Nevada
Environmental Management
Operations Activity

DOE/NV--1517

National Nuclear Security Administration

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

For Calendar Year 2013

Controlled Copy No.:_____

Revision: 0

March 2014

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

DISCLAIMER

DOE/NV--1517

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

FOR CALENDAR YEAR 2013

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

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

FOR CALENDAR YEAR 2013

Approved By: /s/: Tiffany A. Lantow Date: 3/4/2014
Tiffany A. Lantow
Industrial Sites Activity Lead

Approved By: /s/: Wilhelm R. Wilborn Date: 3/5/2014
for Robert F. Boehlecke
Environmental Management Operations Activity Manager

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APPENDICES

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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 2013 and includes inspection and repair activities completed at the following 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 453: Area 9 UXO Landfill (TTR)
- CAU 487: Thunderwell Site (TTR)

Inspections were conducted according to the post-closure plans in the approved Closure Reports and subsequent correspondence with the Nevada Division of Environmental Protection. The post-closure inspection plans and subsequent correspondence modifying the requirements for each CAU are included in Appendix B. The inspection checklists are included in Appendix C. Field notes are included in Appendix D. Photographs taken during inspections are included in Appendix E.

The annual post-closure inspections were conducted on May 14, 2013. Maintenance was performed at CAU 400, CAU 424, and CAU 453. At CAU 400, animal burrows were backfilled. At CAU 424, erosion repairs were completed at Landfill Cell A3-3, subsidence was repaired at Landfill Cell A3-4, and additional lava rock was placed in high-traffic areas to mark the locations of the surface grade monuments at Landfill Cell A3-3 and Landfill Cell A3-8. At CAU 453, two areas of subsidence were repaired and animal burrows were backfilled.

Vegetation monitoring was performed at the CAU 400 Five Points Landfill and CAU 407 in June 2013. The vegetation monitoring report is included in Appendix F.

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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 2013 for Corrective Action Units (CAUs) on the Tonopah Test Range (TTR), Nevada. The CAUs are shown in Figure 1 of Appendix 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 453: Area 9 UXO Landfill (TTR)**
  - CAS 09-55-001-0952: Area 9 Landfill
- **CAU 487: Thunderwell Site (TTR)**
  - CAS RG-26-001-RGRV: Thunderwell Site

Inspection requirements for each CAU are included in Appendix 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 INSPECTION RESULTS

Inspections were conducted on May 14, 2013. The post-closure inspection plans were published in the applicable Closure Report (CR) for each CAU. Subsequent correspondence with the Nevada Division of Environmental Protection (NDEP) modified the requirements. The post-closure plans and subsequent correspondence are included in Appendix B. Inspection checklists are included in Appendix C. Field notes are included in Appendix D. Photographs taken during inspections are included in Appendix E.

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

The Five Points Landfill (CAS TA-19-001-05PT, Ordnance Disposal Pit) was vegetated in 1997 under the *Tonopah Test Range Closure Sites Revegetation Plan* (U.S. Department of Energy, Nevada Operations Office [DOE/NV], 1997). Fencing was required for a minimum of 5 years, and inspections of the fencing are conducted as a best management practice. The Five Points Landfill is shown in Figure 2 of Appendix A. Vegetation monitoring was conducted in June 2013, and the results are included in Appendix F. The annual inspection was conducted on May 14, 2013. Multiple animal burrows were observed. The animal burrows were backfilled on July 16, 2013. No other issues or concerns were identified, and additional maintenance and repairs were not required. Inspections should continue as scheduled. Based on the observations made during vegetation monitoring, it is recommended that future monitoring be conducted on an as-needed basis. When annual inspections are performed, if significant changes in the plant community are noted, monitoring may be requested and performed to document noted changes and potentially identify causes for the changes.

2.2 CAU 407: ROLLER COASTER RADSAFE AREA (TTR)

Inspections are conducted according to the post-closure requirements for CAU 407, Roller Coaster RadSafe Area (TTR), CAS TA-23-001-TARC, Roller Coaster RadSafe Area, as described in the CR (DOE/NV, 2001a) and subsequent correspondence. The site is shown in Figure 3 of Appendix A. Vegetation monitoring was conducted in June 2013, and the results are included in Appendix F. The annual inspection was conducted on May 14, 2013. Minor erosion rills and minor animal burrows were observed that did not require repair. No other issues or concerns were identified, and maintenance and repairs were not required. Inspections should continue as scheduled. It is recommended that vegetation monitoring be conducted in 2014 but only on an as-needed basis after 2014. During annual inspections, if abnormalities are noted or concerns are expressed regarding the status of the plant community, vegetation monitoring should be scheduled and conducted.

2.3 CAU 424: AREA 3 LANDFILL COMPLEXES (TTR)

Inspections are conducted according to the post-closure requirements for 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; and CAS 03-08-002-A308, Landfill Cell A3-8, as described in the CR (DOE/NV, 1999a) and subsequent correspondence. The landfill locations are shown in Figure 4 of Appendix A. The annual inspection was conducted on May 14, 2013.

Landfill Cell A3-1 (CAS 03-08-001-A301): No issues or concerns were identified, and maintenance and repairs were not required. Inspections should continue as scheduled.

Landfill Cell A3-2 (CAS 03-08-002-A302): Minor settling was observed that did not require repair. No other issues or concerns were identified, and maintenance and repairs were not required. Inspections should continue as scheduled.

Landfill Cell A3-3 (CAS 03-08-002-A303): Erosion on the road that traverses the site was observed, and metal debris was visibly protruding up through the surface of the landfill. The road that goes over the landfill was permanently closed. The protruding metal debris was cut at the surface, and loose debris was picked up. Removed debris was disposed of in the TTR sanitary landfill. A 1-foot cover was constructed over the road and compacted by wheel rolling. Repairs were completed on July 16, 2013. Additional lava rock was required in high-traffic areas to mark the locations of the surface grade monuments. Additional lava rock was placed on the surface grade monuments on July 16, 2013. No other issues or concerns were identified, and additional maintenance and repairs were not required. Inspections should continue as scheduled.

Landfill Cell A3-4 (CAS 03-08-002-A304): An area of subsidence was observed on the cover. The subsidence was repaired on July 16, 2013. No other issues or concerns were identified, and additional maintenance and repairs were not required. Inspections should continue as scheduled.

Landfill Cell A3-5 (CAS 03-08-002-A305): No issues or concerns were identified, and maintenance and repairs were not required. Inspections should continue as scheduled.

Landfill Cell A3-6 (CAS 03-08-002-A306): No issues or concerns were identified, and maintenance and repairs were not required. Inspections should continue as scheduled.

Landfill Cell A3-8 (CAS 03-08-002-A308): Additional lava rock was required in high-traffic areas to mark the locations of the surface grade monuments. Additional lava rock was placed on the surface grade monuments on July 16, 2013. No other issues or concerns were identified, and additional maintenance and repairs were not required. Inspections should continue as scheduled.

2.4 CAU 453: AREA 9 UXO LANDFILL (TTR)

Inspections are conducted according to the post-closure requirements for CAU 453, Area 9 UXO Landfill (TTR), CAS 09-55-001-0952, Area 9 Landfill, as described in the CR (DOE/NV, 1999b) and subsequent correspondence. The site is shown in Figure 5 of Appendix A. The annual inspection was conducted on May 14, 2013. Two areas of subsidence were identified, and animal burrows were present. The areas of subsidence were repaired and animal burrows were backfilled on July 16, 2013. No other issues or concerns were identified, and additional maintenance and repairs were not required. Inspections should continue as scheduled.

2.5 CAU 487: THUNDERWELL SITE (TTR)

Inspections are conducted according to the post-closure requirements for CAU 487, Thunderwell Site (TTR), CAS RG-26-001-RGRV, Thunderwell Site, as described in the Corrective Action Decision Document (CADD)/CR (DOE/NV, 2001b), Record of Technical Change (NNSA/NSO, 2004), and subsequent correspondence. The site is shown in Figure 6 of Appendix A. The annual inspection was conducted on May 14, 2013. No issues or concerns were identified, and maintenance and repairs were not required. Inspections should continue as scheduled.

3.0 SUMMARY

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

Animal burrows were backfilled on July 16, 2013, and additional maintenance and repairs were not required. Inspections should continue as scheduled. It is recommended that future vegetation monitoring be conducted on an as-needed basis. When annual inspections are performed, if significant changes in the plant community are noted, vegetation monitoring may be requested and performed to document noted changes and potentially identify causes for the changes.

3.2 CAU 407: ROLLER COASTER RADSAFE AREA (TTR)

Maintenance and repairs were not required. Inspections should continue as scheduled. It is recommended that vegetation monitoring be conducted in 2014 but only on an as-needed basis after 2014. During annual inspections, if abnormalities are noted or concerns are expressed regarding the status of the plant community, vegetation monitoring should be scheduled and conducted.

3.3 CAU 424: AREA 3 LANDFILL COMPLEXES (TTR)

Erosion repairs were completed at Landfill Cell A3-3 on July 16, 2013. Subsidence was repaired at Landfill Cell A3-4 on July 16, 2013. Additional lava rock was placed in high-traffic areas to mark the locations of the surface grade monuments at Landfill Cell A3-3 and Landfill Cell A3-8 on July 16, 2013. Additional maintenance or repairs were not required. Inspections should continue as scheduled.

3.4 CAU 453: AREA 9 UXO LANDFILL (TTR)

Two areas of subsidence and animal burrows identified during the inspection were repaired on July 16, 2013. Inspections should continue as scheduled.

3.5 CAU 487: THUNDERWELL SITE (TTR)

Maintenance and repairs were not 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, 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. 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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APPENDIX A
FIGURES

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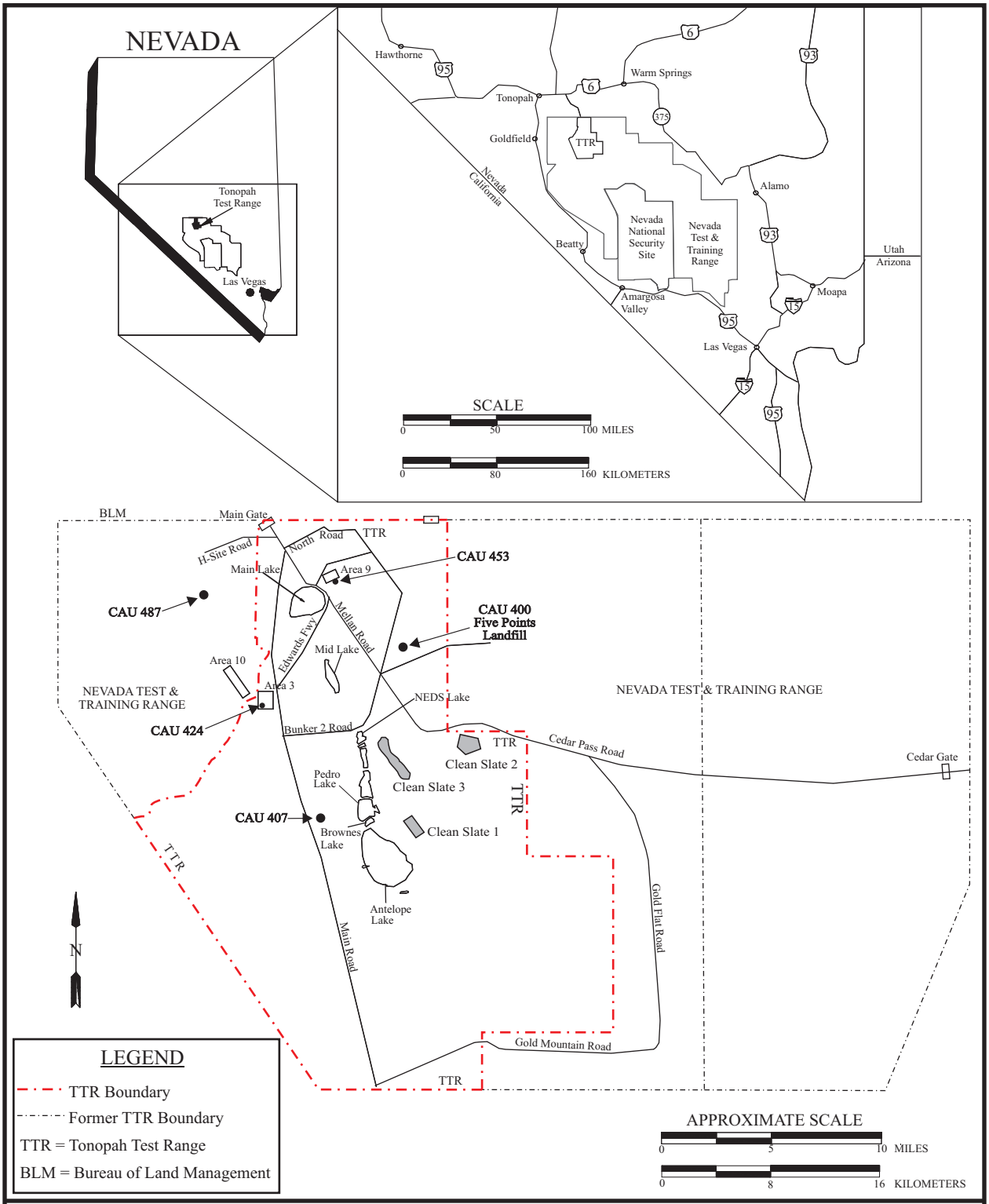

FIGURE 1
TONOPAH TEST RANGE
POST-CLOSURE MONITORING SITES LOCATION MAP

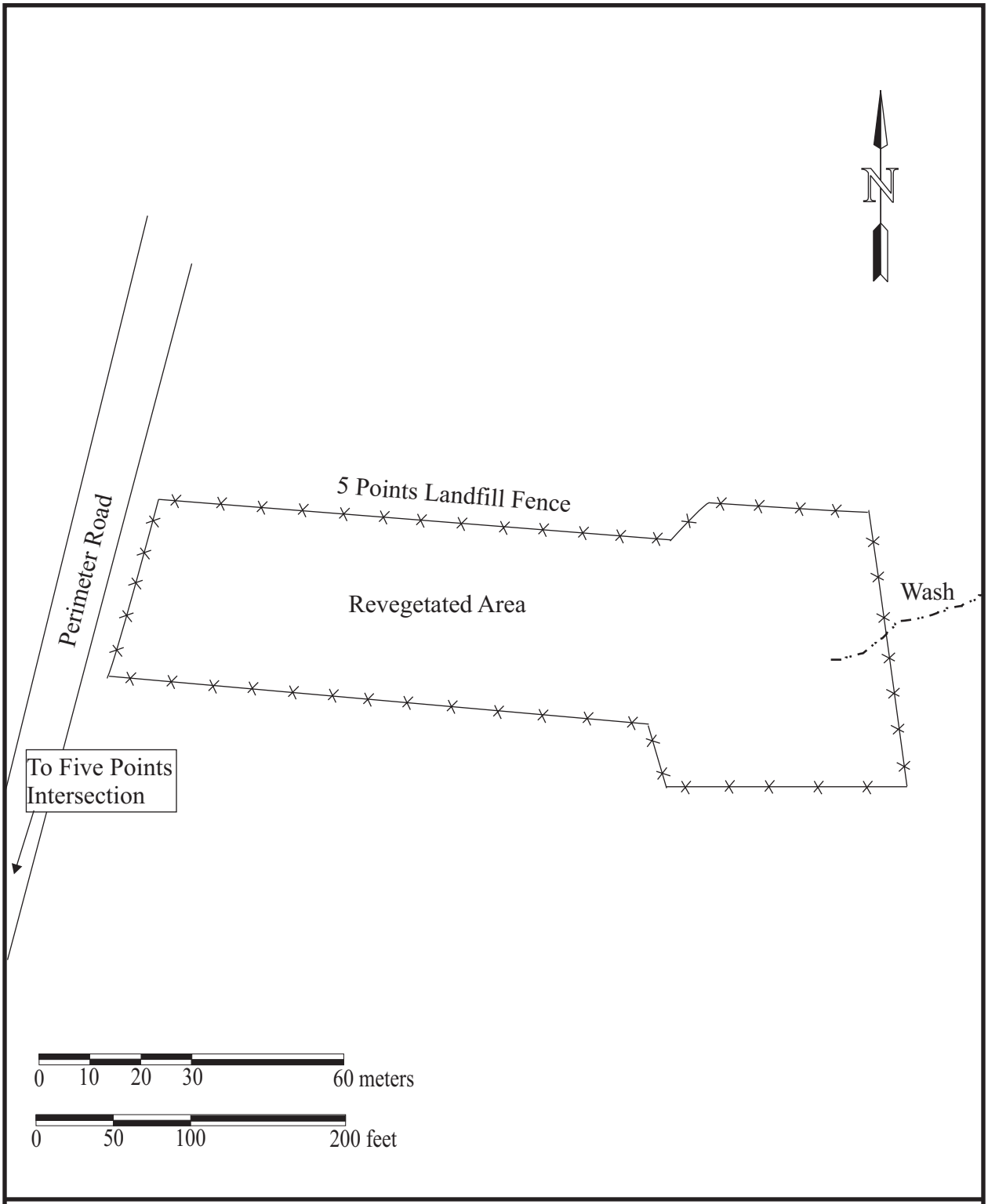

FIGURE 2
CAU 400 FIVE POINTS LANDFILL LOCATION MAP

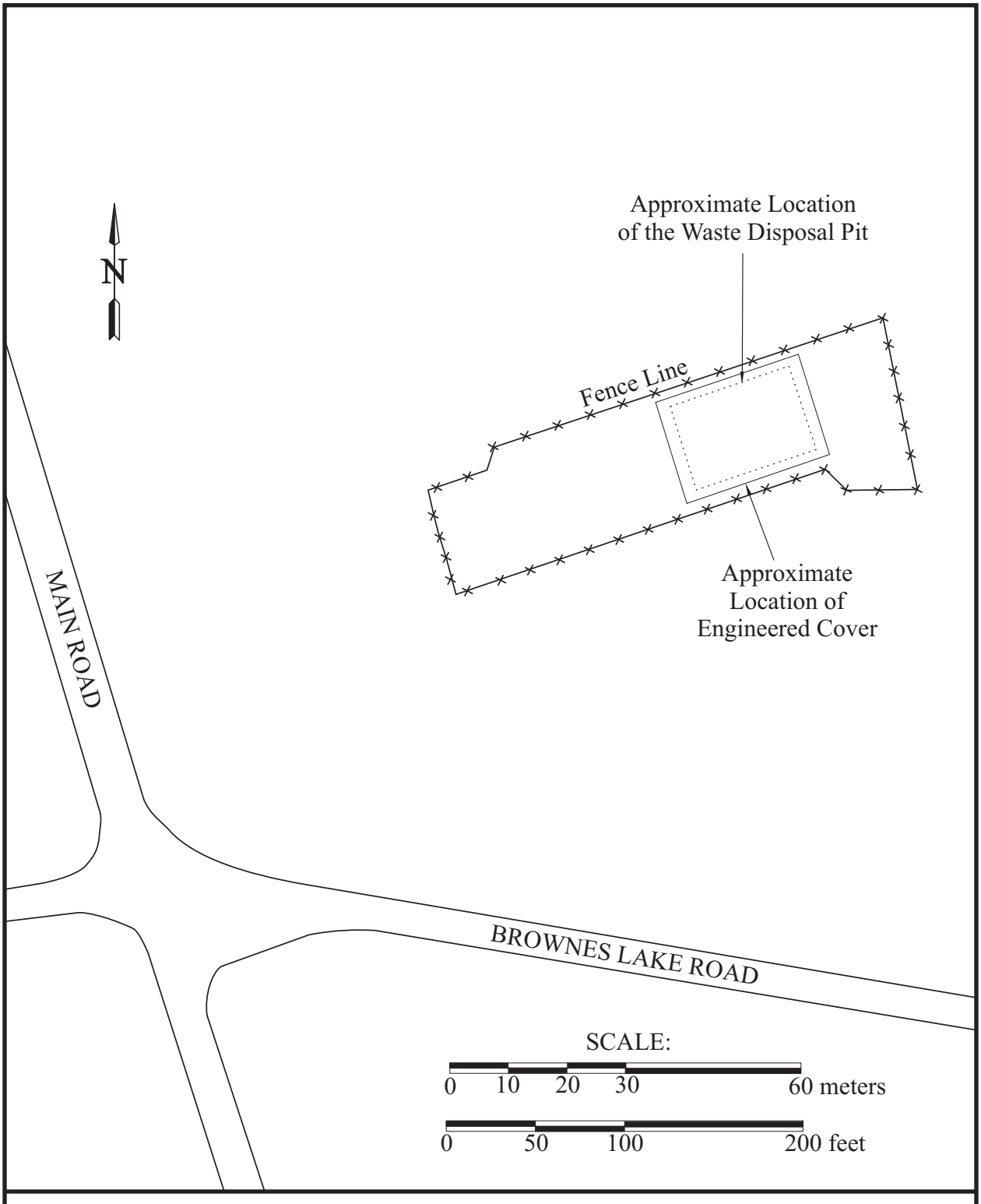

FIGURE 3
CAU 407 ROLLER COASTER RADSAFE AREA LOCATION MAP

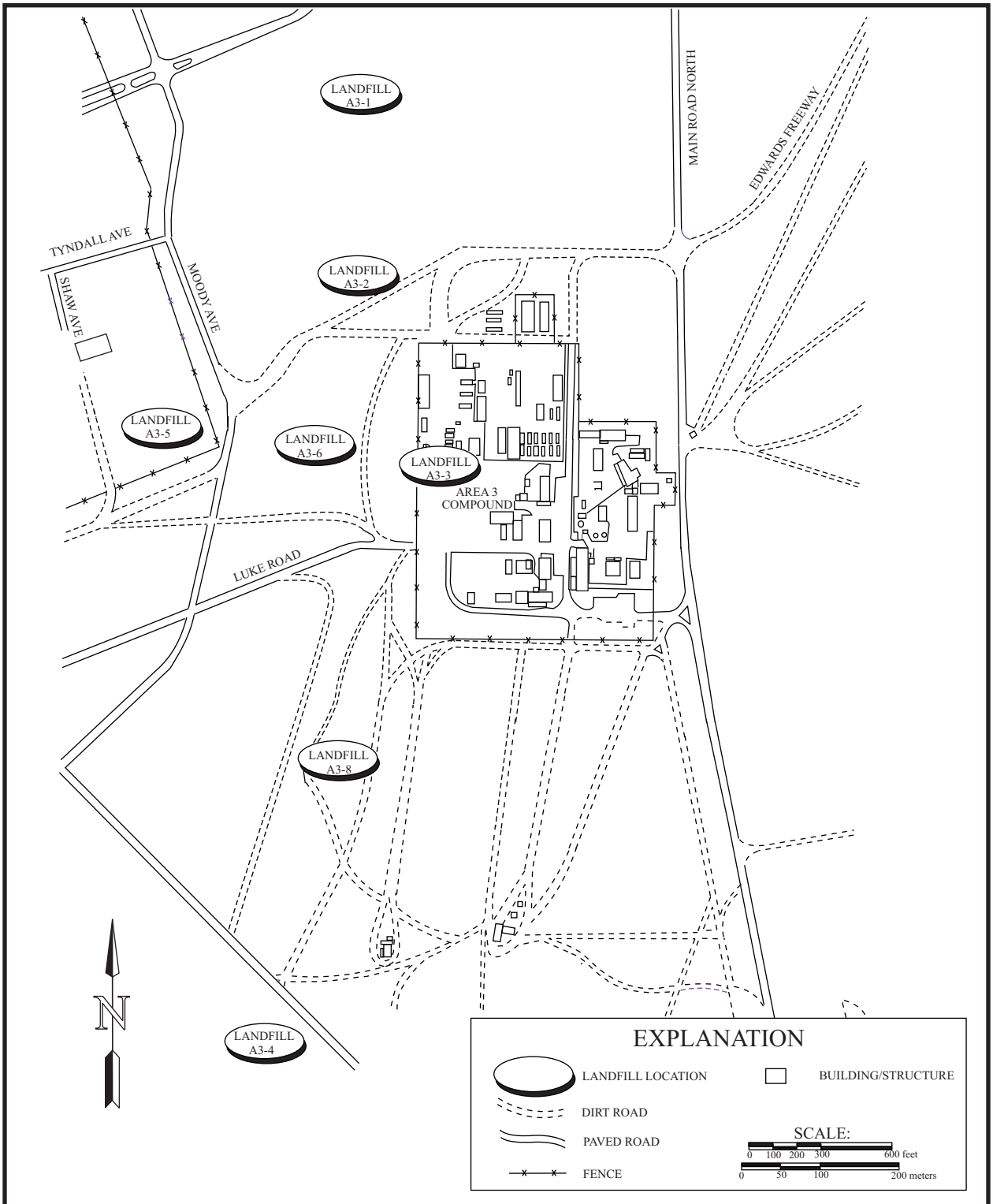

FIGURE 4
CAU 424 AREA 3 LANDFILL COMPLEXES LOCATION MAP

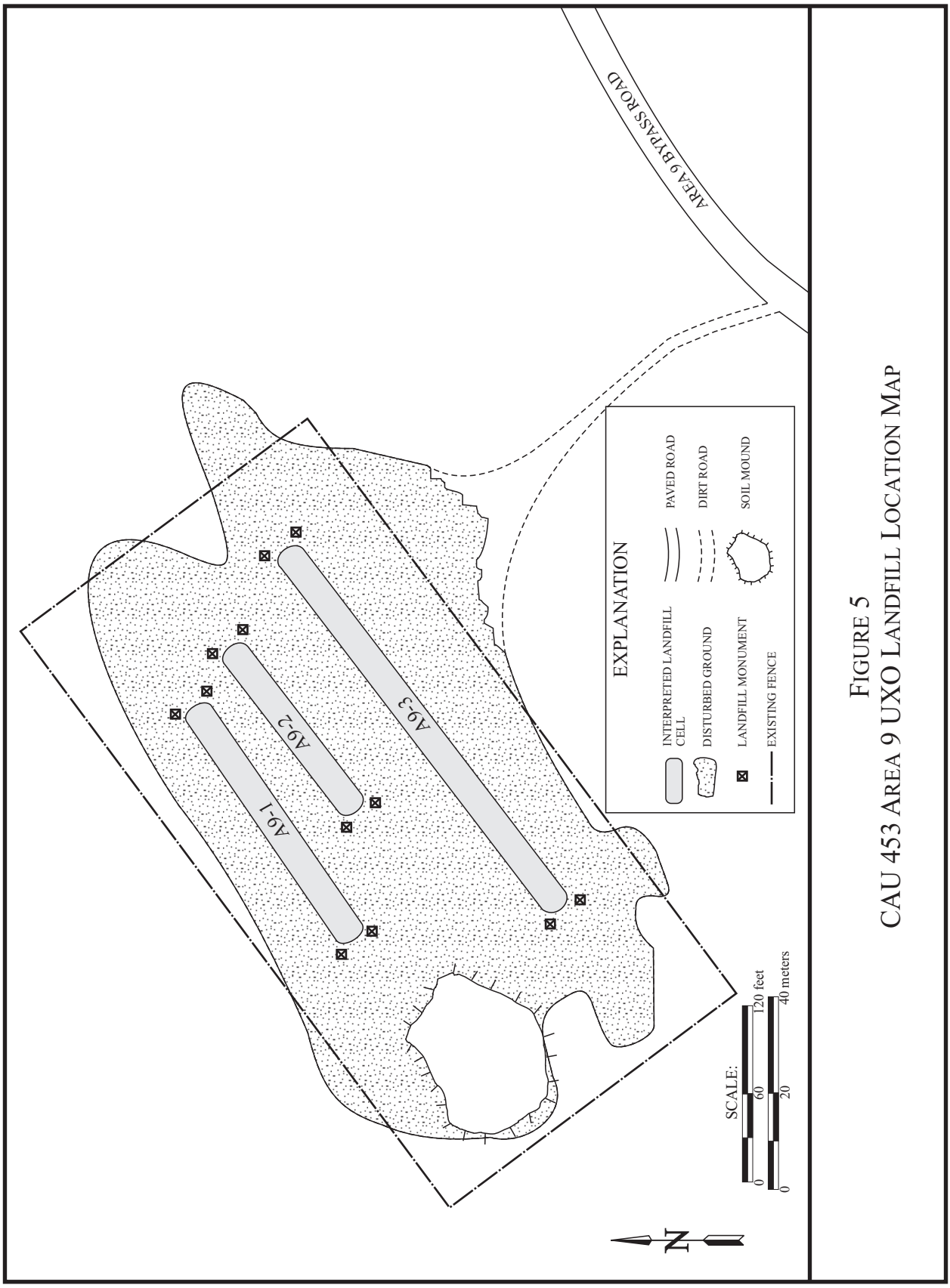

FIGURE 5
CAU 453 AREA 9 UXO LANDFILL LOCATION MAP

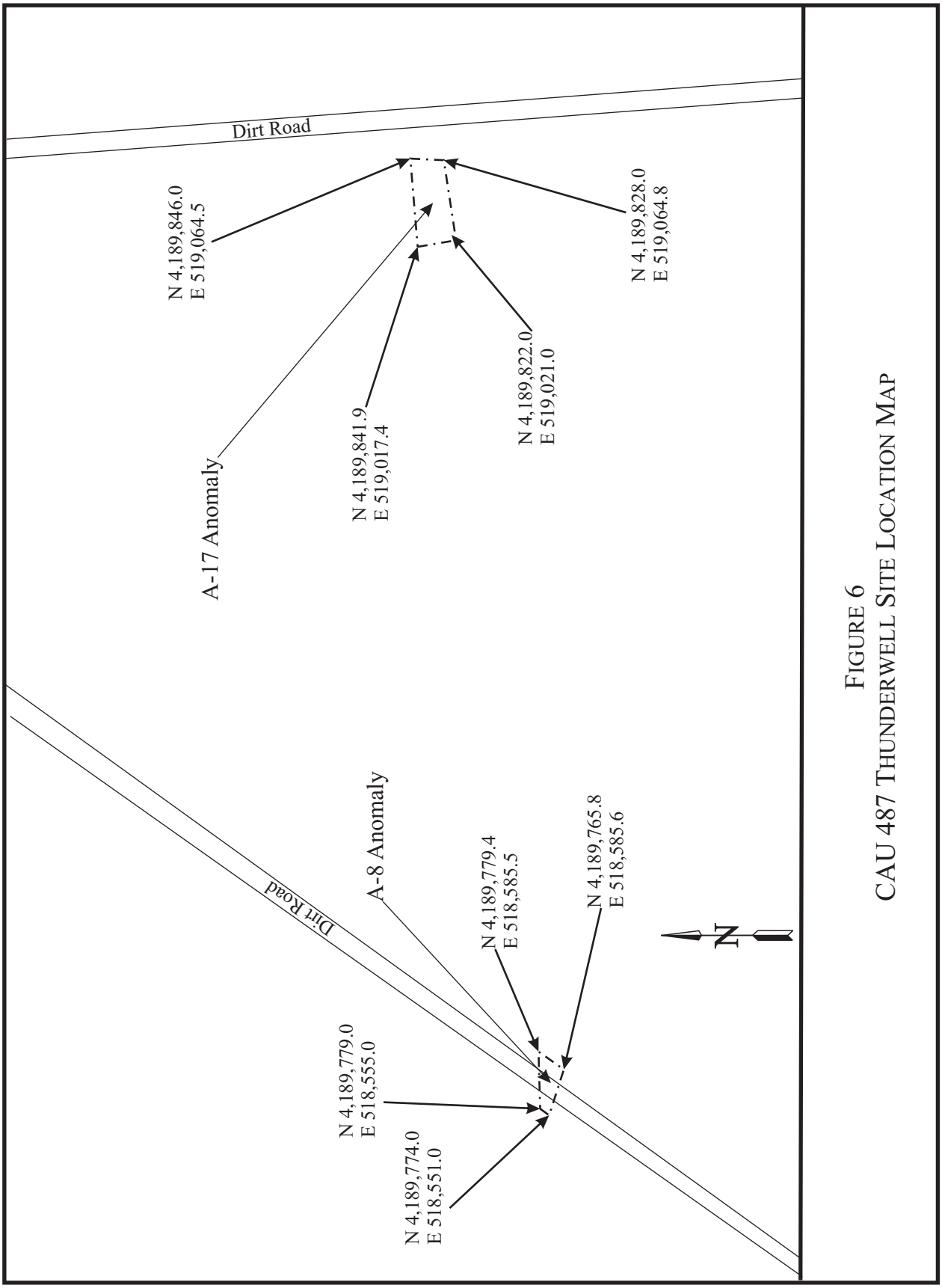

FIGURE 6
CAU 487 THUNDERWELL SITE LOCATION MAP

APPENDIX B
POST-CLOSURE REQUIREMENTS

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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 Appendix 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.

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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.

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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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ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Kenny C. Guinn, Governor
Allen Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

December 5, 2006

John B. Jones, Acting Federal Project Director
Environmental Restoration Project
National Nuclear Security Administration
Nevada Site Office (NNSA/NSO)
P.O. Box 98518
Las Vegas, NV 89193-8518

Subject: NNSA/NSO Request to Reduce the Frequency of Post-Closure Monitoring of Corrective Action Units (CAU) 400, 404, 407, 423, 424, 426, 427, 453, and 487 at Tonopah Test Range (TTR), Nevada

Dear Mr. Jones:

The Nevada Division of Environmental Protection, Bureau of Federal Facilities staff (NDEP) has received and reviewed the referenced request, dated November 28, 2006. The sites have been monitored for various lengths of time beginning in 1997 for CAU 400, 1998 for CAUs 404 and 426, 1999 for CAUs 423, 424, 427, and 453, 2001 for CAU 487, and 2002 for CAU 407. Some of the sites have not been required to conduct post-closure monitoring or have only been required to conduct inspections for a short period of time but all sites have continued to be monitored as a best management practice. Past monitoring has demonstrated that a once per year inspection would be sufficient for soil cover, fencing, monuments and signs at these sites.

NDEP concurs with the NNSA/NSO request to reduce the frequency of the post-closure monitoring inspections of the subject CAUs to an annual frequency. Maintenance and repair requirements must continue to be made within ninety (90) days of discovery and documented in writing at the time of repair. Annual reports to NDEP must also continue.

Address any questions regarding this matter to either Ted Zaferatos at (702) 486-2850, ext. 234, Don Elle at (702) 486-2850, ext. 229, or me at (702) 486-2850, ext. 231.

Sincerely,

/s/: Tim Murphy

T.H. Murphy
Chief
Bureau of Federal Facilities

ACTION	ERP
INFO	WMP AMSP
NSO/MGR	L
AMEM	L
AMNS	
AMSO	
AMSP	L
AMSS	

1771 E. Flamingo Road, Suite 121-A • Las Vegas, Nevada 89119

DRE/TZ

cc: K.J. Cabble, ERP, NNSA/NSO
E.F. Di Sanza, WMP, NNSA/NSO
K.A. Hoar, Director, AD/AMSP, NNSA/NSO
D.C. Loewer, DTRA/CXT1, M/S 645, Mercury, NV
T.A. Lantow, DTRA/CXT1, M/S 645, Mercury, NV
W.R. Griffin, SNJV/DTRA, M/S 645, Mercury, NV
Glenn Richardson, NSTec, NTS 306, Mercury, NV
J.L. Smith, NSTec, Las Vegas, NV
R.F. Boehlecke, SNJV, Las Vegas, NV
Pete Sanders, ERP, NNSA/NSO
Sabine Curtis, ERP, NNSA/NSO
FFACO Group, PSG, NNSA/NSO, Las Vegas, NV
Eloise Hopper, Nellis AFB
Vern Gabbard, SNL/TTR
98 RANW/CC, 3770 Duffer Drive, Las Vegas, NV 89191
98 RANW/XPL, 3770 Duffer Drive, Las Vegas, NV 89191

APPENDIX C
POST-CLOSURE INSPECTION CHECKLISTS

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Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 400, BOMBLET PIT AND FIVE POINTS LANDFILL (TTR) – CAS TA-19-001-05PT, ORDNANCE DISPOSAL PIT

Inspection Date: 5/14/13	Reason for Inspection: Annual
Date of Last Post-Closure Inspection: 5/8/12	Reason for Last Post-Closure Inspection: Annual
Responsible Entity: NSTec Environmental Restoration, Nevada National Security Site, Mercury, Nevada	
Responsible Facility Owner: Thomas A. Thiele, Project Manager, Industrial Sites, Environmental Restoration Project	
Chief Inspector: Rebecca King	Title: Project Manager
Assistant Inspector: Tom Thiele	Title: Program Manager

A. GENERAL INSTRUCTIONS FIVE POINTS LANDFILL ONLY

- ***The site inspection is to document vegetation growth and inspect the integrity of the fence and can be conducted from outside the perimeter fence.***
- All documentation must be legible and clear. Complete all checklist items.
- 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. 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.

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

C. SITE INSPECTION (To be completed during the site visit)			
1. Adjacent Offsite Features:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
2. Site Markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there damage to or a break in the fence or fenceposts?		X	
3. Fenced Area:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of human or large animal intrusion onto the site?		X	
b. Are animal burrows present?	X		MULTIPLE BURROW AREAS OBSERVED
c. Are weedy plants present?			NOT OBSERVED. THESE ITEMS WILL
d. Is there evidence of plant mortality?			BE EVALUATED DURING THE 6/13
e. Are the hay bales along the drainage adequate to prevent erosion?			VEGETATION SURVEY/INSPECTION
f. Is there trash or debris within the fenced area?		X	
g. Are there any other issues not specifically described in this checklist?		X	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Photos are required to be taken from the approximate location where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should also be taken to document maintenance/repair needs, anomalous features, or new features (such as changes in adjacent area land use). These will be used to plan maintenance/repair activities and are not intended for use in the annual post-closure report.
- Photographs will be filed electronically.

4. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have the required photographs of the site been taken?	X		

D. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 400, BOMBLET PIT AND FIVE POINTS LANDFILL (TTR) – CAS TA-19-001-05PT, ORDNANCE DISPOSAL PIT

1. Is maintenance/repair necessary?	X		FILL ANIMAL BURROWS

2. Field Conclusions/Recommendations: FILL ANIMAL BURROWS

E. CERTIFICATION: I have conducted this inspection in accordance with the post-closure requirements as recorded on this checklist and attachments.

Chief Inspector's Signature: /s/: Rebecca King	Date: 5/14/13

F. VERIFICATION: I have reviewed this checklist and attachments and have verified that they are complete.

Signature: /s/: Reed Poderis	Date: 5/29/13

Printed Name: Thomas A. Thiele (or designee)

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 407, ROLLER COASTER RADSAFE AREA (TTR) – CAS TA-23-001-TARC, ROLLER COASTER RADSAFE AREA

Inspection Date:	5/14/13	Reason for Inspection:	Annual
Date of Last Post-Closure Inspection:	5/9/12	Reason for Last Post-Closure Inspection:	Annual

Responsible Entity: NSTec Environmental Restoration, Nevada National Security Site, Mercury, Nevada

Responsible Facility Owner: Thomas A. Thiele, Project Manager, Industrial Sites, Environmental Restoration Project

Chief Inspector:	Rebecca King	Title:	Project Manager
Assistant Inspector:	Tom Thiele	Title:	Manager

A. GENERAL INSTRUCTIONS

- ***The site inspection is an inspection of the entire perimeter to visually inspect all features specifically described in this checklist and observe whether there is an indication that the use restriction may have been compromised. Entry into the fenced area is not required for the inspection.***
- All documentation must be legible and clear. Complete all checklist items.
- 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. 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.

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

C. SITE INSPECTION (To be completed during the site visit)			
1. Adjacent Offsite Features:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
2. Site Markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there damage to or a break in the fencing or fenceposts?		X	
b. Are all use restriction signs legible?	X		
c. How many damaged or missing signs need to be replaced?	0		
d. How many down or loose signs need to be re-hung?	0		
e. Do any Underground Radioactive Material Area signs need to be replaced or re-hung?		X	
3. Waste Unit Cover:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?	X		MINOR RILLS ON EAST SIDE. NO REPAIRS NECESSARY AT THIS TIME.
c. Is there evidence of ponding on the cover?		X	
d. Is organic mulch adequate to prevent erosion?			NOT OBSERVED. WILL BE EVALUATED DURING THE 6/13 VEGETATION SURVEY/INSPECTION.
e. Is there evidence of human or large animal intrusion onto the site?		X	
f. Are animal burrows present?	X		MINOR BURROWING PRESENT, NO REPAIRS NECESSARY AT THIS TIME.

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 407, ROLLER COASTER RADSAFE AREA (TTR) – CAS TA-23-001-TARC, ROLLER COASTER RADSAFE AREA

g. Are weedy plants present?			NOT OBSERVED. THESE ITEMS WILL BE EVALUATED DURING THE 6/13 VEGETATION SURVEY/INSPECTION.
h. Is there evidence of plant mortality?			
i. Is there trash or debris within the fenced area?		X	
j. Are there any other issues not specifically described in this checklist?		X	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Photos are required to be taken from the approximate location where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should also be taken to document maintenance/repair needs, anomalous features, or new features (such as changes in adjacent area land use). These will be used to plan maintenance/repair activities and are not intended for use in the annual post-closure report.
- Photographs will be filed electronically.

4. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have the required photographs of the site been taken?	X		

D. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is maintenance/repair necessary?		X	MINOR RILLS ON EAST SIDE. MONITOR FOR WORK.
2. Is there an imminent hazard to the integrity of the landfill cover?		X	

3. Field Conclusions/Recommendations:

E. CERTIFICATION: I have conducted this inspection in accordance with the post-closure requirements as recorded on this checklist and attachments.

Chief Inspector's Signature: /s/: Rebecca King Date: 5/14/13

F. VERIFICATION: I have reviewed this checklist and attachments and have verified that they are complete.

Signature: /s/: Reed Poderis Date: 5/22/13

Printed Name: Thomas A. Thiele (or designee)

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

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, and CAS 03-08-002-A308, Landfill Cell A3-8

Inspection Date:	5/14/13	Reason for Inspection:	Annual
Date of Last Post-Closure Inspection:	5/8/12	Reason for Last Post-Closure Inspection:	Annual
Responsible Entity: NSTec Environmental Restoration, Nevada National Security Site, Mercury, Nevada			
Responsible Facility Owner: Thomas A. Thiele, Project Manager, Industrial Sites, Environmental Restoration Project			
Chief Inspector:	Rebecca King	Title:	Project Manager
Assistant Inspector:	Tom Thiele	Title:	Manager

A. GENERAL INSTRUCTIONS

- ***The site inspection is an inspection of the each site including the perimeters and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.***
- All documentation must be legible and clear. Complete all checklist items.
- 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. 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.

B. PREPARATION (To be completed prior to the site visit)	YES	NO	EXPLANATION (required if shaded box is checked)
1. Were anomalies or trends detected on previous inspections?		✓	
2. Were maintenance or repairs performed since the last inspection?	✓		subsidence Repair + Placement of Rock on markers
a. If yes, has repair resulted in a change from as-built conditions?		✓	NA
b. If yes (to 2a), are revised as-built plans available that reflect repair changes?			NA ✓

C. SITE INSPECTION (To be completed during the site visit)			
1. Adjacent Offsite Features (Landfill A3-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
2. 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 or damaged?		X	
b. Are all signs legible?	X		
c. How many damaged or missing signs need to be replaced?	0		
d. How many down or loose signs need to be re-hung?	0		
3. Waste Unit Cover (Landfill A3-1):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?		X	
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

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, and CAS 03-08-002-A308, Landfill Cell A3-8

4. Adjacent Offsite Features (Landfill A3-2):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
5. 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 or damaged?		X	
b. Are all signs legible?	X		
c. How many damaged or missing signs need to be replaced?	0		
d. How many down or loose signs need to be re-hung?	0		
6. Waste Unit Cover (Landfill A3-2):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of settling or cracking?	X		MINOR SETTLING NEAR NORTH END, NO REPAIR, MONITOR NEXT YEAR.
b. Is there evidence of erosion (wind or water)?		X	
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	
7. Adjacent Offsite Features (Landfill A3-3, western two cells):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Are there any new activities or offsite features that could potentially affect the site?		X	
8. Site Markers (Landfill A3-3, western two cells):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Have any of the three (3) boundary monuments been disturbed or damaged?		X	
b. Are all three (3) surface markers in good condition and is lava rock sufficient to locate them?	X		
c. Are all signs legible?	X		
d. How many damaged or missing signs need to be replaced?	6		
e. How many down or loose signs need to be re-hung?	0		
9. Waste Unit Cover (Landfill A3-3, western two cells):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?	X	X	MINOR EROSION DUE TO TRAFFIC, MATERIAL IS VISIBLE ON SURFACE
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	
10. Adjacent Offsite Features (Landfill A3-3, eastern cell):	**YES**	**NO**	**EXPLANATION (required if shaded box is checked)**

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

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, and CAS 03-08-002-A308, Landfill Cell A3-8

	YES	NO	EXPLANATION (required if shaded box is checked)
10. Adjacent Offsite Features (Landfill A3-3, eastern cell):			
a. Are there any new activities or offsite features that could potentially affect the site?		X	
11. Site Markers (Landfill A3-3, eastern cell):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are all three (3) surface markers in good condition and is lava rock sufficient to locate them?	X		LAVA ROCK IS SUFFICIENT TO LOCATE, BUT ADD'L ROCK SHOULD BE PLACED TO ENHANCE VISIBILITY.
12. Waste Unit Cover (Landfill A3-3, eastern cell):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?		X	
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	
13. Adjacent Offsite Features (Landfill A3-4):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
14. 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 or damaged?		X	
b. Are all signs legible?	X		
c. How many damaged or missing signs need to be replaced?	0		
d. How many down or loose signs need to be re-hung?	0		
15. Waste Unit Cover (Landfill A3-4):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?	X		~10'x10' AREA OF SUBSIDENCE NEAR N. SIDE.
b. Is there evidence of erosion (wind or water)?		X	
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	
16. Adjacent Offsite Features (Landfill A3-5):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
17. 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 or damaged?		X	
b. Are all signs legible?	X		

POST-CLOSURE INSPECTION CHECKLIST

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, and CAS 03-08-002-A308, Landfill Cell A3-8

c. How many damaged or missing signs need to be replaced?	0		
d. How many down or loose signs need to be re-hung?	0		
18. Waste Unit Cover (Landfill A3-5):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?		X	
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	
19. Adjacent Offsite Features (Landfill A3-6):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
20. 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 or damaged?		X	
b. Are all signs legible?	X		
c. How many damaged or missing signs need to be replaced?	0		
d. How many down or loose signs need to be re-hung?	0		
21. Waste Unit Cover (Landfill A3-6):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?		X	
c. Is there evidence of human intrusion or large animal onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	
22. Adjacent Offsite Features (Landfill A3-8):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
23. Site Markers (Landfill A3-8):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are all four (4) surface markers in good condition and is lava rock sufficient to locate them?	X		LAVA ROCK IS SUFFICIENT TO LOCATE, BUT ADD'L ROCK SHOULD BE ADDED TO ENHANCE VISIBILITY
b. Are all signs legible?	X		NO UR SIGNS, BUT RAD SIGNS ARE FINE
c. How many damaged or missing signs need to be replaced?	0		
d. How many down or loose signs need to be re-hung?	0		

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

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, and CAS 03-08-002-A308, Landfill Cell A3-8

24. Waste Unit Cover (Landfill A3-8):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?		X	
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?		X	
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Photos are required to be taken from the approximate location where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should also be taken to document maintenance/repair needs, anomalous features, or new features (such as changes in adjacent area land use). These will be used to plan maintenance/repair activities and are not intended for use in the annual post-closure report.
- Photographs will be filed electronically.

25. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have the required photographs of the site been taken?	X		

D. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is maintenance/repair necessary?	X		SEE D.3
2. Is there an imminent hazard to the integrity of the landfills?		X	

3. Field Conclusions/Recommendations:

ADD'L LAVA ROCK SHOULD BE ADDED AT A3-3 AND A3-8.
REPAIR SUBSIDENCE AT A3-4.
REMOVE SOME DEBRIS AND RE-COVER AT A3-3

E. CERTIFICATION: I have conducted this inspection in accordance with the post-closure requirements as recorded on this checklist and attachments.

Chief Inspector's Signature: /s/: Rebecca King Date: 5/14/13

F. VERIFICATION: I have reviewed this checklist and attachments and have verified that they are complete.

Signature: /s/: Reed Poderis Date: 5/29/13

Printed Name: Thomas A. Thiele (or designee)

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 453, AREA 9 UXO LANDFILL (TTR) – CAS 09-55-001-0952, AREA 9 LANDFILL

Inspection Date:	5/14/13	Reason for Inspection:	Annual
Date of Last Post-Closure Inspection:	5/8/12	Reason for Last Post-Closure Inspection:	Annual
Responsible Entity: NSTec Environmental Restoration, Nevada National Security Site, Mercury, Nevada			
Responsible Facility Owner: Thomas A. Thiele, Project Manager, Industrial Sites, Environmental Restoration Project			
Chief Inspector:	Rebecca Kuiz	Title:	Project Manager
Assistant Inspector:	Tom Thiele	Title:	Manager

A. GENERAL INSTRUCTIONS

- ***The site inspection is an 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.***
- All documentation must be legible and clear. Complete all checklist items.
- 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. 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.

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

C. SITE INSPECTION (To be completed during the site visit)			
1. Adjacent Offsite Features:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
2. Site Markers:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there damage to the gate or lock?		X	
b. Is there damage to fencing or fenceposts?		X	
c. Have any boundary monuments been disturbed or damaged?		X	
d. Are all signs legible?	X		
e. How many damaged or missing signs need to be replaced?	0		
f. How many down or loose signs need to be re-hung?	0		
3. Use Restricted Area:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of settling or cracking?		X	
b. Is there evidence of erosion (wind or water)?	X		2 AREAS OF MINOR WATER EROSION
c. Is there evidence of human or large animal intrusion onto the site?		X	
d. Are animal burrows present?	X		NUMEROUS BORROWS PRESENT
e. Is there trash or debris within the use restricted area?		X	
f. Are there any other issues not specifically described in this checklist?		X	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 453, AREA 9 UXO LANDFILL (TTR) – CAS 09-55-001-0952, AREA 9 LANDFILL

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Photos are required to be taken from the approximate location where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should also be taken to document maintenance/repair needs, anomalous features, or new features (such as changes in adjacent area land use). These will be used to plan maintenance/repair activities and are not intended for use in the annual post-closure report.
- Photographs will be filed electronically.

4. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have the required photographs of the site been taken?	X		

D. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is maintenance/repair necessary?	X		SEE D.3
2. Is there an imminent hazard to the integrity of the landfill cover?		X	

3. Field Conclusions/Recommendations: REPAIR ERODED AREAS AND BACKFILL ANIMAL BURROWS

E. CERTIFICATION: I have conducted this inspection in accordance with the post-closure requirements as recorded on this checklist and attachments.

Chief Inspector's Signature: /s/: Rebecca King Date: 5/14/13

F. VERIFICATION: I have reviewed this checklist and attachments and have verified that they are complete.

Signature: /s/: Reed Poderis Date: 5/29/13

Printed Name: Thomas A. Thiele (or designee)

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 487, THUNDERWELL SITE (TTR) – CAS RG-26-001-RGRV, THUNDERWELL SITE

Inspection Date and Time:	5/14/13	Reason for Inspection:	Annual
Date of Last Post-Closure Inspection:	5/8/12	Reason for Last Post-Closure Inspection:	Annual

Responsible Entity: NSTec Environmental Restoration, Nevada National Security Site, Mercury, Nevada

Responsible Facility Owner: Thomas A. Thiele, Project Manager, Industrial Sites, Environmental Restoration Project

Chief Inspector:	Rebecca King	Title:	Project Manager
Assistant Inspector:	Tom Thiele	Title:	Manager

A. GENERAL INSTRUCTIONS

- ***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.***
- All documentation must be legible and clear. Complete all checklist items.
- 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. 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.

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

C. SITE INSPECTION (To be completed during the site visit)			
1. Adjacent Offsite Features (A8 Anomaly):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
2. Site Markers (A8 Anomaly):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any boundary monuments been disturbed or damaged?		X	
b. How many damaged or missing signs need to be replaced?	0		
c. How many down or loose signs need to be re-hung?	0		
3. Use Restricted Area (A8 Anomaly):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of human or large animal intrusion onto the site?		X	
b. Is there trash or debris within the use restricted area?		X	
c. Are there any other issues not specifically described in this checklist?		X	
4. Adjacent Offsite Features (A17 Anomaly):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Are there any new activities or offsite features that could potentially affect the site?		X	
5. Site Markers (A17 Anomaly):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have any boundary monuments been disturbed or damaged?		X	
b. How many damaged or missing signs need to be replaced?	0		
c. How many down or loose signs need to be re-hung?	0		
6. Use Restricted Area (A17 Anomaly):	YES	NO	EXPLANATION (required if shaded box is checked)
a. Is there evidence of human or large animal intrusion onto the site?		X	

Inspection Requirement: **Annual**

POST-CLOSURE INSPECTION CHECKLIST

CAU 487, THUNDERWELL SITE (TTR) – CAS RG-26-001-RGRV, THUNDERWELL SITE

b. Is there trash or debris within the use restricted area?		X	
c. Are there any other issues not specifically described in this checklist?		X	

Photograph Instructions:

- ***A standard set of photographs is needed for the post-closure report. Photos are required to be taken from the approximate location where photos were taken the previous year (as found in the previous year's post-closure report).***
- Photographs should also be taken to document maintenance/repair needs, anomalous features, or new features (such as changes in adjacent area land use). These will be used to plan maintenance/repair activities and are not intended for use in the annual post-closure report.
- Photographs will be filed electronically.

7. Photograph Documentation:	YES	NO	EXPLANATION (required if shaded box is checked)
a. Have the required photographs of the site been taken?	X		

D. FIELD CONCLUSIONS	YES	NO	EXPLANATION (required if shaded box is checked)
1. Is maintenance/repair necessary?		X	

2. Field Conclusions/Recommendations: _____

E. CERTIFICATION: I have conducted this inspection in accordance with the post-closure requirements as recorded on this checklist and attachments.

Chief Inspector's Signature: /s/: Rebecca King Date: 5/14/13

F. VERIFICATION: I have reviewed this checklist and attachments and have verified that they are complete.

Signature: /s/: Reed Poderis Date: 5/29/13

Printed Name: Thomas A. Thiele (or designee)

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APPENDIX D
FIELD NOTES

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May 14, 2013

Personnel (ER)
Tom Thiele - Manager
Rebecca King - Project Manager
Domenic Cotroneo III - RCT
Kevin Cubble - NFO
Ted Zaferatos - NDEP

11am Clean Slate II - site, signs + fencing in good condition - break for lunch.

12:15 Safety brief conducted, sun, slips/trips + wildlife.

12:30 CAU 424 A3-5 Markers, monuments and cover in good condition. No issues.

12:35 A3-1 markers, monuments + cover in good condition. No issues

12:50 A3-2 Markers, monuments in good condition. Minor settling on north end of cover. No action needed at this time - monitor on next inspection.

1:00 A3-3 West cell - monuments and markers in in good condition. Erosion from traffic has uncovered some debris - need to evaluate.
East cells - lava rock on eastern most cells could use refreshing.

1:15 A3-6 Markers, monuments + cover in good condition. No issues.

Work continued to Page 40

SIGNATURE /s/: R. A. King **DATE** 5/14/13

DISCLOSED TO AND UNDERSTOOD BY **DATE** **WITNESS** **DATE**

1:30 A3-8 All markers located and visible but one ~~closest~~ nearest to road RAK 5/14/13 needs more Rock.

1:40 A3-4 Monument, markers and cover in good condition, except for a 10X10 subsidence just ~~west~~ South RAK 5/14/13 of the 2nd monument on the west.

2:10 CAU 407 Fence and signs in good condition. Cover in good condition except for a few small animal burrows + minor erosion rills to monitor.

2:40 CAU 400 Bourdett Pit drone by to view vegetation on previously disturbed area - some veg appears to be propagating.

5 Points Landfill: Vegetation looks good with lots of new growth. Fence is in good condition. There is a lot of animal burrowing inside fence + under fence. Hay bails at wash are in bad shape. Need to have botanist make recommendation on vegetation, haybales and animal burrows.

3:30 CAU 453 - Fence and signs in good condition. Large animal burrows on various sections of the cover that have been enlarged with water erosion and require filling. Monuments in good condition. Lock needs lubricant.

3:50 CAU 487 - Signs monuments and cover good at both sites.

Work continued to Page 41

SIGNATURE /s/: R. A. King DATE 5/14/13

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 40

Slates PAC 5/14/13

4:15 Clean ~~Sites~~ I - Fence and signs in good condition.

5:10 Clean Slates III - Fence + Signs in good condition.

5/14/13

/s/: R. A. King

last entry

SIGNATURE /s/: R. A. King

DISCLOSED TO AND UNDERSTOOD BY **DATE** **WITNESS** **DATE** 5/14/13

Work continued to Page

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APPENDIX E
PHOTOGRAPHS

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PHOTOGRAPH LOG

PHOTOGRAPH	DATE	DESCRIPTION
1	05/14/2013	CAU 400 Five Points Landfill, Looking West
2	05/14/2013	CAU 407, Looking East
3	05/14/2013	CAU 424, Landfill Cell A3-1, Looking Southeast
4	05/14/2013	CAU 424, Landfill Cell A3-2, Looking North
5	05/14/2013	CAU 424, Landfill Cell A3-3, Looking North
6	06/11/2013	CAU 424, Landfill Cell A3-3, Debris Looking North
7	05/14/2013	CAU 424, Landfill Cell A3-4, Looking North
8	05/14/2013	CAU 424, Landfill Cell A3-5, Looking Southeast
9	05/14/2013	CAU 424, Landfill Cell A3-6, Looking East
10	05/14/2013	CAU 424, Landfill Cell A3-8, Looking West
11	05/14/2013	CAU 453, Subsidence
12	05/14/2013	CAU 487, A-8 Anomaly, Looking East
13	05/14/2013	CAU 487, A-17 Anomaly, Looking West

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Photograph 1: CAU 400 Five Points Landfill, Looking West, 05/14/2013

Photograph 2: CAU 407, Looking East, 05/14/2013

Photograph 3: CAU 424, Landfill Cell A3-1, Looking Southeast, 05/14/2013

Photograph 4: CAU 424, Landfill Cell A3-2, Looking North, 05/14/2013

Photograph 5: CAU 424, Landfill Cell A3-3, Looking North, 05/14/2013

Photograph 6: CAU 424, Landfill Cell A3-3, Debris Looking North, 06/11/2013

Photograph 7: CAU 424, Landfill Cell A3-4, Looking North, 05/14/2013

Photograph 8: CAU 424, Landfill Cell A3-5, Looking Southeast, 05/14/2013

Photograph 9: CAU 424, Landfill Cell A3-6, Looking East, 05/14/2013

Photograph 10: CAU 424, Landfill Cell A3-8, Looking West, 05/14/2013

Photograph 11: CAU 453, Subsidence, 05/14/2013

Photograph 12: CAU 487, A-8 Anomaly, Looking East, 05/14/2013

Photograph 13: CAU 487, A-17 Anomaly, Looking West, 05/14/2013

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APPENDIX F
POST-CLOSURE VEGETATION MONITORING REPORT

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POST-CLOSURE VEGETATION MONITORING REPORT

CORRECTIVE ACTION UNIT 400, FIVE POINTS LANDFILL (TTR)

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

Field Work Completed
June 5, 2013

Report Prepared
by
David C. Anderson, Sr. Scientist
Ecological & Environmental Monitoring

September 2013

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TABLE OF CONTENTS

TABLES

ATTACHMENTS

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1.0 INTRODUCTION

Vegetation monitoring was conducted at Corrective Action Units (CAUs) 400 and 407 on the Tonopah Test Range (TTR) in June 2013. This report documents the methods used during the monitoring and describes the status of the vegetation community that has established on the two CAUs. Concerns and issues related to the status of the vegetation community are identified and recommendations made to ensure a viable plant cover is maintained.

CAU 400, referred to as Five Points Landfill, and CAU 407, Roller Coaster RADSAFE Area, were seeded with a mix of native plant species and covered with straw mulch. A flash flood swept through the center of CAU 400 in 2003 and damaged the peripheral fence and eradicated a majority of the vegetation in the center of the site. The site was reseeded in 2004 and flooded again in 2006. Much of the vegetation in the central portion of the site was lost again. No remedial action was taken after the 2006 flooding.

Some remedial revegetation also occurred at CAU 407. Repairs to the closure cover in 2004 resulted in the loss of vegetation on the site and required remedial revegetation. The cover and side slopes were seeded, and a biodegradable erosion control blanket was installed to minimize erosion on the side slopes.

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 and maintains the integrity of the site. It also impedes the growth of noxious, weedy species and provides cover and food for wildlife. Vegetation monitoring is conducted annually to document the success of revegetation efforts and to identify any issues that may need to be addressed to ensure that the plant community persists.

3.0 METHODS

Monitoring was performed on June 5, 2013. 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 placed at designated 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 an indication of the diversity or heterogeneity of the plant community.

Quantification of the success of the revegetation effort at these two sites is accomplished by comparing the percentage of plant cover and plant density on the reseeded closure cover with the percentage of plant cover and plant density on an adjacent undisturbed plant community or reference area. Typically, if cover and density on the reseeded area are close to 70 percent of the cover and density on the reference area over consecutive years, the site is considered to be successfully revegetated.

Wildlife usage is a subjective determination and is measured by the presence of animals, burrows, scat, or browsed shrubs and grasses. Indications of erosion include the movement of surface litter, pedestalling and rilling of soils, or exposure of plant roots.

4.0 CAU 400, FIVE POINTS LANDFILL

In 2013, five transects were sampled, two in the area that had not flooded and three in the area that was flooded and reseeded in 2004. The reference area was sampled from 2000 to 2010, and data collected during that period were averaged to determine reclamation success standards.

4.1 MONITORING RESULTS: STAGING AREA

4.1.1 Cover

Plant cover on the staging area was 19 percent and included a mix of annual forbs and perennial shrubs and grasses (Table 1). Fourwing saltbush continued to be the dominant shrub and made up about half of the total plant cover. Indian ricegrass, a perennial grass, made up about a fourth of the plant cover, and esteve's pincushion, an annual forb, accounted for the remaining fourth.

Plant cover in 2013 represented an average year. Plant cover averaged 18 percent over the last 13 years. The lowest recorded was in 2012 at 9 percent. The highest plant cover was 33 percent and occurred shortly after the site was revegetated. The 10 percent shrub cover in 2013 was the highest recorded since 2007 and was about 2 percent higher than during the previous 5 years. Grass cover in 2013 was 4 percent, slightly below the 13-year average of 6 percent; however, it was the second highest grass cover recorded over the last 10 years. Grass cover in 2013 was about three times what it was in 2012. Forb cover fluctuates dramatically from year to year, which is inherent with annual plants. The 5 percent forb cover in 2013 was equal to the long-term forb cover average for the site. Over the previous 10 years, there was no forb cover for 3 years, less than 5 percent for 4 years, and higher than 5 percent for 3 years (Table I.1).

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

		Staging	Reseeded	Reference	Standard
SHRUBS	Fourwing saltbush	10.0	10.0	1.6	
	Greene's rabbitbrush	0.0	0.0	6.6	
	Total Shrub Cover	**10.0**	**10.0**	**8.2**	**5.7**
GRASSES	Indian ricegrass	4.4	0.0	4.9	
	Sand dropseed	0.0	0.0	0.1	
	Total Grass Cover	**4.4**	**0.0**	**5.0**	**3.5**
FORBS	Buckwheat	0.0	0.0	0.2	
	Cryptantha	0.0	0.0	0.1	
	Desert woollystar	0.0	0.0	0.2	
	Eggleaf fiddleleaf	0.0	0.0	0.2	
	Esteve's pincushion	5.0	0.0	1.0	
	Flatcrown buckwheat	0.0	0.0	0.1	
	Herb Sophia	0.0	0.8	0.0	
	Lupine	0.0	0.0	0.1	
	Nye gilia	0.0	0.0	0.7	
	Springparsley	0.0	0.0	0.1	
	Tufted evening primrose	0.0	0.0	0.3	
	Western tansymustard	0.0	31.7	0.1	
	Whitestem blazingstar	0.0	0.0	1.1	
	Total Forb Cover	**5.0**	**32.5**	**4.2**	**2.9**
TOTAL PLANT COVER		**19.4**	**42.5**	**17.7**	**12.1***
Bare Ground		57.5	47.5	68.2	
Litter		23.1	10.0	14.5	
INVASIVE WEEDS	Prickly Russian thistle	0.0	0.0	0.3	
	Total Invasive Weed Cover	**0.0**	**0.0**	**0.3**	

* Does not include invasive weeds

4.1.2 Density

Plant density on the staging area was 7.4 plants per m^2 when measured in 2013 and included 0.8 shrubs per m^2, 0.2 grasses per m^2, and 6.4 forbs per m^2 (Table 2). The three perennial species observed included one shrub, fourwing saltbush, and two grasses, Indian ricegrass and James' galleta grass. Forb density was primarily esteve's pincushion with minor contribution from other forbs. Prickly Russian thistle, an invasive species, was present, but only at 0.3 plants per m^2.

Shrub density in 2012 was about what it has been for the previous 5 years, but higher than it has been during the preceding 3 years. It was less than the 10-year average. Of note in 2013 was the absence of bud sagebrush for the first time in 8 years. The density of bud sagebrush has never been high, but it has been present on the site since 2006. The dry spring and early summer may explain its absence in 2013. The density of grasses in 2013 was below the 5-year average but the same as in 2012. Grass density in 2013 was about half of the highest grass densities recorded in 5 years. The density of forbs at this site ranged from 0 to almost 75 plants per m^2. The 6.4 forbs per m^2 in 2013 was about a third of the 5-year average (Table I.4).

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

		Staging	Reseeded	Reference	Standard
SHRUBS	Bud sagebrush	0.0	0.0	0.0	
	Fourwing saltbush	0.8	0.6	0.1	
	Greene's rabbitbrush	0.0	0.0	0.7	
	Winterfat	0.0	0.0	0.02	
	Total Shrub Density	**0.8**	**0.6**	**0.8**	**0.6**
GRASSES	Indian ricegrass	0.1	0.03	1.6	
	James' galleta grass	0.1	0.0	0.01	
	Sand dropseed	0.0	0.0	0.01	
	Squirreltail grass	0.0	0.1	0.02	
	Total Grass Density	**0.2**	**0.1**	**1.6**	**1.1**
FORBS	Birdnest buckwheat	0.0	0.0	0.02	
	Buckwheat	0.0	0.0	1.1	
	Cryptantha	0.03	0.0	0.2	
	Cushion cryptantha	0.1	0.0	1.2	
	Desert globemallow	0.0	0.0	0.7	
	Desert woollystar	0.0	0.0	0.3	
	Eggleaf fiddleleaf	0.0	0.0	1.4	
	Esteve's pincushion	6.0	0.3	3.9	
	Herb Sophia	0.0	1.8	0.3	
	Hoary tansyaster	0.1	0.03	3.6	
	Lupine	0.1	0.0	0.2	
	Nye gilia	0.0	0.0	1.6	
	Ragweed	0.0	0.0	2.5	
	Red root cryptantha	0.0	0.0	1.8	
	Small wirelettuce	0.0	0.0	0.02	
	Sowthistle desert dandelion	0.0	0.0	0.3	
	Springparsley	0.0	0.0	0.1	
	Suncup	0.0	0.0	0.5	
	Tufted evening primrose	0.0	0.0	0.1	
	Western tansymustard	0.1	9.6	0.7	
	Whitestem blazingstar	0.0	0.0	0.9	
	Total Forb Density	**6.4**	**11.8**	**17.6**	**12.3**
TOTAL PLANT DENSITY		**7.4**	**12.6**	**20.0**	**14.0***
INVASIVE WEEDS	Halogeton	0.0	0.0	0.1	N/A
	Prickly Russian thistle	0.3	0.2	1.5	
	Cheat grass	0.0	0.0	0.02	
	Total Invasive Weed Density	**0.3**	**0.0**	**1.6**	

* Does not include invasive weed density

4.1.3 Diversity

Species richness varies based on the timing and amount of precipitation. Precipitation was below average in 2013, resulting in less diverse vegetation. The 1.8 species per m^2 (Table 3) in 2013 included shrubs, grasses, and forbs and was below the 10-year average diversity of 2.8 species per m^2. Plant diversity was higher than 2012 but below the 3 years previous to 2012. Shrub diversity of 0.4 shrubs per m^2 was the highest it has been since 2006 and just below the 10-year average of 0.5 shrubs per m^2. In 2013, fourwing saltbush was the only shrub found on the site. In previous years bud sagebrush was also present. Grass diversity of 0.2 grasses per m^2 was low in 2013 compared to the 10-year average of 0.5 grasses per m^2, but about what it has been for 3 of the previous 5 years. The diversity of grasses was about half of the 10-year average grass diversity. Indian ricegrass and squirreltail grass were the only two perennial grasses found on the site. Forbs are occasionally common on the staging area, but were relatively uncommon in 2013. Forb diversity was 1.2 forbs per m^2. Esteve's pincushion was the most common species. In 2012, the most common forb was whitestem blazingstar; it was not present in 2013.

Species richness values in 2013 were the lowest experienced in 5 years. Species richness for shrubs over the previous 5 years ranged from 0.4 to 0.6 species per m^2, with an average for the same period of 0.5 species per m^2. Fourwing saltbush was the most abundant species (Table I.7).

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

	Staging	Reseeded	Reference	Standard
Shrubs	0.4	0.4	0.6	0.4
Grasses	0.2	0.1	0.9	0.6
Forbs	1.2	1.4	2.6	1.8
Total Species	**1.8**	**1.9**	**4.1**	**2.9**

4.2 MONITORING RESULTS: RESEEDED AREA

4.2.1 Cover

Plant cover was 42.5 percent on the reseeded area and was made up of one perennial shrub, fourwing saltbush, and two forbs, herb Sophia and western tansymustard (Table 1). This was the highest plant cover on the reseeded area since the site was flooded in 2006. Ten percent of the cover was perennial plants, specifically fourwing saltbush. The remaining 32.5 percent cover was the two annual forbs, the highest forb cover ever recorded for the reseeded area. Shrub cover has increased over the preceding 5 years, even in relatively dry conditions (Table I.2).

4.2.2 Density

Plant density was 12.6 plants per m^2 on the reseeded area, the highest it has been since the site was flooded in 2006 (Table 2). Shrub density was 0.6 shrubs per m^2, double what it was in 2012 and four times the average shrub density since the area was flooded in 2006. Shrub density consisted of a single species, fourwing saltbush. Although grass density was low (0.1 grasses per m^2), it was the highest it has been since 2010. Indian ricegrass and squirreltail grass were the perennial grasses present. Grass density was slightly below the average grass density since the area was flooded. Forb density on the reseeded area was the highest it has been since the area was flooded. Western tansymustard was the most common forb and accounted for 82 percent of the forb density and 75 percent of the total plant density. There were three other forbs, but their contribution was relatively insignificant. The only invasive weed present was prickly Russian thistle at a density of 0.3 plants per m^2 (Table I.8).

4.2.3 Diversity

Plant diversity on the reseeded area was 1.9 species per m^2 (Table 3), which was slightly higher than plant diversity was on the staging area. As mentioned previously, fourwing saltbush was the only shrub on the reseeded area. Perennial grass diversity was greater than zero in 2013 after being absent in 2012 and 0.1 grasses per m^2 in 2011. The diversity of forbs was the highest it has been in 3 years and about 50 percent higher than the average forb diversity since the area was flooded.

4.3 REVEGETATION SUCCESS

4.3.1 Staging Area

Cover

Total plant cover on the staging area exceeded revegetation success standards. In addition, each of the three plant life forms exceeded success standards. The standard for total plant cover was 12.1 percent, and there was 19.4 percent plant cover on the staging area. The 10 percent shrub cover exceeded the standard for shrubs of 5.7 percent. Grass cover was 4.4 percent compared to a standard of 3.5 percent. Forb cover was 4.2 percent and exceeded the standard of 2.9 percent. Non-invasive forbs and invasive weeds were represented by a single species in 2013, prickly Russian thistle, and total cover was only 0.3 percent.

Shrub cover on the staging area has exceeded the revegetation success standard since 2002, just a couple years after it was revegetated. Grasses have not done as well. Grass cover in 2013 exceeded the standard, but this was the first year since 2007. Grasses are more susceptible to drought conditions, whereas shrubs are more persistent. Forbs fluctuate significantly from year to year and are not as good an indicator of revegetation success as shrubs and grasses. When forbs are present, the amount of forb cover typically exceeds or comes close to meeting revegetation success standards.

Density

Total plant density for 2013 was 7.4 plants per m^2, which was about half of the revegetation success standard. However, shrub density was more encouraging. Shrub density was 0.8 shrubs per m^2, which exceeded the standard of 0.6 shrubs per m^2. Shrub density has exceeded the standard every year since the site was first sampled in 1998. Grass density was not as good. Grass density was 0.2 grasses per m^2, less than the standard of 1.1 grasses per m^2. Grass density has not exceeded the standard since 2007. The average grass density since 2007 was 0.3 grasses per m^2. Forb density was about half the revegetation success standard and only exceeded the standard twice since the flood in 2006.

Diversity

Plant diversity was 1.8 species per m^2, which was about 60 percent of the revegetation success standard. Shrub diversity exceeded the standard; however, grass diversity was about one third of the standard and forbs about two thirds. The average diversity for perennial shrubs and grasses over the last 10 years was 1.0 species per m^2, which met the standard for the same two life forms. Because forbs fluctuate from year to year, they are not as good an indicator of revegetation success.

4.3.2 Reseeded Area

Cover

Total plant cover on the reseeded area was about three and a half times the revegetation success standard for plant cover. Shrub cover was almost double the standard, and forbs were ten times the standard. Grasses did not contribute to plant cover, which has been the case for 3 years. Shrub cover exceeded the success standard for the previous 3 years. Forbs only contributed to plant cover for 2 of the previous 5 years, but they exceeded the standard both years.

Density

Although plant density on the reseeded area was about double the density on the staging area, it was still just 90 percent of the success standard. Shrub density was equal to the standard, but grass density was not quite 10 percent of the standard, and forb density was 96 percent of the standard. The year 2013 was the first year since the flood in 2006 that shrub density has met revegetation success standards. It was also the first year in the previous 3 years that grasses were present, and forb density in 2013 was the highest it has ever been. These were good indications that although success standards were not achieved in 2013, both grasses and forbs are beginning to establish on the site and with time will contribute more to both plant density and plant cover.

Diversity

Plant diversity on the reseeded area was lower than on the staging area in 2013 but there was an increase for all three life forms. Overall plant diversity was not quite half of the revegetation success standard. Shrub diversity was about two-thirds of the standard. Grasses were about one-fifth of the standard. Forbs were about half of the standard. Plant diversity was the third highest diversity recorded for the reseeded area since the site was flooded.

4.4 WILDLIFE USE

There was a minimal amount of small mammal activity on the Five Points Landfill in 2013. There were no signs of excessive browsing of shrubs and no indication that large animals, such as horses or antelope, had been present on the site.

4.5 SOIL EROSION

There were no signs of flooding on the site in 2013. The hay bales used for erosion control are deteriorating, but there were no signs of excessive water flow in the small channel that enters the site from the east, and the soils in the bottom areas had not changed significantly.

4.6 SUMMARY

Average annual precipitation was below average in 2013 and the previous several years. Late summer and early winter storms recharged the soils and favored growth more in perennial shrubs and grasses than in forbs. The plant community on the staging area appeared stable and met revegetation success standards. The plant community on the reseeded area struggled to become established, with repeated setbacks from surface flooding. However, shrubs were becoming well established in 2013, and there were signs of perennial grasses and native annual plants moving back into the area. In time, this area is expected to meet revegetation success standards. Flooding is always a concern because the site is situated along a natural drainage. However, over time, the area seems to rebound from the effects of flooding with or without remedial revegetation efforts.

4.7 RECOMMENDATIONS

There have been minor fluctuations in plant cover and density since 2008. The conditions of the plant community depend primarily on the amount and timing of precipitation. The changes in plant cover and density observed are typical of the native plant communities surrounding the site. Based on these observations it is recommended that future vegetation monitoring be conducted on an as-needed basis. When annual inspections are performed, if significant changes in the plant community are noted, vegetation monitoring may be requested and performed to document noted changes and potentially identify causes for the changes.

No additional erosion control measures are recommended. It has been demonstrated that plants will reestablish on the flooded area with or without remedial reseeding. The area that has been prone to flooding in the past is a slight depression, and waters will collect in that area either from flash flooding or from heavy precipitation events. Sufficient preventative measures have already been taken for such events.

5.0 CAU 407 SURVEY RESULTS

Three transects were sampled in 2013. Reclamation success standards were determined by averaging data collected at a reference site from 2000 to 2009. The reference site is located less than a mile north of CAU 407.

5.1 PLANT COVER

Plant cover was 14.2 percent in 2013, all from shadscale saltbush (Table 4). Fourwing saltbush and a few native forbs have commonly contributed to plant cover in the past. Plant cover was higher than in 2012 and the same as 2011, but below the 8-year high of 20.8 percent in 2010. Perennial grasses have never contributed significantly to plant cover and have not been part of total plant cover since 2009. Annual forbs have contributed to plant cover for 4 of the 8 years preceding 2013. There was no forb cover in 2012 or 2013, as was the case in 2007 and 2009 (Table II.1).

TABLE 4. PLANT COVER (PERCENT) ON CAU 407

		Cover	Reference	Standard
SHRUBS	Bud sagebrush	0.0	5.3	
	Fourwing saltbush	0.0	3.8	
	Shadscale saltbush	14.2	0.0	
	Yellow rabbitbrush	0.0	0.1	
	Winterfat	0.0	0.2	
	Total Shrub Cover	**14.2**	**9.4**	**6.6**
GRASSES	Indian ricegrass	0.0	0.7	
	Woolly tuftgrass	0.0	0.1	
	James' galleta grass	0.0	1.0	
	Total Grass Cover	**0.0**	**1.8**	**1.3**
FORBS	Esteve's pincushion	0.0	1.5	
	Filaree	0.0	0.2	
	Milkvetch	0.0	0.2	
	Total Forb Cover	**0.0**	**1.9**	**1.3**
INVASIVE WEEDS	Halogeton	0.0	0.1	
	Total Invasive Weed Cover	**0.0**	**0.1**	
TOTAL PLANT COVER		**14.2**	**13.2**	**9.2***
Bare Ground		71.6	69.6	
Litter		14.2	17.2	

* Does not include invasive weeds

5.2 PLANT DENSITY

Plant density was 12.3 plants per m^2 and included three perennial shrubs (Table 5). The most abundant shrub was shadscale saltbush with a density of 11.0 plants per m^2, which was the average density for this species from 2009 through 2013. Fourwing saltbush and winterfat were rarely encountered in 2013. Fourwing saltbush was relatively abundant between 2005 and 2009 but has steadily declined since then, although 2013 density was higher than during the previous 2 years. Winterfat was never commonly encountered on the site. The 0.7 plants per m^2 in 2013 was the highest density recorded since 2007 and an improvement over the previous 2 years (Table II.3).

TABLE 5. PLANT DENSITY (PLANTS PER M^2) ON CAU 407

		Cover	Reference	Standard
SHRUBS	Bud sagebrush	0.0	3.1	
	Fourwing saltbush	0.7	0.0	
	Shadscale saltbush	11.0	0.8	
	Sagebrush cholla	0.0	0.03	
	Winterfat	0.7	0.1	
	Total Shrub Density	**12.3**	**4.0**	**2.8**
GRASSES	Indian ricegrass	0.0	0.4	
	Woolly tuftgrass	0.0	0.4	
	Squirreltail grass	0.0	0.04	
	James' galleta grass	0.0	0.9	
	Total Grass Density	**0.0**	**1.7**	**1.2**
FORBS	Buckwheat species	0.0	0.1	
	Desert globemallow	0.0	0.3	
	Esteve's pincushion	0.0	8.7	
	Freckled milkvetch	0.0	0.1	
	Gooseberryleaf globemallow	0.0	0.1	
	Hoary tansyaster	0.0	0.04	
	Lambsquarter	0.0	0.1	
	Milkvetch	0.0	0.2	
	Pepperweed	0.0	0.2	
	Total Forb Density	**0.0**	**9.8**	**6.9**
INVASIVE WEEDS	Halogeton	0.0	0.3	
	Total Invasive Weed Cover	**0.0**	**0.3**	
TOTAL PLANT DENSITY		**12.3**	**15.9**	**10.9***

* Does not include invasive weeds

5.3 SPECIES RICHNESS

There was an average of 0.9 species per m^2 encountered on the cover, which was what it had been for the previous 3 years (Table 6). Also, as occurred in the previous 3 years, there were no grasses or forbs (Table II.5).

TABLE 6. SPECIES RICHNESS (SPECIES PER M^2) ON CAU 407

	Cover	Reference	Standard
Shrubs	0.9	1.6	1.1
Grasses	0.0	0.5	0.4
Forbs	0.0	1.1	0.8
Total Species	**0.9**	**3.2**	**2.3**

5.4 REVEGETATION SUCCESS

Even though plant cover and density were relatively low in 2013, of the three parameters measured to determine success, these two parameters met the standards (Tables 5 and 6). Although plant cover was about 50 percent higher than the standard, all of the plant cover was from shrubs. With better growing conditions than have been experienced the last few years, grasses and forbs should become more common on the site. Total plant density in 2013 was higher than the revegetation success standard of 10.9 plants per m^2, but the only plants present were three perennial shrubs, with no grasses or forbs. The third parameter measured reflects a low diversity of species on the site. Plant diversity was 0.9 species per m^2 in 2013 and has not been above that value for the previous 3 years. The success standard for plant diversity is 2.3 species per m^2, a value that has not been achieved since 2006, just a couple years after the site was reseeded.

5.5 WILDLIFE USE

As noted in previous years, there were a few animal burrows on the side slopes of the cover in 2013. The burrows appeared to be shallow and showed no signs of extensive use.

5.6 SOIL EROSION

The soil on the cover and side slopes appeared stable in 2013. No gullies were observed and overall there were no indications that erosion should be a concern.

5.7 SUMMARY

Previous corrective measures appeared to be controlling severe erosion. The animal burrows, primarily along the southern slope, did not appear to be frequently used, and there were no signs of subsurface soils being carried to the surface.

The lack of plant diversity was a minor concern. Precipitation the last several years was near drought levels. A few significant rains fell in the fall of 2012, which helped shrubs, but the lack of spring and summer precipitation perpetuated the absence of grasses and annual forbs. Shrubs established on the site and afforded sufficient protection from erosion. As mentioned in previous reports, the established plants were smaller than expected, which may have been the result of compacted subsurface soils. As years of higher precipitation occur, the compacted soils may loosen and allow greater root penetration and better plant growth.

5.8 RECOMMENDATIONS

Even though there was a lack of diversity in the vegetation that has established, no remedial action is recommended at this time. As observed at other revegetation sites, the changes in plant cover and density and the occurrence of more species is most likely the result of precipitation amounts and patterns. When more favorable growing conditions occur, it is anticipated that the makeup of the plant community will improve.

The year 2014 will mark 10 years since the site was reseeded. It is recommended that vegetation monitoring be conducted in 2014. It is also recommended that vegetation monitoring after 2014 be conducted on an as-needed basis. During annual inspections, if abnormalities are noted or concerns are expressed regarding the status of the plant community on the cover, vegetation monitoring should be scheduled and conducted.

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ATTACHMENT I

CAU 400, FIVE POINTS LANDFILL, COVER AND DENSITY DATA AND PHOTOGRAPHS

TABLE I.1. CAU 400, FIVE POINTS LANDFILL, PLANT COVER (PERCENT), STAGING AREA

	Year												
	2000	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Litter	17.5	17.5	23.3	26.5	11.5	28.8	28.1	16.9	30.0	15.0	15.6	30.8	23.1
Bare	43.4	49.2	47.5	58.0	52.6	48.1	57.5	56.2	58.7	61.2	70.6	60.2	57.5
Rock	23.3	0.8	10.0	1.5	16.7								
Fourwing saltbush	2.5	8.3	9.2	8.1	9.0	13.8	10.6	8.1	8.1	8.1	8.1	7.7	10.0
Indian ricegrass	10.0	22.5	10.0	3.7	1.3	5.0	3.8		0.6		2.5	1.3	4.4
Squirreltail	3.3	0.8			0.6	0.6							
James' galleta grass											0.6		
Buckwheat species		0.8		1.5	1.3					1.3			
Cushion cryptantha					0.6					1.3			
Eggleaf fiddleleaf				0.7	0.6				1.25				
Esteve's pincushion					1.3			16.9		8.8			5.0
Hoary tansyaster						2.5		1.3			1.3		
Prickly Russian thistle						1.3							
Western tansymustard					0.6			0.6					
Whitestem blazingstar					3.8				1.25	4.4	1.3		
Shrubs	2.5	8.3	9.2	8.1	9.0	13.8	10.6	8.1	8.1	8.1	8.1	7.7	10.0
Grasses	13.3	23.3	10.0	3.7	1.9	5.6	3.8		0.6		3.1	1.3	4.4
Forbs		0.8		2.2	8.2	2.5		18.8	2.5	15.8	2.6		5.0
Invasive Weeds						1.3							
TOTAL PLANT COVER	**15.8**	**32.4**	**19.2**	**14.0**	**19.1**	**23.2**	**14.4**	**26.9**	**11.2**	**23.9**	**13.8**	**9.0**	**19.4**

TABLE I.2. CAU 400, FIVE POINTS LANDFILL, PLANT COVER (PERCENT), RESEEDED AREA

	Year							
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Litter	15.0		10.2	11.7	13.3	11.7	15.9	10.0
Bare	70.0	100.0	78.7	85.0	63.4	82.5	74.8	47.5
Rock	0.8							
Fourwing saltbush	3.3		6.8	2.5	2.5	5.8	9.3	10.0
Rubber rabbitbrush	0.8							
Winterfat	0.8							
Indian ricegrass	0.8		0.8					
Squirreltail	0.8				0.8			
Esteve's pincushion			3.4		0.8			
Herb Sophia								0.8
Prickly Russian thistle				0.8	0.8			
Western tansymustard					16.7			31.7
Western blazingstar					1.7			
Shrubs	4.9		6.8	2.5	2.5	5.8	9.3	10.0
Grasses	1.6		0.8		0.8			
Forbs	0.0		3.4		19.2			32.5
Invasive Weeds				0.8	0.8			
TOTAL PLANT COVER	**6.5**	**0.0**	**11.0**	**3.3**	**23.3**	**5.8**	**9.3**	**42.5**

TABLE I.3. CAU 400, FIVE POINTS LANDFILL, PLANT COVER (PERCENT), REFERENCE AREA

	Year										
	2000	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**10-Year Average**
Litter	9.2	13.3	15.0	16.7	12.5	22.5	20.8	8.3	14.2	12.5	14.5
Bare	67.6	65.1	70.9	63.4	65.8	63.3	60.0	74.2	75.0	60.9	66.6
Rock	5.8	5.0	1.7	2.5	0.6						1.6
Fourwing saltbush	0.8	0.8	0.8	1.7	2.5	1.7	1.7	1.7	1.7	2.5	1.6
Greene's rabbitbrush	10.8	10.0	5.0	5.8	5.6	6.7	10.0	4.2	0.8	6.7	6.6
Indian ricegrass	5.0	5.0	5.8	3.3	3.1	5.8	7.5	2.5	5.8	5.0	4.9
Sand dropseed		0.8									0.1
Biscuitroot					0.6						0.1
Buckwheat species 1				0.8							0.1
Buckwheat species 2					0.6						0.1
Cushion cryptantha								0.8		0.8	0.2
Desert woollystar	0.8										0.1
Eggleaf fiddleleaf				0.8	1.3						0.2
Esteve's pincushion								5.0	1.7	3.3	1.0
Flatcrown buckwheat					0.6						0.1
Lupine										0.8	0.1
Nye gilia				4.2	0.6					1.7	0.7
Prickly Russian thistle			0.8	0.8	0.6				0.8		0.3
Tufted evening primrose								2.5			0.3
Western tansymustard								0.8			0.1
Whitestem blazingstar					5.6					5.8	1.1
Shrubs	11.6	10.8	5.8	7.5	8.1	8.4	11.7	5.8	2.5	9.2	8.1
Grasses	5.0	5.8	5.8	3.3	3.1	5.8	7.5	2.5	5.8	5.0	5.0
Forbs	0.8			5.8	9.3			9.2	1.7	12.4	3.9
Invasive Weeds			0.8	0.8	0.6				0.8		0.3
TOTAL PLANT COVER	**17.4**	**16.6**	**12.4**	**17.4**	**21.1**	**14.2**	**19.2**	**17.5**	**10.8**	**26.6**	**17.3**

TABLE I.4. CAU 400, FIVE POINTS LANDFILL, PLANT DENSITY (PLANTS/M^2), STAGING AREA

	Year														
	1998	**1999**	**2000**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Bud sagebrush	0.2				0.1			0.2	0.1	0.03	0.03	0.1	0.1	0.03	
Fourwing saltbush	2.6	0.8	0.7	0.2	1.4	1.1	1.4	1.2	0.5	1.0	0.8	0.6	0.7	0.7	0.8
Greene's rabbitbrush				0.9											
Winterfat						0.03	0.03	0.1							
Cheatgrass			0.1												
Indian ricegrass	3.8	5.1	4.8	3.2	2.1	1.0	0.4	0.7	1.0	0.2	0.3	0.1	0.3	0.1	0.1
James' galleta grass			0.03			0.2		0.1	0.1		0.1	0.03		0.1	0.1
Sand dropseed				0.03											
Squirreltail	3.6	3.9	2.2	0.3	0.8	0.4	0.1	1.1	0.4			0.03	0.2		
Birdnest buckwheat															
Booth's evening primrose															
Buckwheat species 1						0.2	2.6	0.1				15.9			
Flatcrown buckwheat		0.9	0.4	0.2		0.1	27.8	0.2			4.1	0.1			
Cryptantha species			1.3			0.1		0.4							
Cushion cryptantha						0.1				1.1	4.2	3.9			0.1
Cymopterus species						0.7									
Desert globemallow				0.03											
Desert woollystar		0.5	0.7			0.2				0.03	0.5	0.8	1.2		
Eggleaf fiddleleaf		1.7	1.4				3.7	0.8			2.7	1.7			
Esteve's pincushion						0.1	2.4	0.3		36.5	5.6	27.2			6.0
Herb sophia										0.4		0.1			
Hoary tansyaster						2.2	0.1	0.5		1.3	0.6		0.1		0.1
Lupine species							0.1								
Nye gilia						4.5	5.8			0.03	0.6	2.1	0.1		
Prickly Russian thistle		3.9	1.3	0.1	0.9		0.1	0.2		0.1	0.9	0.2	0.4		0.3
Ragweed			0.6	0.03	0.4	1.4	0.2	0.3					0.1		
Red root cryptantha							2.4								
Halogeton		0.1	0.1	0.1	0.03	2.2									
Small wirelettuce											0.3		0.5		
Sowthistle desert dandelion												0.2			
Tufted evening primrose										0.1					
Western tansymustard		0.6	4.2			2.0	0.7				0.03				0.1
Whitestem blazingstar		0.03	0.1				10.6	0.1			2.0	6.4	2.3	0.03	
Shrubs	2.8	0.8	0.7	1.1	1.5	1.1	1.4	1.5	0.6	1.0	0.8	0.7	0.8	0.7	0.8
Grasses	7.4	9.0	7.0	3.6	2.9	1.6	0.5	1.9	1.5	0.2	0.4	0.2	0.5	0.2	0.2
Forbs		3.7	8.7	0.2	0.4	11.6	56.4	2.7		39.5	20.6	58.4	4.3	0.03	6.4
Invasive Weeds		4.0	1.5	0.2	0.9	2.2	0.1	0.2		0.1	0.9	0.2	0.4	0.0	0.3
TOTAL PLANT DENSITY	**10.2**	**17.5**	**17.9**	**5.1**	**5.7**	**16.5**	**58.4**	**6.3**	**2.1**	**40.8**	**22.7**	**59.5**	**6.0**	**0.9**	**7.7**

TABLE I.5. CAU 400, FIVE POINTS LANDFILL, PLANT DENSITY (PLANTS/M^2), RESEEDED AREA

	Year								
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Fourwing saltbush	1.6	0.9		0.04	0.03	0.1	0.1	0.3	0.6
Shadscale saltbush		0.03							
Winterfat	1.0	0.8							
Cheatgrass	0.5								
Indian ricegrass	0.1	0.6	0.2	1.4	0.1	0.3			0.03
Squirreltail	8.6	1.7	0.1	0.03	0.3	0.1			0.1
Booth's suncup	0.2								
Buckwheat species	0.1					0.03			
Desert globemallow				0.1				0.03	
Esteve's pincushion	0.9				0.01	0.1	0.03		0.3
Halogeton	0.1	0.9			0.01	0.02			
Herb sophia				0.1		0.03			0.5
Hoary tansyaster									0.1
Lambsquarter						0.2			
Nye gilia	0.1								
Prickly Russian thistle	3.0	67.3			0.2	1.3	0.01		0.3
Ragweed	0.2			0.02	0.03	0.4			
Red root cryptantha	0.2					0.01			
Small wirelettuce	0.1								
Tufted evening primrose				0.1					
Western tansymustard				0.1		1.0			9.6
Whitestem blazingstar	12.9				0.02	0.7			
Shrubs	2.6	1.7		0.04	0.03	0.1	0.1	0.3	0.6
Grasses	8.7	2.3	0.3	1.4	0.4	0.4			0.1
Forbs	14.7			0.4	0.06	2.5	0.03	0.03	11.8
Invasive Weeds	3.6	68.2			0.2	1.3	0.01		0.3
TOTAL PLANT DENSITY	**29.6**	**72.2**	**0.3**	**1.8**	**0.7**	**4.3**	**0.1**	**0.3**	**12.8**

TABLE I.6. CAU 400, FIVE POINTS LANDFILL, PLANT DENSITY (PLANTS/M^2), REFERENCE AREA

	Year										
	2000	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**10-Year Average**
Fourwing saltbush	0.2	0.2	0.1	0.3	0.1	0.1	0.03	0.03	0.2	0.2	0.1
Greene's rabbitbrush	1.4	0.9	0.9	0.4	0.5	0.4	0.6	0.6	0.6	0.3	0.7
Winterfat				0.03	0.03				0.1		0.02
Cheatgrass						0.1					0.0
Indian ricegrass	1.5	1.6	1.8	3.1	1.1	1.7	1.2	1.4	1.2	1.1	1.6
James' galleta grass					0.03		0.03				0.01
Sand dropseed	0.03	0.03									0.01
Squirreltail						0.1	0.1			0.03	0.02
Ragweed	0.8	0.1					0.03		21.7	0.2	2.3
Birdnest buckwheat				0.1					0.07		0.02
Booth's suncup			0.2	1.7					1.8		0.4
Buckwheat species 1				5.2							0.5
Buckwheat species 2	0.1			2.0						1.1	0.3
Cryptantha species				0.5					0.7		0.1
Cushion catseye	3.7		0.1	0.9				1.1	2.7		0.9
Cymopterus species	0.03			0.03	0.03				0.5		0.1
Desert globemallow				5.7					0.03		0.6
Desert woollystar	0.7								0.3	1.3	0.2
Eggleaf fiddleleaf	0.4			8.7						2.0	1.1
Halogeton									0.5		0.1
Herb sophia									0.9	0.1	0.1
Hoary tansyaster				31.8		0.5		0.1		0.2	3.3
Lupine	0.1		0.1							1.3	0.2
Nye gilia								0.9		12.1	1.3
Pinnate tanseymustard	4.8			0.3				0.2	0.3	0.2	0.6
Prickly Russian thistle	0.5		1.0	5.4		2.8		4.1	0.4	0.8	1.5
Red root cryptantha				1.9				0.6	2.1	9.7	1.4
Small wirelettuce	0.03		0.03	0.03							0.01
Sowthistle desert dandelion										0.3	0.03
Steve's duskymaiden	0.2		0.1			0.1		23.1	0.1	11.8	3.5
Tufted evening primrose								0.2			0.02
Whitestem blazingstar	0.2			1.7				0.5		4.8	0.7
Shrubs	1.6	1.1	1.0	0.7	0.6	0.5	0.6	0.6	0.9	0.5	0.8
Grasses	1.5	1.6	1.8	3.1	1.1	1.8	1.3	1.4	1.2	1.1	1.6
Forbs	11.1	0.1	0.5	60.6	0.03	0.6	0.03	26.7	31.2	45.1	17.6
Invasive Weeds	0.5		1.0	5.4		2.9		4.1	0.9	0.8	1.6
TOTAL PLANT DENSITY	**14.7**	**2.8**	**4.3**	**69.8**	**1.7**	**5.8**	**1.9**	**32.8**	**34.0**	**47.5**	**21.5**

TABLE I.7. CAU 400, FIVE POINTS LANDFILL, PLANT DIVERSITY (SPECIES/QUADRAT), STAGING AREA

LIFEFORM	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Ref
Shrubs	0.4	0.5	0.6	0.6	0.7	0.8	0.4	0.6	0.5	0.4	0.5	0.5	0.4	0.6
Grasses	1.8	1.2	1.4	0.6	0.5	1.1	0.9	0.1	0.3	0.2	0.4	0.2	0.2	0.9
Forbs	3.0	0.2	0.7	3.8	6.0	1.6	0.0	2.0	5.1	5.4	1.6	0.1	1.2	2.6
TOTAL SPP/Quad	**5.2**	**6.4**	**2.7**	**5.0**	**7.2**	**3.5**	**1.3**	**2.7**	**5.9**	**6.0**	**2.5**	**0.8**	**1.8**	**4.1**
Invasive Weeds	2.2	0	0	0	0	0	0	0	0	0.1	0.3	0.4	0.2	0.04

TABLE I.8. CAU 400, FIVE POINTS LANDFILL, PLANT DIVERSITY (SPECIES/QUADRAT), RESEEDED AREA

LIFEFORM	2005	2006	2007	2008	2009	2010	2011	2012	2013	Ref
Shrubs	1.3	1.0	0	0.6	0.1	0.2	0.2	0.2	0.4	0.6
Grasses	1.0	1.0	0.2	0.1	0.3	0.6	0.1	0	0.2	0.9
Forbs	3.5	1.2	0	2.0	0.7	2.1	0	0.03	1.3	2.6
TOTAL SPP/Quad	**5.8**	**3.2**	**0.2**	**2.7**	**1.1**	**2.9**	**0.3**	**0.2**	**1.8**	**4.1**
Invasive Weeds	0.3	0	0	0	0	0.9	0.03	0.1	0.1	0.04

TABLE I.9. CAU 400, FIVE POINTS LANDFILL, PLANT DIVERSITY (SPECIES/QUADRAT), REFERENCE AREA

LIFEFORM	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	Ref
Shrubs	0.8	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6
Grasses	0.8	0.7	0.8	0.9	2.0	0.9	0.8	0.7	0.7	0.7	0.9
Forbs	3.2	0.1	0.6	7.7	0.0	0.6	0.03	3.4	4.6	5.9	2.6
TOTAL SPP/Quad	**4.8**	**1.6**	**2.0**	**9.1**	**3.0**	**2.0**	**1.3**	**4.6**	**5.9**	**7.1**	**4.1**
Invasive Weeds	0.0	0.0	0.0	0.0	0.0	0.07	0	0.0	0.0	0.3	0.04

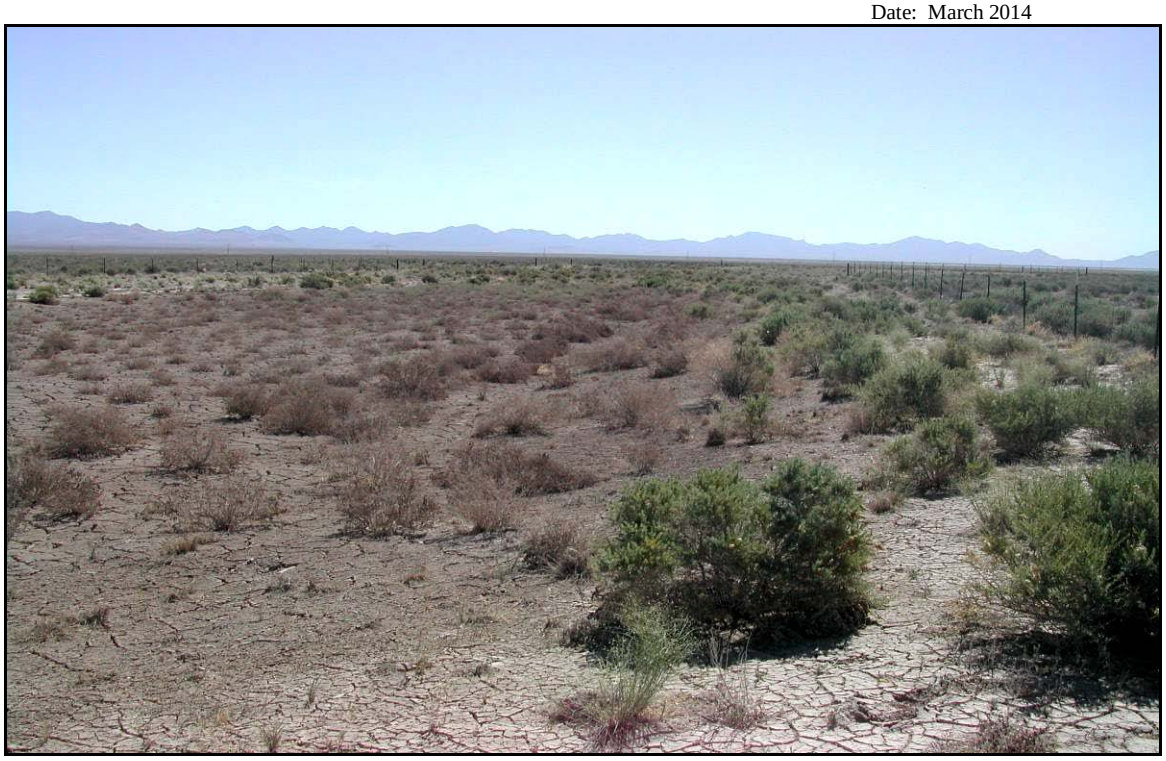
PHOTOGRAPHS

CAU 400, Five Points Landfill, 1998

CAU 400, Five Points Landfill, 2000

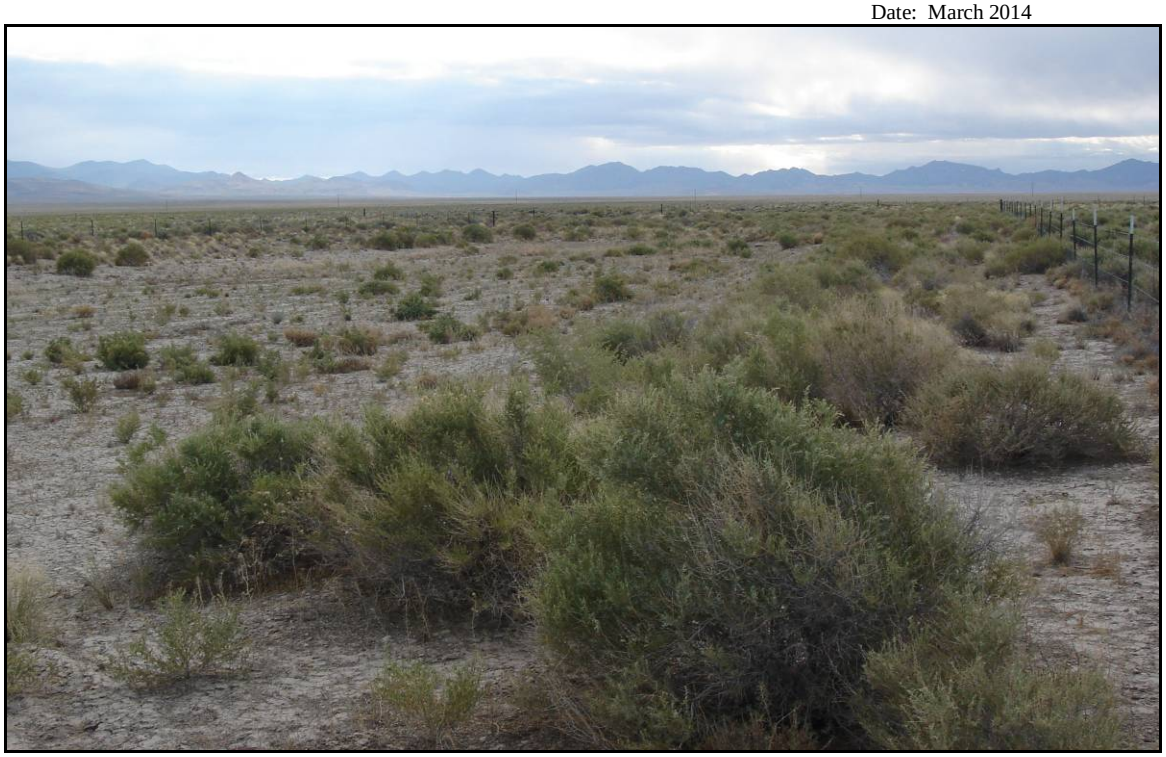
CAU 400, Five Points Landfill, 2002

CAU 400, Five Points Landfill, 2003



CAU 400, Five Points Landfill, 2004

CAU 400, Five Points Landfill, 2005



CAU 400, Five Points Landfill, 2006

CAU 400, Five Points Landfill, 2007

CAU 400, Five Points Landfill, 2008

CAU 400, Five Points Landfill, 2009

CAU 400, Five Points Landfill, 2010

CAU 400, Five Points Landfill, 2011

CAU 400, Five Points Landfill, 2012

CAU 400, Five Points Landfill, 2013

ATTACHMENT II
CAU 407 COVER, DENSITY & DIVERSITY DATA AND PHOTOGRAPHS

TABLE II.1. CAU 407 PLANT COVER (PERCENT), STAGING AREA

	Year						
	2006	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Litter	74.2	66.7	39.2	47.5	20.0	20.8	14.2
Bare		23.4	50.9	30.9	64.2	67.5	71.6
Bud sagebrush	0.8						
Fourwing saltbush		0.8	0.8	1.7	0.8		
Shadscale saltbush	15.0	7.5	8.3	18.3	13.3	11.7	14.2
Winterfat				0.8			
Indian ricegrass			0.8				
Squirreltail	9.2	0.8					
Esteve's pincushion		0.8		0.8			
Halogeton	0.8				1.7		
Shrubs	15.8	8.3	9.1	20.8	14.1	11.7	14.2
Grasses	9.2	0.8	0.8				
Forbs		0.8		0.8			
Invasive Weeds	0.8				1.7		
TOTAL PLANT COVER	**25.8**	**9.9**	**9.9**	**21.6**	**15.8**	**11.7**	**14.2**

TABLE II.2. CAU 407 PLANT COVER (PERCENT), REFERENCE AREA

	Year									
	2000	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average**
Litter	19.0	18.5	13.0	14.5	10.0	27.8	19.8	13.8	18.3	17.2
Bare	45.5	34.0	34.0	24.5	38.5	54.9	64.6	68.3	73.2	**48.4**
Rock	18.5	41.0	41.5	49.5	43.5					21.6
Bud sagebrush	8.0	3.0	4.0	6.0	1.5	7.2	8.3	5.6	3.9	5.3
Shadscale saltbush	5.0	1.5	5.0	3.0	5.5	3.3	4.7	3.6	2.8	3.8
Yellow rabbitbrush			0.5							0.06
Winterfat				0.5		0.6	0.5	0.5		0.2
Greasewood		0.5								0.06
Indian ricegrass	1.5	0.5	0.5	1.0	0.5	1.7	0.5			0.7
Low woollygrass	2.5	1.0	1.0	0.5	0.5				0.6	0.7
James' galleta grass						1.1	1.6		0.6	0.4
Esteve's pincushion								8.2		0.9
Gooseberryleaf globemallow									0.6	0.1
Milkvetch						1.7				0.2
Redstem stork's bill						1.7				0.3
Shrubs	13.0	5.0	9.0	9.5	7.0	11.1	13.5	9.7	6.7	**9.4**
Grasses	4.0	2.0	1.5	1.5	1.0	2.8	2.1		1.2	**1.8**
Forbs			0.5			3.4		8.2	0.6	**1.6**
Invasive Weeds										0
TOTAL PLANT COVER	**17.0**	**6.5**	**11.0**	**11.0**	**8.0**	**17.3**	**15.6**	**17.9**	**8.5**	**12.8**

TABLE II.3. CAU 407 PLANT DENSITY (PLANTS/M^2), STAGING AREA

	Year								
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Bud sagebrush	2.9	1.3	1.3	0.5	0.3	0.7	0.1		
Fourwing saltbush	2.3	3.2	2.4	1.8	1.7	0.8	0.5	0.3	0.7
Shadscale saltbush	17.5	17.9	14.2	18.1	11.6	11.7	10.2	8.2	11.0
Rubber rabbitbrush		0.3							
Winterfat	0.7	2.0	1.2	0.7		0.7			0.7
Indian ricegrass	16.4	1.1	5.4						
Cheatgrass	0.1	0.3							
Squirreltail	42.9	53.3	22.3	2.0	0.3				
Birdnest buckwheat	0.1								
Buckwheat	2.9	7.0				0.3			
Esteve's pincushion				13.4		14.6			
Hoary tansyaster		0.3		0.3	0.3				
Lambsquarter	1.3								
Manybranched ipomopsis	0.1								
Milkvetch	0.1								
Mountain pepperweed					0.3				
Prickly Russian thistle	0.3								
Halogeton					4.1	7.6	1.9		
Shrubs	23.4	24.8	19.2	21.1	13.6	13.9	10.8	8.5	12.3
Grasses	59.3	54.5	27.6	2.0	0.3	0.0	0.0	0.0	0.0
Forbs	4.4	7.3	0.0	13.7	0.7	14.9	0.0	0.0	0.0
Invasive Weeds	0.4	0.3	0.0	0.0	4.1	7.6	1.9	0.0	0.0
TOTAL PLANT DENSITY	**12.3**	**86.9**	**46.8**	**36.8**	**18.7**	**36.4**	**12.7**	**8.5**	**12.3**

TABLE II.4. CAU 407 PLANT DENSITY (PLANTS/M^2), REFERENCE AREA

	Year									
	2000	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average**
Bud sagebrush	4.1	3.3	3.8	3.2	3.1	2.6	2.9	2.8	2.5	3.1
Shadscale saltbush	0.9	0.9	1.1	0.7	1.0	0.8	0.6	0.7	0.8	0.8
Winterfat	0.02	0.04	0.1	0.1	0.1	0.1	0.04	0.1	0.2	0.1
Sagebrush cholla	0.02	0.02		0.1						0.01
Indian ricegrass	0.8	0.5	0.2	0.3	0.2	0.3	0.4	0.3	0.2	0.4
Squirreltail	0.2	0.1		0.04		0.04	0.04			0.04
Low woollygrass	0.7	0.8	1.5	1.2	1.2	0.3	0.2	0.3	0.3	0.4
James' galleta grass	0.7		0.02			0.8	0.9	0.2	0.7	0.9
Birdnest buckwheat				0.1		0.02		0.04		0.01
Buckwheat	0.7	0.5	0.5	0.5	0.1				0.1	0.1
Cryptantha	0.1									0.01
Cushion cryptantha				0.1						0.01
Desert globemallow	0.3			0.1				0.2	0.1	0.3
Esteve's pincushion	1.3			2.7	36.9			31.9	5.6	8.7
Freckled milkvetch	0.02	0.04		0.1	0.9					0.1
Gooseberryleaf globemallow		0.1	0.6	0.02	0.3	0.3	0.3			0.1
Hoary tansyaster	0.02	0.5		0.2	0.03	0.2				0.04
Lambsquarter			0.5							0.1
Manybranched ipomopsis			0.3	0.5				0.1		0.01
Milkvetch						1.9				0.2
Mountain pepperweed								0.2		0.03
Pepperweed	0.1					0.9		0.1		0.2
Halogeton	1.7		0.3	0.1						0.3
Suncup					0.1					0.01
Shrubs	5.1	4.3	4.9	4.0	4.2	3.4	3.6	3.7	3.5	4.1
Grasses	2.5	1.3	1.7	1.6	1.5	1.4	1.6	0.9	1.2	1.5
Forbs	2.6	1.3	1.9	4.8	38.4	3.3	0.3	32.6	5.8	10.1
Invasive Weeds	1.7			0.3	0.1					0.2
TOTAL PLANT DENSITY	11.9	6.9	8.5	10.7	44.1	8.1	5.5	37.2	10.5	15.9

TABLE II.5. CAU 407 PLANT DIVERSITY (SPECIES/QUADRAT), STAGING AREA

LIFEFORM	2005	2006	2007	2008	2009	2010	2011	2012	2013	Ref
Shrubs	2.5	2.3	2.2	1.4	1.1	1.2	0.9	0.9	0.9	1.6
Grasses	1.1	1.5	1.3	0.1	0.1	0	0	0	0	0.5
Forbs	0.9	0.3	0	1.1	0.5	1.0	0	0	0	1.1
TOTAL SPP/Quad	**4.5**	**4.1**	**3.5**	**2.6**	**1.7**	**2.2**	**0.9**	**0.9**	**0.9**	**3.2**
Invasive Weeds	0.1	0	0	0	0	0.9	0.3	0	0	1.1

TABLE II.6. CAU 407 PLANT DIVERSITY (SPECIES/QUADRAT), REFERENCE AREA

LIFEFORM	2000	2002	2003	2004	2005	2006	2007	2008	2009	Avg
Shrubs	1.5	1.5	1.5	1.4	1.6	1.7	1.5	1.6	1.9	1.6
Grasses	1.1	0.5	0.4	0.4	0.4	0.5	0.3	0.3	0.4	0.5
Forbs	1.1	0.8	0.9	1.7	1.9	1.2	0.2	1.2	1.1	1.1
TOTAL SPP/Quad	**3.7**	**2.8**	**2.8**	**3.4**	**3.9**	**3.4**	**2.0**	**3.1**	**3.4**	**3.2**
Invasive Weeds	1.1	0.8	0.9	1.7	1.9	1.2	0.2	1.2	1.1	1.1

PHOTOGRAPHS

CAU 407, 2005

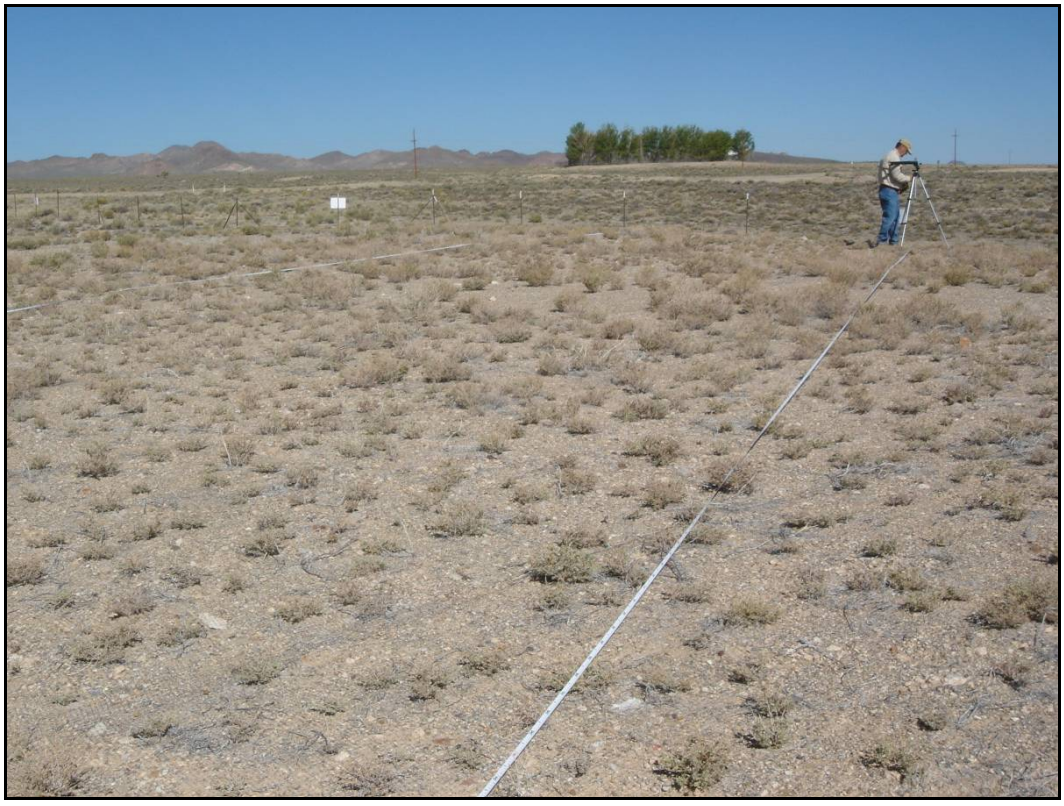
CAU 407, 2006

CAU 407, 2007

CAU 407, 2008

CAU 407, 2009

CAU 407, 2010



CAU 407, 2011

CAU 407, 2012

CAU 407, 2013

ATTACHMENT III
COMMON AND SCIENTIFIC NAMES OF PLANTS

TABLE III.1. COMMON AND SCIENTIFIC NAMES OF PLANTS

	Common Name	Scientific Name
SHRUBS	Black sagebrush	*Artemisia nova*
	Broom snakeweed	*Gutierrezia sarothrae*
	Bud sagebrush	*Picrothamnus desertorum*
	Fourwing saltbush	*Atriplex canescens*
	Greasewood	*Sarcobatus vermiculatus*
	Nevada jointfir	*Ephedra nevadensis*
	Greene's rabbitbrush	*Chrysothamnus greenei*
	Rubber rabbitbrush	*Ericameria nauseosa*
	Sagebrush cholla	*Grusonia pulchella*
	Shadscale saltbush	*Atriplex confertifolia*
	Winterfat	*Krascheninnikovia lanata*
GRASSES	Alkali sacaton	*Sporobolus aeroides*
	Cheatgrass	*Bromus tectorum*
	Indian ricegrass	*Achnatherum hymenoides*
	James' galleta grass	*Pleuraphus jamesii*
	Low woollygrass	*Dasyochloa pulchella*
	Low woollygrass	*Erioneuron pulchellum*
	Sand dropseed	*Sporobolus cryptandrus*
	Squirreltail	*Elymus elymoides*
FORBS	Birdnest buckwheat	*Eriogonum nidularium*
	Buckwheat	*Eriogonum* species
	Cleft-leaf phacelia	*Phacelia crenulata*
	Common pepperweed	*Lepedium densiflorum*
	Cryptantha	*Cryptantha* species
	Cushion cryptantha	*Cryptantha circumscissa*
	Desert evening primrose	*Camissonia boothii*
	Desert globemallow	*Sphaeralcea ambigua*
	Desert pepperweed	*Lepedium fremontii*
	Desert woollystar	*Eriastrum eremicum*
	Eggleaf fiddleleaf	*Nama pusillum*
	Esteve's pincushion	*Chaenactis steviodes*
	Flatcrown buckwheat	*Eriogonum deflexum*
	Fleshcolor pincushion	*Chaenactis xantiana*
	Freckled milkvetch	*Astragalus lentiginosus*
	Gilia	*Gilia* species
	Gooseberryleaf globemallow	*Sphaeralcea grossulariifolia*
	Great basin wollystar	*Eriastrum sparsiflorum*
	Halogeton	*Halogeton glomeratus*
	Herb sophia	*Descurania sophia*
	Hoary tansyaster	*Macheranthera canescens*
	Lambsquarter	*Chenopodium album*
	Lupine	*Lupinus* species
	Manybranched ipomopsis	*Ipomopsis polycladon*
	Milkvetch	*Astragalus* species
	Mountain pepperweed	*Lepedium montanum*
	Nye gilia	*Aliciella nyensis*
	Pepperweed	*Lepidium* species
	Phacelia	*Phacelia* species
	Prickly Russian thistle	*Salsola iberica*
	Ragweed	*Ambrosia* species
	Red root cryptantha	*Cryptantha micrantha*
	Redstem stork's bill	*Erodium cicutarium*
	Roundleaf oxytheca	*Oxytheca perfoliata*
	Small wirelettuce	*Stephanomeria exigua*
	Sowthistle desert dandelion	*Malacothrix sonchoides*
	Springparsley	*Cymopteris* species
	Suncup	*Camissonia* species
	Tall tumblemustard	*Sisymbrium altissimum*
	Tufted evening primrose	*Oenothera caespitosa*
	Western tansymustard	*Descurania pinnata*

TABLE III.1. COMMON AND SCIENTIFIC NAMES OF PLANTS, CONTINUED

	Common Name	Scientific Name
FORBS, continued	Whitestem blazingstar	*Mentzelia albicaulis*
	Wishbone-bush	*Mirabilis laevis* var. *villosa*
	Yellow rabbitbrush	*Chrysothamnus viscidiflorus*

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