the reseeded area after the flooding events of the last 5 years. Fourwing saltbush was the only shrub species found on the reseeded area, and Indian ricegrass and squirreltail were the two grass species found. There were more species of annual forbs on the reseeded area than on the staging area, but most were infrequent, which accounts for the low species richness of forbs.

Species richness values for the reference area were the highest of the three areas. Greene's rabbitbrush, fourwing saltbush, and winterfat are common species of the shrub community. Indian ricegrass was the most common perennial grass, as it was at the other two areas. Squirreltail was infrequently encountered. The reference area has the richest occurrence of forbs of the three areas. There were fourteen species on the reference area compared to nine and ten species on the staging area and reseeded area, respectively.

TABLE 3. SPECIES RICHNESS (SPECIES PER M^2) ON CAU 400, FIVE POINTS LANDFILL, 2010

	Staging	Reseeded	Reference	Standard
Shrubs	0.35	0.23	0.47	0.33
Grasses	0.18	0.63	0.73	0.51
Forbs/Annuals	5.53	3.03	6.23	4.36
Total Species	**6.06**	**3.89**	**7.43**	**5.20**

4.1.2 Revegetation Success

STAGING AREA

The plant community that has established on the Five Points Landfill appears to be viable, but there were deficiencies. Total plant cover was near 25 percent, which represents the second highest amount of plant cover over the last 5 years. There was an abundance of forbs this year, like in 2006 and 2008, when plant cover was also 25 percent. This year more than half of the plant cover measured on the staging area was forbs. Shrub cover was around 8 percent, which is about average for the last 3 years. Grasses continued to struggle on the staging area. In 2006, grass cover was near 5 percent, it dropped to almost 0 percent last year, and was just less than 1 percent this year.

Plant cover on the staging area exceeded the standard. However, it was due to the abundance of forbs. Shrub cover was higher than the standard, but there was no grass cover on the staging area, and the standard of 3.5 percent was not met. Forb cover was 15.6 percent, which was almost twice the standard of 8.7 percent.

Perennial plant density on the staging area was the lowest it has ever been. Shrub density decreased from 1.5 shrubs per m^2 in 2006 to 0.7 shrubs per m^2 this year. There was a slight increase in the density of bud sagebrush, but the density of fourwing saltbush, the most common shrub present on the staging area, decreased from 0.8 plants per m^2 in 2009 to 0.6 plants per m^2 this year. Grass density decreased from 1.7 grasses per m^2 in 2006 to 0.3 grasses per m^2 this year. There was a decrease in both Indian ricegrass and galleta grass density from last year. Of note this year was the presence of squirreltail grass, which has not been found on the staging area since 2007. Forb density fluctuates with precipitation and does not provide a good indication of the stability of a plant community. The presence of native forbs, rather than invasive weedy forbs, suggests that the site is progressing towards a native plant community and not a disturbance plant community, which is typically dominated by invasive annual weeds.

Over the last 3 years, shrub density experienced a gradual decline but was still twice the standard. Grass density declined over the last 3 years, and this year was 20 percent of the standard. Forb density was not considered because it fluctuates from year to year and does not provide an accurate assessment of the status of the plant community. Forb density this year was the second highest recorded to date on the staging area. Of note is the fact that the more commonly occurring forb species found on the staging area are native to the area and are commonly encountered on the adjacent undisturbed area.

Species richness for all lifeforms increased over the last 4 years on the staging area. However, this trend is attributable to the species richness of forbs. The number of different shrub species has been about the same for the last 5 years. Grasses declined substantially from 2007 to 2008 and have maintained since then at about 0.2 species per m^2.

Overall diversity of the staging area as measured by species richness values was equivalent to the adjacent undisturbed area. On average, there were six different species encountered per m^2 on the staging area compared to the standard of five species. The number of species of forbs found on the staging area exceeded the revegetation success standard, and the number of different shrub species was essentially the same as the success standard. However, the number of grass species was about one fifth of the standard.

Of the three parameters used to evaluate revegetation success, plant density is the only one that did not exceed success standards. Shrub density exceeded the standard, but grass density was only 40 percent of the standard, and forb density was slightly below the standard. As with plant cover, shrub density has been relatively consistent over the last 5 years, whereas grass density declined from relatively high densities just 3 years ago.

The Five Points Landfill has been successfully revegetated. Using 70 percent of plant cover, plant density, and species richness on the reference area as a standard for successful revegetation, plant cover and species richness exceeded the standards, and plant density was about 96 percent of the success standard. Overall plant cover was 11.3 percent, which is almost one and a half times the standard of 7.6 percent. Shrubs and forbs exceeded the revegetation success standard. Shrub cover is more than four times the standard, and forb cover is about 50 percent higher than the standard. Grass cover is about 17 percent of the standard. Shrub cover has maintained at a relatively high level over the past 5 years, but grass cover has dropped off the last 2 years. Growing conditions have been less than optimal for the last several years, and it appears grasses are most affected by the drier conditions. Forb growth corresponds to the timing and intensity of precipitation, and the fluctuations in forb cover over the last 5 years indicate such a response.

RESEEDED AREA

The increase in plant cover on the reseeded area from 3 percent last year to 23 percent this year was primarily due to the increase in forb cover. Western tansymustard was the major contributor to forb cover. It was not as abundant as other forbs but was robust and at peak production during sampling. Shrub cover did not change. Fourwing saltbush was the only shrub on the reseeded area. Its presence is a result of re-seeding efforts in the fall of 2004 and possible resprouting of some shrubs that were established prior to the flooding events over the last 6 years.

Grass cover on the reseeded area increased from 0 percent in 2009 to 1 percent this year, and the presence of grasses was encouraging. Grass cover was primarily squirreltail grass. Indian ricegrass was more abundant on the reseeded area, but plants were young seedlings, whereas individuals of squirreltail grass, although less abundant, were in their third or fourth year of growth and were larger.

Perennial plant density continued to decline, although the decline from 2009 to 2010 was not as dramatic as from 2008 to 2009. The decline in the density of both shrubs and grasses may have reached equilibrium with available resources and may maintain at this level in the future. Fourwing saltbush was the only shrub found on the reseeded area. Indian ricegrass and squirreltail, two native grasses, have persisted since 2004. The density of forbs was the highest it has been since the first year after the site was reseeded.

The soils on site are still without structure (powdery and loose) and subject to future flooding, but all lifeforms are establishing as evidenced by the species richness. There were about four different species encountered in each quadrat compared to the standard of five species. There was a mix of shrubs, grasses, and forbs on the reseeded area, but there were only one shrub and two grasses. There were ten species of forbs on the reseeded area, but most were uncommon. Western tansymustard was one of the most common forbs and was the most obvious. Western tansymustard plants were large and robust and appeared to be dominant. Prickly Russian thistle had the highest density of all the forbs, but the plants were primarily seedlings and less showy.

The reseeded area was deficient in plant cover and density. Plant cover the last 3 years has fluctuated from no cover in 2007 after the area was flooded to a high of 23 percent this year, which exceeded the standard of 19 percent. As with the staging area, the majority of the plant cover was forbs. Shrub cover and grass cover were less than the standard. Plant density was 2 plants per m^2 the first 2 years after being seeded, but flooding in 2006 removed all the plants. Grasses recovered quickly, but shrubs have not. Shrub density was 20 percent of the standard, and grasses were 40 percent of the standard. Species richness for shrubs was 70 percent of revegetation success standards; however, grasses exceeded the standards.

4.1.3 Wildlife Use

As noted in previous years, there was a higher concentration of small mammal burrows on the southeastern section of the site than on other areas. No signs of excessive browsing of shrubs were observed. There were no signs of large animals, such as horses or antelope, on the site.

4.1.4 Soil Erosion

There were no signs of additional flooding on the site this year. The water channel that traverses the site appeared to be stable and showed no signs of excessive water flows. The silts and sands in the bottom areas did not show significant change. Soils on the upper areas that did not flood appeared to be stable and showed no signs of erosion.

4.1.5 Summary/Recommendations

There are no new concerns or issues at the site. The plant community on the staging area appears stable, although it is lacking in perennial grasses. Shrubs are well established, but a few dead shrubs were observed this year. Grasses appear to be the lifeform impacted the most by the drier conditions experienced the last few years. There have been gradual declines in both grass cover and density over the last few years. Prickly Russian thistle was more common this year than in recent years and should be monitored to ensure it does not become a dominant species on the site. Typically, as native plants become established, weedy species such as prickly Russian thistle diminish in abundance.

There is always a potential for more flooding at this site. Accumulation of water in the bottom areas usually results in the death of most plants. Corrective actions for this situation have been discussed previously and are considered to be too labor intensive and costly to implement. It is recommended that the plant community at this site continue to be monitored to document changes and to identify conditions that may affect plant establishment and growth.

4.2 CAU 407, ROLLER COASTER RADSAFE AREA

Three transects were sampled in 2010.

4.2.1 Vegetation Monitoring Results

4.2.1.1 Plant Cover

Plant cover was 22 percent, indicating that young plants are establishing and increasing in size (Table 4). Three shrubs made up 21 percent of the cover. Shadscale saltbush was the most common species, making up 18 percent cover. Fourwing saltbush and winterfat were less common, but accounted for 2 percent of the cover. Esteve's pincushion, an annual forb, was the only other species that contributed to plant cover. It accounted for the remaining 1 percent cover. No invasive species contributed to plant cover this year.

The reference area was not sampled this year, but data collected over the last 9 years were summarized and used for calculation of revegetation success standards. The average plant cover on the reference area was 13 percent. Shrub cover was 9.5 percent, grass cover was 1.8 percent, forb cover was 2.1 percent, and invasive species contributed about 0.1 percent. Bud sagebrush was the most common species and made up over half of shrub cover. Shadscale saltbush made up 40 percent of shrub cover, and winterfat accounted for 10 percent. Grass cover was a good mix of species. James' galleta grass was the most common and made up over half of grass cover. Indian ricegrass made up 40 percent of grass cover, and the less common low woollygrass made up less than 10 percent. There were four forbs that contributed to plant cover, but Esteve's pincushion was the most common and accounted for 1.5 percent of the 2 percent forb cover. Three other forbs made up the remaining 0.5 percent forb cover. The invasive weed halogeton made up less than 1 percent of total plant cover.

TABLE 4. PLANT COVER (%) ON CAU 407, ROLLER COASTER RADSAFE AREA, 2010

	Staging	Reference	Standard
Shrubs			
Bud sagebrush (*Picrothamnus desertorum*)	0.00	5.29	
Fourwing saltbush (*Atriplex canescens*)	1.67	0.00	
Shadscale saltbush (*Atriplex confertifolia*)	18.33	3.82	
Winterfat (*Kraschinnikovia lanata*)	0.83	0.23	
Total Shrub Cover	**20.83**	**9.34**	**6.54**
Grasses			
Indian ricegrass (*Achnatherum hymenoides*)	0.00	0.69	
James' galleta (*Pleuraphus jamesii*)	0.00	0.97	
Low woollygrass (*Dasyochloa pullchella*)	0.00	0.12	
Total Grass Cover	**0.00**	**1.78**	**1.24**
Forbs/Annuals			
Esteve's pincushion (*Cryptantha steviodes*)	0.83	1.52	
Halogeton (*Halogeton glomeratus*)*	0.00	0.06	
Other forbs	0.00	0.49	
Total Forb Cover	**0.83**	**2.07**	**1.45**
TOTAL PLANT COVER	**21.66**	**13.19**	**9.23**
Bare Ground	30.80	69.52	
Litter	47.50	17.19	

* Invasive Species

4.2.1.2 Plant Density

Plant density was 36 plants per m^2 and was a mix of shrubs and forbs, but no grasses were present (Table 5). The most abundant species was Esteve's pincushion. Three other shrubs were encountered, but densities were less than 1 plant per m^2. Two forbs were encountered other than Esteve's pincushion. Buckwheat was rare, and halogeton, an invasive weed, was common.

Reference data collected from 2000 to 2009 were used. The average plant density on the reference area was 16 plants per m^2. There was a more even distribution between lifeforms on the reference area. There were 4 shrubs per m^2, 2 grasses per m^2, and 10 forbs per m^2. The most abundant shrub was bud sagebrush. James' galleta was the most common grass species. The plant with the highest average density of all lifeforms was Esteve's pincushion.

TABLE 5. PLANT DENSITY (PLANTS PER M^2) ON CAU 407, ROLLER COASTER RADSAFE AREA, 2010

	Staging	Reference	Standard
Shrubs			
Bud sagebrush (*Picrothamnus desertorum*)	0.67	3.14	
Fourwing saltbush (*Atriplex canescens*)	0.83	0.00	
Shadscale saltbush (*Atriplex confertifolia*)	11.73	0.84	
Winterfat (*Krascheninnikovia lanata*)	0.67	0.06	
Total Shrub Density	**13.90**	**4.04**	**2.83**
Grasses			
Indian ricegrass (*Achnatherum hymenoides*)	0.00	0.35	
James' Galleta (*Pleuraphus jamesii*)	0.00	0.90	
Low woollygrass (*Dasyochloa pullchella*)	0.00	0.40	
Squirreltail (*Elymus elymoides*)	0.00	0.04	
Total Grass Density	**0.00**	**1.69**	**1.18**
Forbs			
Buckwheat (*Eriogonum* species)	0.33	0.02	
Esteve's pincushion (*Chaenactis steviodes*)	14.57	8.71	
Halogeton (*Halogeton glomeratus*)*	7.60	0.27	
Other forbs	0.00	1.08	
Total Forb Density	**14.90**	**9.81**	**6.87**
Total Invasive (Forb) Density	**7.60**	**0.27**	**0.19**
TOTAL PLANT DENSITY	**36.40**	**15.81**	**11.07**

* Invasive Species

4.2.1.3 Species Richness

An average of three different species were encountered in each quadrat sampled (Table 6). This included one shrub and two forb species. The most common shrub encountered was shadscale saltbush. The two most common forb species were Esteve's pincushion and halogeton. As the site matures and species become established, species richness may increase and more closely represent the species richness of the adjacent undisturbed plant community.

TABLE 6. SPECIES RICHNESS (SPECIES PER M^2) ON CAU 407, ROLLER COASTER RADSAFE AREA, 2010

	Staging	Reference	Standard
Shrubs	1.2	1.61	1.13
Grasses	0.0	0.50	0.35
Forbs/Annuals	1.9	1.07	0.75
Total Species	**3.1**	**3.18**	**2.23**

4.2.2 Revegetation Success

Total plant cover is twice the revegetation success standard; however, success by lifeform varies. Shrub cover is the highest it has ever been. Shrub cover was 16 percent the first year after revegetation occurred but was the result of an abundance of young shrub seedlings. By 2008, shrub cover dropped to 8 percent, and it increased to 9 percent in 2009 and to 21 percent this year. This is not the result of more plants but the result of increased growth of the plants that have established on the site. The density of shrubs was 14 plants per m^2, which was similar to last year, but substantially lower than the previous 4 years. Shrubs appear to be establishing; however, they may decline as resources become limited.

The lack of grasses is a concern. Grass cover was about 1 percent the previous 2 years, but for the first time since the site was revegetated there was no grass cover. The first year after revegetation there was an abundance of grasses, mainly squirreltail, but grasses have not survived the relatively dry conditions the last few years.

The abundance of forbs fluctuates with precipitation amounts and timing. This year there were several precipitation events during the winter and early spring months that resulted in an abundance of Esteve's pincushion and halogeton. Esteve's pincushion contributed to overall plant cover but halogeton did not. The less than 1 percent forb cover was more than half of the revegetation success standard. Forb cover has not exceeded 1 percent since the site was reseeded in 2005, and there was no forb cover in 2006 and 2009.

Shrub density was artificially high the first 4 years after the site was reseeded, and shrub density the last 2 years is still five times the revegetation success standard. As mentioned previously, shrub density is declining, but shrub cover is increasing, suggesting fewer but larger plants. The most abundant species was shadscale saltbush. Bud sagebrush, fourwing saltbush, and winterfat were also encountered but in lower numbers. This indicates shrubs are establishing.

Grass density has steadily declined over the last 5 years, and no grasses were found this year. There was a substantial drop from 2007 to 2008, and grasses have not recovered. Forb density reached a high of 15 plants per m^2 this year, which is more than twice the revegetation standard. The abundance of halogeton, an invasive weedy species, is a concern. This species experienced a 50-percent increase from 2009 to 2010. This species has been present at other sites on the TTR

that were revegetated, and over time the abundance of this species declined as perennial shrubs and grasses became established.

Species richness has stabilized over the last 5 years and exceeds revegetation standards. Species richness for shrubs was 1.2, which was higher than the standard of 1.1. Grasses were not present. Species richness for forbs was almost twice the standard. The higher shrub and forb species richness values overcame the deficiency of grasses and resulted in the overall achievement of revegetation success based on species richness.

4.2.3 Wildlife Use

There were a number of burrows along the side slopes of the site. The burrows appeared shallow and showed no signs of extensive use. Burrowing appeared to be confined to the fill material and not subsurface soils.

4.2.4 Soil Erosion

The soils appeared stable and compact and showed no signs of erosion.

4.2.5 Summary/Recommendations

The three plant community parameters exceeded standards. The absence of perennial grasses is a concern. The site should be monitored to assess the progression of the plant community. Monitoring efforts should focus on the re-establishment of perennial grasses and the abundance and dominance of halogeton. At this time, remedial action to correct either of these issues is not warranted. A viable population of shrubs seems to be establishing on the site as are several native annual forbs, which provide a vegetative cover that protects the site from wind and water erosion. If grasses do not re-establish or halogeton becomes so abundant that the existence of perennial shrubs and grasses is jeopardized, then some form of remedial action would be appropriate.

There has been some concern about the impact of burrowing animals. There were a few burrows along the slopes of the site. The burrows were relatively shallow, did not show signs of intensive use, and did not appear to create a means of exposing subsurface soils.

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