

Nevada  
Environmental  
Restoration  
Project

DOE/NV--1323



Closure Report for  
Corrective Action Unit 107:  
Low Impact Soil Sites  
Nevada Test Site, Nevada

Controlled Copy No.: \_\_\_\_\_

Revision: 0

June 2009

Environmental Restoration  
Project



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

## **DISCLAIMER**

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof.

This report has been reproduced directly from the best available copy.

Available for sale to the public from:

U.S. Department of Commerce  
National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161-0002  
Telephone: (800) 553-6847  
Fax: (703) 605-6900  
E-mail: [orders@ntis.gov](mailto:orders@ntis.gov)  
Online ordering: <http://www.ntis.gov/ordering.htm>

Available electronically at <http://www.osti.gov/bridge>.

Available for a processing fee to the U.S. Department of Energy and its contractors, in paper, from:

U.S. Department of Energy  
Office of Scientific and Technical Information  
P.O. Box 62  
Oak Ridge, TN 37831-0062  
Telephone: (865) 576-8401  
Fax: (865) 576-5728  
E-mail: [reports@adonis.osti.gov](mailto:reports@adonis.osti.gov)

**CLOSURE REPORT FOR  
CORRECTIVE ACTION UNIT 107:  
LOW IMPACT SOIL SITES,  
NEVADA TEST SITE, NEVADA**

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

**Controlled Copy No. \_\_\_\_\_**

**Revision: 0**

**June 2009**

THIS PAGE INTENTIONALLY LEFT BLANK

**CLOSURE REPORT FOR  
CORRECTIVE ACTION UNIT 107:  
LOW IMPACT SOIL SITES,  
NEVADA TEST SITE, NEVADA**

Approved By: /S/K Cabbie  
Kevin J. Cabbie,  
Acting Federal Sub-Project Director  
Soils Sub-Project

Date: 6-22-09

Approved By: /S/K Boehlecke  
Robert F. Boehlecke  
Federal Project Director  
Environmental Restoration Project

Date: 6/22/09

THIS PAGE INTENTIONALLY LEFT BLANK

# TABLE OF CONTENTS

---

ACRONYMS AND ABBREVIATIONS .....	vii
EXECUTIVE SUMMARY.....	ix
1.0 INTRODUCTION.....	1
1.1 PURPOSE .....	1
1.2 SCOPE.....	3
1.3 CLOSURE REPORT CONTENTS.....	3
2.0 CLOSURE ACTIVITIES.....	5
2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES.....	5
2.1.1 No Further Action Sites.....	5
2.1.2 Closure in Place with Administrative Controls Sites .....	6
2.2 DEVIATIONS FROM THE SAFER PLAN AS APPROVED .....	7
2.3 CORRECTIVE ACTION SCHEDULE AS COMPLETED .....	7
2.4 SITE PLAN/SURVEY PLAT .....	7
3.0 WASTE DISPOSITION.....	9
4.0 CLOSURE VERIFICATION RESULTS.....	11
4.1 DATA QUALITY ASSESSMENT .....	11
4.2 USE RESTRICTION .....	11
5.0 CONCLUSIONS AND RECOMMENDATIONS.....	13
5.1 CONCLUSIONS.....	13
5.2 POST-CLOSURE REQUIREMENTS.....	13
5.2.1 Inspections.....	13
5.3 RECOMMENDATIONS .....	14
6.0 REFERENCES.....	15

## LIBRARY DISTRIBUTION LIST

## LIST OF FIGURES

FIGURE 1. CORRECTIVE ACTION UNIT 107 SITE LOCATION MAP.....	2
---	---

## LIST OF TABLES

TABLE 1. SUMMARY OF CORRECTIVE ACTION UNIT 107 CLOSURE ACTIVITIES .....	X
TABLE 2. CORRECTIVE ACTION UNIT 107 CLOSURE ACTIVITIES SCHEDULE .....	7

## APPENDICES

- APPENDIX A. DATA QUALITY OBJECTIVES
- APPENDIX B. USE RESTRICTION DOCUMENTATION
- APPENDIX C. SITE CLOSURE PHOTOGRAPHS

THIS PAGE INTENTIONALLY LEFT BLANK



## ACRONYMS AND ABBREVIATIONS

---

BMP	best management practice
CAS	Corrective Action Site
CAU	Corrective Action Unit
CFR	Code of Federal Regulations
COC	contaminant of concern
CR	Closure Report
CSM	conceptual site model
DQO	data quality objective
FFACO	<i>Federal Facility Agreement and Consent Order</i>
mrem/yr	millirem(s) per year
NDEP	Nevada Division of Environmental Protection
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NTS	Nevada Test Site
RMA	Radioactive Material Area
SAFER	Streamlined Approach for Environmental Restoration
UR	use restriction
URMA	Underground Radioactive Material Area

THIS PAGE INTENTIONALLY LEFT BLANK

## EXECUTIVE SUMMARY

---

Corrective Action Unit (CAU) 107 is identified in the *Federal Facility Agreement and Consent Order* (FFACO) as “Low Impact Soil Sites” and consists of the following 15 Corrective Action Sites (CASs), located in Areas 1, 2, 3, 4, 5, 9, 10, and 18 of the Nevada Test Site:

- CAS 01-23-02, Atmospheric Test Site - High Alt
- CAS 02-23-02, Contaminated Areas (2)
- CAS 02-23-03, Contaminated Berm
- CAS 02-23-10, Gourd-Amber Contamination Area
- CAS 02-23-11, Sappho Contamination Area
- CAS 02-23-12, Scuttle Contamination Area
- CAS 03-23-24, Seaweed B Contamination Area
- CAS 03-23-27, Adze Contamination Area
- CAS 03-23-28, Manzanitas Contamination Area
- CAS 03-23-29, Truchas-Chamisal Contamination Area
- CAS 04-23-02, Atmospheric Test Site T4-a
- CAS 05-23-06, Atmospheric Test Site
- CAS 09-23-06, Mound of Contaminated Soil
- CAS 10-23-04, Atmospheric Test Site M-10
- CAS 18-23-02, U-18d Crater (Sulky)

Closure activities were conducted from February through April 2009 according to the FFACO (1996; as amended February 2008) and Revision 1 of the Streamlined Approach for Environmental Restoration Plan for CAU 107 (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office, 2009). The corrective action alternatives included No Further Action and Closure in Place with Administrative Controls. Closure activities are summarized in Table 1.

**TABLE 1. SUMMARY OF CORRECTIVE ACTION UNIT 107 CLOSURE ACTIVITIES**

CAS	CAS Name	Closure Method	COC	Closure Activities
01-23-02	Atmospheric Test Site - High Alt	No Further Action	None	As a BMP, a site visit was conducted. 10 CFR 835 postings are not required at this site.
02-23-02	Contaminated Areas (2)	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected. Two radiological warning signs were reattached to the fence.
02-23-03	Contaminated Berm	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected and verified to be in good condition.
02-23-10	Gourd-Amber Contamination Area	No Further Action	None	As a BMP, a site visit was conducted. 10 CFR 835 postings are not required at this site.
02-23-11	Sappho Contamination Area	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected and verified to be in good condition.
02-23-12	Scuttle Contamination Area	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected and verified to be in good condition.
03-23-24	Seaweed B Contamination Area	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected. One radiological warning sign was reattached to the fence.
03-23-27	Adze Contamination Area	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected and verified to be in good condition.
03-23-28	Manzanas Contamination Area	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected and verified to be in good condition.
03-23-29	Truchas-Chamisal Contamination Area	Closure in Place with Administrative Controls	Radionuclides	UR warning signs were installed. As a BMP, existing 10 CFR 835 URMA postings were inspected and verified to be in good condition.
04-23-02	Atmospheric Test Site T4-a	No Further Action	None	As a BMP, a site visit was conducted. 10 CFR 835 postings are not required at this site.
05-23-06	Atmospheric Test Site	No Further Action	None	As a BMP, existing 10 CFR 835 RMA postings were inspected and verified to be in good condition.
09-23-06	Mound of Contaminated Soil	No Further Action	None	As a BMP, existing 10 CFR 835 URMA postings were inspected and verified to be in good condition.
10-23-04	Atmospheric Test Site M-10	No Further Action	None	As a BMP, a site visit was conducted. 10 CFR 835 postings are not required at this site.
18-23-02	U-18d Crater (Sulky)	Closure in Place with Administrative Controls	Radionuclides	UR warning signs were installed. As a BMP, existing 10 CFR 835 RMA postings were inspected and verified to be in good condition.

BMP: best management practice  
CAS: Corrective Action Site  
CFR: Code of Federal Regulations

COC: contaminant of concern  
RMA: Radioactive Material Area  
UR: use restriction

URMA: Underground Radioactive Material Area

## 1.0 INTRODUCTION

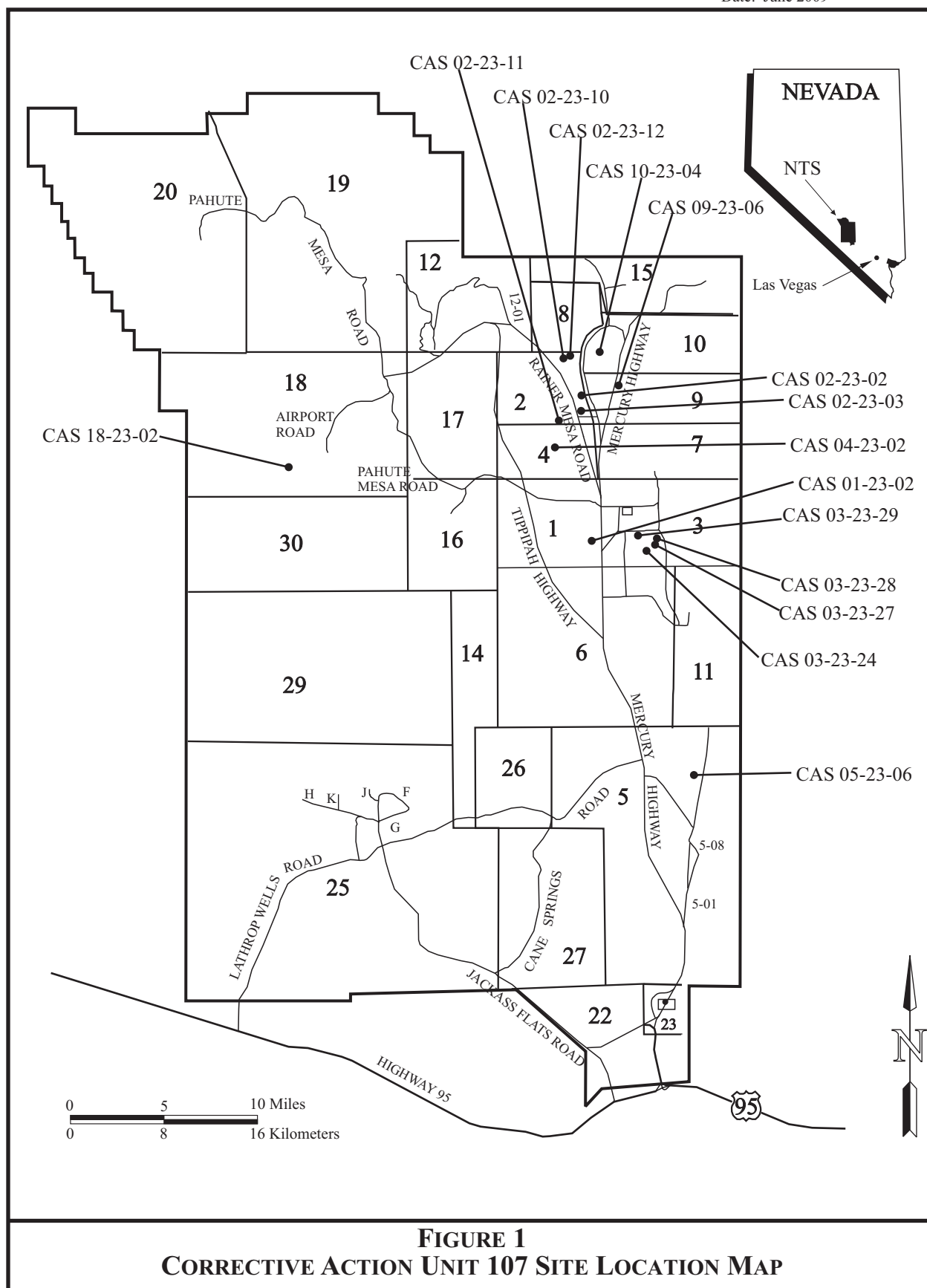
---

This Closure Report (CR) documents closure activities for Corrective Action Unit (CAU) 107, “Low Impact Soil Sites,” according to the *Federal Facility Agreement and Consent Order* (FFACO) (1996; as amended February 2008) and Revision 1 of the Streamlined Approach for Environmental Restoration (SAFER) Plan for CAU 107 (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2009). CAU 107 consists of the following 15 Corrective Action Sites (CASs), located in Areas 1, 2, 3, 4, 5, 9, 10, and 18 of the Nevada Test Site (NTS) (Figure 1):

- CAS 01-23-02, Atmospheric Test Site - High Alt
- CAS 02-23-02, Contaminated Areas (2)
- CAS 02-23-03, Contaminated Berm
- CAS 02-23-10, Gourd-Amber Contamination Area
- CAS 02-23-11, Sappho Contamination Area
- CAS 02-23-12, Scuttle Contamination Area
- CAS 03-23-24, Seaweed B Contamination Area
- CAS 03-23-27, Adze Contamination Area
- CAS 03-23-28, Manzanitas Contamination Area
- CAS 03-23-29, Truchas-Chamisal Contamination Area
- CAS 04-23-02, Atmospheric Test Site T4-a
- CAS 05-23-06, Atmospheric Test Site
- CAS 09-23-06, Mound of Contaminated Soil
- CAS 10-23-04, Atmospheric Test Site M-10
- CAS 18-23-02, U-18d Crater (Sulky)

### 1.1 PURPOSE

CAU 107, “Low Impact Soil Sites,” consists of 15 CASs in Areas 1, 2, 3, 4, 5, 9, 10, and 18 of the NTS. The closure alternatives included No Further Action and Closure in Place with Administrative Controls. This CR provides a summary of completed closure activities.



## **1.2 SCOPE**

No further action was required at 13 of the 15 CASs; however, as a best management practice (BMP), site visits were conducted to document site conditions. Several of the sites require postings for compliance with Title 10 Code of Federal Regulations (CFR) Part 835, “Occupational Radiation Protection” (CFR, 1993). At these sites, as a BMP, the existing postings were inspected and repaired if needed. The following CASs required no further action:

- CAS 01-23-02, Atmospheric Test Site - High Alt
- CAS 02-23-02, Contaminated Areas (2)
- CAS 02-23-03, Contaminated Berm
- CAS 02-23-10, Gourd-Amber Contamination Area
- CAS 02-23-11, Sappho Contamination Area
- CAS 02-23-12, Scuttle Contamination Area
- CAS 03-23-24, Seaweed B Contamination Area
- CAS 03-23-27, Adze Contamination Area
- CAS 03-23-28, Manzanitas Contamination Area
- CAS 04-23-02, Atmospheric Test Site T4-a
- CAS 05-23-06, Atmospheric Test Site
- CAS 09-23-06, Mound of Contaminated Soil
- CAS 10-23-04, Atmospheric Test Site M-10

The following CASs were closed in place with administrative controls; use restriction (UR) warning signs were posted; and as a BMP, the existing 10 CFR 835 postings were inspected and verified to be in good condition:

- CAS 03-23-29, Truchas-Chamisal Contamination Area
- CAS 18-23-02, U-18d Crater (Sulky)

## **1.3 CLOSURE REPORT CONTENTS**

This CR includes the following sections:

- Section 1.0 – Introduction
- Section 2.0 – Closure Activities
- Section 3.0 – Waste Disposition
- Section 4.0 – Closure Verification Results
- Section 5.0 – Conclusions and Recommendations
- Section 6.0 – References
- Appendix A – Data Quality Objectives

- Appendix B – Use Restriction Documentation
- Appendix C – Site Closure Photographs
- Library Distribution List

Data quality objectives (DQOs) were developed for site characterization of CAU 107 and presented in Section 3.0 of Revision 1 of the SAFER Plan for CAU 107 (NNSA/NSO, 2009). The DQOs are included as Appendix A of this report.

Conceptual site models (CSMs) were developed based on process knowledge and historical information. The CSM for 13 of the 15 CASs is that a distinct, measurable release of radionuclides to the soils has not occurred as a result of the associated tests, and there is no credible exposure pathway that could cause an NTS worker to receive a dose greater than 25 millirems per year (mrem/yr). Data are adequate to support a closure option of No Further Action for these sites.

Historical evidence indicates that there is limited contamination within the potential crater area of the TRUCHAS-CHAMISAL detonation associated with CAS 03-23-29. Historical evidence also indicates that there may be limited contamination present at the SULKY site associated with CAS 18-23-02. Data are adequate to support a closure option of Closure in Place with Administrative Controls at these two CASs.



## **2.0 CLOSURE ACTIVITIES**

---

This section describes the closure activities completed for CAU 107, deviations from the SAFER Plan, and the schedule of completed activities.

### **2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES**

The following sections describe the closure activities completed for CAU 107.

#### **2.1.1 No Further Action Sites**

For 13 of the 15 CASs, operational history and historical data indicate that a distinct, measurable release of radionuclides to the soils has not occurred as a result of the associated tests, and there is no credible exposure pathway that could cause an NTS worker to receive a dose greater than 25 mrem/yr. No further action was required; however, as a BMP, site visits were conducted to document site conditions and verify that no additional environmental hazards are present. Photographs of the sites were taken during the site visits and are included in Appendix C. At the sites that require radiological postings to satisfy the requirements of 10 CFR 835, the current postings were inspected and repaired if needed. The following BMPs were conducted at the sites that required no further action:

- At CAS 01-23-02, Atmospheric Test Site - High Alt, a site visit was conducted, and photographs were taken to document site conditions. 10 CFR 835 postings are not required at this site, and no additional environmental hazards were observed during the site visit.
- At CAS 02-23-02, Contaminated Areas (2), a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 Underground Radioactive Material Area (URMA) postings were inspected, and two signs were reattached to the fence. No additional environmental hazards were observed during the site visit.
- At CAS 02-23-03, Contaminated Berm, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 URMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed during the site visit.
- At CAS 02-23-10, Gourd-Amber Contamination Area, a site visit was conducted, and photographs were taken to document site conditions. 10 CFR 835 postings are not required at this site, and no additional environmental hazards were observed during the site visit.
- At CAS 02-23-11, Sappho Contamination Area, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 URMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed during the site visit.
- At CAS 02-23-12, Scuttle Contamination Area, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 URMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed during the site visit.
- At CAS 03-23-24, Seaweed B Contamination Area, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 URMA postings were inspected, and one sign was reattached to the fence. No additional environmental hazards were observed during the site visit.

- At CAS 03-23-27, Adze Contamination Area, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 URMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed during the site visit.
- At CAS 03-23-28, Manzanas Contamination Area, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 URMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed during the site visit.
- At CAS 04-23-02, Atmospheric Test Site T4-a, a site visit was conducted, and photographs were taken to document site conditions. 10 CFR 835 postings are not required at this site, and no additional environmental hazards were observed during the site visit.
- At CAS 05-23-06, Atmospheric Test Site, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 Radioactive Material Area (RMA) postings were inspected and verified to be in good condition. No additional environmental hazards were observed during the site visit.
- At CAS 09-23-06, Mound of Contaminated Soil, a site visit was conducted, and photographs were taken to document site conditions. The existing 10 CFR 835 URMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed during the site visit.
- At CAS 10-23-04, Atmospheric Test Site M-10, a site visit was conducted, and photographs were taken to document site conditions. 10 CFR 835 postings are not required at this site, and no additional environmental hazards were observed during the site visit.

### **2.1.2 Closure in Place with Administrative Controls Sites**

The following CASs were closed in place with administrative controls:

- CAS 03-23-29, Truchas-Chamisal Contamination Area
- CAS 18-23-02, U-18d Crater (Sulky)

Contaminants of potential concern were identified in historical information about these sites. A post-test radiological survey identified low levels of alpha contamination on a concrete pad at CAS 03-23-29, and particulate releases of radionuclides were identified at CAS 18-23-02 in the historical document *Radiological Effluents Released from U.S. Continental Tests, 1961 through 1992* (U.S. Department of Energy, Nevada Operations Office, 1996).

At CAS 03-23-29, UR warning signs were posted according to the FFACO UR posting guidance (FFACO, 2003) outside the existing fence that delineates the radiologically controlled area. As a BMP, the existing 10 CFR 835 URMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed at the site.

At CAS 18-23-02, UR warning signs were posted according to the FFACO UR posting guidance (FFACO, 2003) outside the existing fence that delineates the radiologically controlled area. As a BMP, the existing 10 CFR 835 RMA postings were inspected and verified to be in good condition. No additional environmental hazards were observed at the site.

## **2.2 DEVIATIONS FROM THE SAFER PLAN AS APPROVED**

Deviations from the SAFER Plan (NNSA/NSO, 2009) were not necessary.

## **2.3 CORRECTIVE ACTION SCHEDULE AS COMPLETED**

Closure activities were completed in February and April 2009. Details of the schedule are provided in Table 2.

**TABLE 2. CORRECTIVE ACTION UNIT 107 CLOSURE ACTIVITIES SCHEDULE**

<b>ACTIVITY</b>	<b>START DATE</b>	<b>END DATE</b>
Conduct site visits	February 17, 2009	February 17, 2009
Reattach radiological postings	February 23, 2009	February 23, 2009
Install UR warning signs	April 16, 2009	April 20, 2009

UR: use restriction

## **2.4 SITE PLAN/SURVEY PLAT**

As-built drawings were not required for CAU 107 closure activities.

THIS PAGE INTENTIONALLY LEFT BLANK

### **3.0 WASTE DISPOSITION**

---

No waste was generated during closure of CAU 107.

THIS PAGE INTENTIONALLY LEFT BLANK

## 4.0 CLOSURE VERIFICATION RESULTS

---

Site closure was verified by visual observations and photographs. Photographs documenting site conditions are included as Appendix C.

### 4.1 DATA QUALITY ASSESSMENT

Samples were not collected for closure of CAU 107.

### 4.2 USE RESTRICTION

A UR has been implemented for assumed radioactive contamination that could cause an NTS worker to receive a dose greater than 25 mrem/yr at the following CASs:

- CAS 03-23-29, Truchas-Chamisal Contamination Area
- CAS 18-23-02, U-18d Crater (Sulky)

At CAS 03-23-29, Truchas-Chamisal Contamination Area, historical evidence indicates that there is limited contamination on the concrete pad and sheave located within the fenced URMA. Based on radiological surveys performed for the *Nevada Test Site Contaminated Land Areas Report* (Bechtel Nevada, 2000), contamination is not migrating outside the fenced area; therefore, the UR was established at the fence. Additional information can be found in Section 2.12.3.2 of Revision 1 of the SAFER Plan for CAU 107 (NNSA/NSO, 2009).

At CAS 18-23-02, U-18d Crater (Sulky), historical evidence indicates that there may be limited contamination within the fenced RMA; however, representative sampling of this site would be difficult to achieve due to the nature of the large rubble pile created by the test. In addition, if contamination is present, it is likely on the large rubble, not in the soils. Based on radiological surveys performed for the *Nevada Test Site Contaminated Land Areas Report* (Bechtel Nevada, 2000), contamination is not migrating outside the fenced area; therefore, the UR was established at the fence. Additional information can be found in Section 2.17.3.2 of Revision 1 of the SAFER Plan for CAU 107 (NNSA/NSO, 2009).

The future use of the UR areas is restricted from any activity that may alter or modify the containment controls, unless appropriate concurrence is obtained in advance. UR warning signs were posted to warn against intrusive activity according to the FFACO UR posting guidance (FFACO, 2003). Annual site inspections will be required to ensure that the signs are intact and legible and that the UR is maintained. Details on the post-closure requirements are included in Section 5.2. The CAU Use Restriction Information forms and figures showing the locations of the surveyed points delineating the UR area are included in Appendix B.

THIS PAGE INTENTIONALLY LEFT BLANK



## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

---

### **5.1 CONCLUSIONS**

At the following CASs, no further action was required; however, as a BMP, site visits were conducted to document site conditions and verify postings, as applicable:

- CAS 01-23-02, Atmospheric Test Site - High Alt
- CAS 02-23-02, Contaminated Areas (2)
- CAS 02-23-03, Contaminated Berm
- CAS 02-23-10, Gourd-Amber Contamination Area
- CAS 02-23-11, Sappho Contamination Area
- CAS 02-23-12, Scuttle Contamination Area
- CAS 03-23-24, Seaweed B Contamination Area
- CAS 03-23-27, Adze Contamination Area
- CAS 03-23-28, Manzanas Contamination Area
- CAS 04-23-02, Atmospheric Test Site T4-a
- CAS 05-23-06, Atmospheric Test Site
- CAS 09-23-06, Mound of Contaminated Soil
- CAS 10-23-04, Atmospheric Test Site M-10

At the following CASs, UR warning signs were posted, and a UR was implemented:

- CAS 03-23-29, Truchas-Chamisal Contamination Area
- CAS 18-23-02, U-18d Crater (Sulky)

### **5.2 POST-CLOSURE REQUIREMENTS**

#### **5.2.1 Inspections**

The following CASs require post-closure inspections:

- CAS 03-23-29, Truchas-Chamisal Contamination Area
- CAS 18-23-02, U-18d Crater (Sulky)

Radiological contamination is assumed to be present based on historical information about the sites. Inspections will be performed annually to verify that the UR warning signs are in place and legible and that the URs are maintained. The interiors of the UR areas will be inspected to confirm there have been no disturbances to the areas. Maintenance or repair needs that are identified, such as sign or post repair, will be completed prior to the following inspection and documented in writing at the time the work is done. Inspection results will be documented in the

annual combined NTS post-closure letter report. The report will include a discussion of observations and will describe any maintenance activities performed since the last inspection. Copies of the inspection checklists will be provided, and the field notes will be maintained in the project files. The letter report will be submitted to the Nevada Division of Environmental Protection (NDEP).

### **5.3 RECOMMENDATIONS**

Since closure activities for CAU 107 have been completed following the NDEP-approved SAFER Plan (NNSA/NSO, 2009) as documented in this report, NNSA/NSO requests the following:

- A Notice of Completion be provided by NDEP to NNSA/NSO for closure of CAU 107.
- The transfer of CAU 107 from Appendix III to Appendix IV, Closed Corrective Action Units, of the FFACO (1996; as amended February 2008).

## 6.0 REFERENCES

---

Bechtel Nevada, 2000. *Nevada Test Site Contaminated Land Areas Report, Volume I*. DOE/NV/11718--324. Prepared for the U.S. Department of Energy, Nevada Operations Office. Las Vegas, NV.

CFR, see Code of Federal Regulations.

Code of Federal Regulations, Title 10, Part 835, "Occupational Radiation Protection," 1993.

*Federal Facility Agreement and Consent Order*, 1996 (as amended February 2008). Agreed to by the State of Nevada; U.S. Department of Energy, Environmental Management; U.S. Department of Defense; and U.S. Department of Energy, Legacy Management.

*Federal Facility Agreement and Consent Order*, 2003. Use Restriction Posting Guidance.

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

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, 2009. *Streamlined Approach for Environmental Restoration Plan for Corrective Action Unit 107: Low Impact Soil Sites, Nevada Test Site, Nevada*. DOE/NV--1295-REV.1. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office, 1996. *Radiological Effluents Released from U.S. Continental Tests, 1961 through 1992*. Prepared by Bechtel Nevada. Las Vegas, NV.

THIS PAGE INTENTIONALLY LEFT BLANK

## **APPENDIX A\***

### **DATA QUALITY OBJECTIVES**

\* As presented and published in Section 3.0 of the approved *Streamlined Approach for Environmental Restoration Plan for Corrective Action Unit 107: Low Impact Soil Sites, Nevada Test Site, Nevada*, 2009, DOE/NV--1295-REV.1. Las Vegas, NV.

THIS PAGE INTENTIONALLY LEFT BLANK

## 3.0 DATA QUALITY OBJECTIVES

---

The DQO process is a seven-step systematic planning method based on the scientific method. The information presented in this document is based on historical data generated from preliminary assessment activities for CAU 107. The DQOs were developed according to the EPA *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006). The steps systematically build on the data acquired during preliminary assessment work and background research.

### 3.1 SUMMARY OF DQO ANALYSIS

#### 3.1.1 STATE THE PROBLEM (STEP 1)

Step 1 of the DQO process describes the problem to be studied and develops a CSM to gain a sufficient understanding in defining the problem.

##### 3.1.1.1 Problem Statement

The problem statement for CAU 107 is “Conceptual corrective actions have been clearly identified based on historical data and background information. Are the sites sufficiently characterized to support closure through no further action and/or administrative controls?”

##### 3.1.1.2 Conceptual Site Model

The CSM is used to organize and communicate information about site characteristics. It reflects the best interpretation of available information. The CSM is based on historical documentation, personnel interviews, site process knowledge, site visits, photographs, engineering drawings, field screening, and analytical results. The CSM describes the most probable scenario for current conditions at the site and defines the assumptions that are the basis for choosing a conceptual corrective action alternative.

The sites fall into the following categories:

- Category A: Sites associated with atmospheric tests with no confirmed release to surface soils
  - CAS 01-23-02, Atmospheric Test Site - High Alt
  - CAS 05-23-06, Atmospheric Test Site
  - CAS 10-23-04, Atmospheric Test Site M-10
- Category B: Sites associated with underground tests and detonations with no confirmed release to surface soils
  - CAS 02-23-02, Contaminated Areas (2)
  - CAS 02-23-10, Gourd-Amber Contamination Area
  - CAS 02-23-11, Sappho Contamination Area
  - CAS 02-23-12, Scuttle Contamination Area
  - CAS 03-23-24, Seaweed B Contamination Area
  - CAS 03-23-28, Manzanitas Contamination Area
  - CAS 09-23-06, Mound of Contaminated Soil

- Category C: Sites associated with atmospheric or underground tests and detonations with possible release to surface soils
  - CAS 02-23-03, Contaminated Berm
  - CAS 03-23-27, Adze Contamination Area
  - CAS 03-23-29, Truchas-Chamisal Contamination Area
  - CAS 04-23-02, Atmospheric Test Site T4-a
  - CAS 18-23-02, U-18d Crater (Sulky)

### **3.1.2 IDENTIFY THE GOAL OF THE STUDY (STEP 2)**

Step 2 of the DQO process identifies the questions the study will attempt to resolve and what actions may result. The goal of the study is to answer the following questions satisfactorily:

1. Does historical information indicate that a release to ground surface soils occurred as a result of the associated detonation?
2. If so, is the soil impacted with contamination levels that exceed action levels?
3. If so, do the risks to personnel and the environment justify a corrective action, or are the current 10 CFR 835, "Occupational Radiation Protection," compliant controls adequate for this purpose?

### **3.1.3 IDENTIFY INFORMATION INPUTS (STEP 3)**

Step 3 of the DQO process identifies the information needed to address the goals of the study.

#### **3.1.3.1 Information Needs**

In order to determine if a distinct, measurable release to the surface soils resulting from historical operations occurred and, if so, to quantify that release, existing historical information must be evaluated using the following criteria:

- Documented process knowledge indicates a release to surface soils has not occurred.
  - Tests were documented to be performed well above ground surface.
  - Documented releases were short-lived, gaseous radionuclides.
  - Location and direction of plume deposition paths (or lack thereof) were recorded in post-test documentation.
- Process knowledge and multiple, semi-quantitative data sets are in agreement with each other.
  - Aerial survey data provide 100-percent coverage of areas.
  - RIDP data were collected from areas most likely to be contaminated on a statistically based grid.
  - Contaminated Lands Report Survey data were collected from areas most likely to be contaminated.
  - Soil sampling data were collected under an approved CAIP from sites with similar CSMs.

#### **3.1.3.2 Sources of Information**

Existing information, such as historical documentation, personnel interviews, site process knowledge, site visits, photographs, and previous field screening and analytical results, will be evaluated to determine if it satisfies the decisions.



### ***Qualitative Data***

Qualitative data identify or describe the characteristics or components of the site. The quality assurance (QA)/quality control (QC) requirements are the least rigorous for qualitative data. This measurement of quality is typically assigned to historical information and data where QA/QC may be highly variable or not known. Professional judgment is often used to generate qualitative data. Visual observations made during field visits, process knowledge about the sites and the nature of the atmospheric tests, and historical records and interviews will be used to confirm the absence or presence of contamination.

### ***Semi-quantitative Data***

Semi-quantitative data indirectly measure the quantity or amount of a characteristic or component. Inferences are drawn about the quantity or amount of a characteristic or component because a correlation has been shown to exist between the indirect measurement and a quantitative measurement. QA/QC requirements on semi-quantitative collection and measurements are high but may not be as rigorous as for quantitative data. Previous data that have been collected, including 1994 aerial radiological survey results (Hendricks and Riedhauser, 1999), RIDP data (McArthur, 1991), dose rate measurements, FIDLER readings, removable alpha and beta/gamma measurements, walkover radiological survey results, and other data, will be evaluated. Some portions of these data sets may be considered quantitative.

### ***Quantitative Data***

Quantitative data measure the quantity or amount of a characteristic or component. These data require the highest level of QA/QC in collection and measurement systems because the intended use of the data is to resolve primary decisions and/or to verify that closure standards have been met. Laboratory analytical data are generally considered quantitative. For the sites where analytical data have been collected, these data will be evaluated to verify they meet the information needs and satisfy the criteria for the decision inputs. Portions of the RIDP data may qualify as quantitative. Soil sampling data were collected and analyzed under both a field and laboratory QA/QC program. In situ measurements that directly quantify gamma-emitting radionuclides should be considered quantitative if appropriately validated.

#### **3.1.4 DEFINE THE BOUNDARIES OF THE STUDY (STEP 4)**

Step 4 of the DQO process defines target populations of interest, specifies spatial boundaries and time constraints, and determines practical constraints on data collection.

##### **3.1.4.1 Population of Interest**

The population of interest to resolve the decisions includes the spatial boundaries of the sites. The spatial boundaries of all sites are limited to the surface or near-surface radioactive contamination. This CAU contains several types of sites:

- Atmospheric tests with no distinct, operationally related contaminant plume (3 of 15 sites)
- Underground detonations with no documented history of release of particulate radionuclides or documented releases were very low (7 of 15 sites)
- Atmospheric or underground tests and detonations with possible release to surface soils (5 of 15 sites, including CAS 02-23-03, CAS 03-23-27, and CAS 03-23-29, which involved pulling a contaminated cable from a test hole; CAS 04-23-02, an atmospheric test; and CAS 18-23-02, a cratering test)

#### 3.1.4.2 Time Constraints

The study data will be evaluated considering the length of time that will be required to complete the closure process and the closure report, as allowed for by the SAFER process. Time constraints that may affect the schedule of this project include approval of the SAFER Plan and DQOs. In addition, if classified information must be accessed, additional time may be needed to complete the study.

### 3.1.5 **DEVELOP THE ANALYTIC APPROACH (STEP 5)**

Step 5 of the DQO process develops a decision rule statement (“If..., then...” ) that defines the conditions under which possible alternative actions will be chosen. In this step, the action levels are specified and the sensitivity of the historical analytical methods is evaluated.

#### 3.1.5.1 Decision Rules

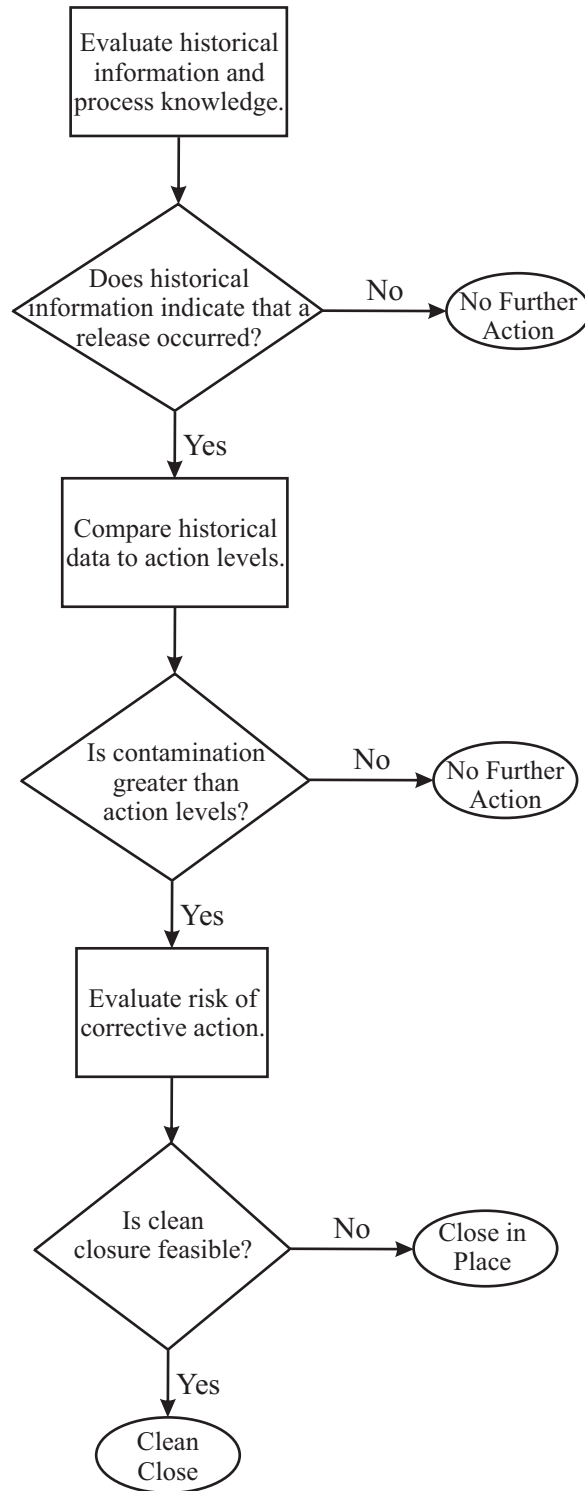
The decision rules are as follows:

- If it is determined, through evaluation of the information inputs, that there has not been a distinct, measurable release to the surface soils resulting from the associated historical operations, then no further action will be required.
- If it is determined that a distinct, measurable release to the surface soils resulted from the associated historical operations, then soil contamination levels will be determined and compared to action levels. This will be accomplished by evaluating the following:
  - RIDP data, both in situ and soil sample values
  - Aerial survey data where correlated
  - Soil sampling data from like sites
  - Soil sampling data collected in the vicinity of the site supporting other investigations
- If radiological concentrations in the soil are less than the action levels, then no further action will be required.
- If radiological concentrations are greater than action levels, then the risks to personnel and the environment will be evaluated to determine a path forward.
- If it is determined that clean closure is not feasible, the site(s) will be closed in place with administrative controls.

The decision flowchart is summarized in Figure 19.

#### 3.1.5.2 Action Levels

The action levels for radiological contaminants are based on the National Council on Radiation Protection (NCRP)-recommended screening limits for construction, commercial, industrial land-use scenarios (NCRP, 1999) scaled to 25 mrem/yr dose constraint (Murphy, 2004) and 10 CFR 835, which provides guidelines for levels of radiological control depending on the levels of radiological hazards present (CFR, 1993). Remaining radiological contamination will be posted per the NV/YMP RadCon Manual (NNSA/NSO, 2004b). The action levels will be the greater of either the levels described above or the local area background levels.



**FIGURE 19.**  
**DECISION FLOWCHART**

### 3.1.5.3 Measurement and Analysis Sensitivity

The historical measurement and analysis methods must be capable of measuring analyte concentrations at or below the corresponding action levels.

RIDP and aerial survey data allow calculations of minimum detectable activity. As appropriate, detection limits will be determined and compared to the action levels described above. Should detection limits be higher than the action levels, the detection limit will be used to make the appropriate closure decision, likely closure in place with administrative controls.

### 3.1.6 SPECIFY PERFORMANCE OR ACCEPTANCE CRITERIA (STEP 6)

Step 6 of the DQO process specifies performance criteria for the decision rules. Setting tolerable limits on decision errors requires the planning team to weigh the relative effects of threats to human health and the environment, expenditure of resources, and the consequences of an incorrect decision. This section provides an assessment of the possible outcomes of DQO decisions and the impact of those outcomes if the decisions are in error.

In general, confidence in DQO decisions will be established qualitatively by the following:

- Developing CSMs
- Testing the validity of the CSMs based on an analysis of historical data
- Evaluating the quality of the data based on data quality indicator parameters

#### 3.1.6.1 Decision Errors

The baseline condition (i.e., null hypothesis) is that soil has not been impacted with radionuclides at concentrations above action levels. The alternative condition is that the soil has been impacted with radionuclides at concentrations above action levels.

##### ***False Rejection***

This error would mean deciding that the baseline condition is false when, in fact, it is true. This error means deciding that the soil is contaminated above action levels when it is not. The consequence of this decision is increased cost for the closure effort or post-closure requirements.

Several false positive errors have been identified through review of historical data. False positive errors include the determination that a release to the surface soils occurred as a result of a nuclear detonation when, in light of further historical investigation, it is demonstrated that such a release did not occur. Examples include CAS 01-23-02, where detonation occurred at 40,000 ft above ground, and CAS 03-23-24, where the only documented release involves very short-lived gaseous radionuclides.

##### ***False Acceptance***

This error would mean deciding that the baseline condition is true when, in fact, it is false. This error means deciding that the soil is not contaminated when, in fact, it is contaminated above action levels. The potential consequence is an increased risk to human health and the environment. This error will be controlled by having a high degree of confidence that the data identify contamination, if present. To satisfy this criterion, the data will be closely evaluated to ensure that the data cover the areas of the sites and are adequate to detect contamination at or below the action levels. Further, since most of these sites are currently controlled for radiological purposes and there is no proximal public receptor, the impact of this error is minimized.

### **3.1.7 DEVELOP THE PLAN FOR OBTAINING DATA (STEP 7)**

Step 7 of the DQO process provides the general approach for resolving the decisions. The pool of existing data will be used to resolve the decisions outlined above.

#### **3.1.7.1 Process Knowledge**

The historical operations associated with these sites are well documented through multiple historical sources. Much of the operational information is based on semi-quantitative, or in some cases, quantitative data.

#### **3.1.7.2 Aerial Survey Data**

Detection limits for this data can be established. Aerial survey data provide 100-percent coverage of the study areas.

#### **3.1.7.3 Contaminated Lands Survey Data**

These data are semi-quantitative and have been found to be consistent with process knowledge, aerial survey data, and RIDP data where available.

#### **3.1.7.4 RIDP Data**

In general, RIDP did not cover these sites, as they were not suspected to contain surface contamination. In some cases, the RIDP study boundary for other soils sites extends into regions near the subject sites. If needed, RIDP data will be converted to units of picocuries per gram and compared to action levels. In general, evaluation of RIDP data will be used to support process knowledge assumptions and results of aerial surveys. RIDP survey areas were first determined through the use of aerial survey data. Aerial survey data provided a mechanism to bias study areas. Within each study area, survey and sampling points were determined through a statistical approach that generally provided higher measurement frequencies in areas of higher contamination and lower frequencies in areas of lower contamination.

Taken together, these data sets provide adequate information to do the following:

- Determine if there has been a distinct, measurable release to the surface soils resulting from the associated historical operations.
- Make comparisons to action levels as appropriate.
- Determine if appropriate controls are already in place, thus providing the basis for no further action.
- Identify cases in which appropriate controls are not in place, leading to closure in place with administrative controls.

## **3.2 RESULTS OF THE DQO ANALYSIS**

Results of the DQO analysis are presented in Section 2.0. The problem statement, “Conceptual corrective actions have been clearly identified based on historical data and background information. Are the sites sufficiently characterized to support closure through no further action and/or administrative controls?” has been resolved through the collection and evaluation of the items discussed in Section 3.1.3.1, Information Needs. The sites are sufficiently characterized to support the closure decisions described in this SAFER Plan. The evaluation found that there was sufficient process knowledge and historical characterization data to resolve the first goal of the study outlined in Section 3.1.2, Identify the Goal of the Study (Step 2). The resolution to the question, “Does historical information indicate that a release to ground surface soils occurred as a result of the associated test?” is presented in Section 2.0. Available historical documentation and characterization data indicate that a release to surface soils did not occur as a result of the associated tests. The decision rule outlined in Section 3.1.5.1, Decision Rules, states, “If it is determined, through evaluation of the information inputs, that there has not been a distinct, measurable release to the surface soils resulting from the associated historical operations, then no further action will be required.” The sites will be closed as outlined in the SAFER Plan through the existing 10 CFR 835 controls. Table 48 provides a summary of the results of the evaluation for the CASs discussed in Section 2.0.

### **3.2.1 ACTION LEVEL DETERMINATION AND BASIS**

Based on the evaluation presented in Section 2.0, releases of radionuclides to the surface soils as a result of the tests did not occur. The decision flowchart (Figure 19) indicates that the development of action levels is not required if a release to the surface soils did not occur.

### **3.2.2 HYPOTHESIS TEST**

The null hypothesis is that a distinct, measurable release of radionuclides to the soils has not occurred as a result of the associated tests. The two types of decision errors are false rejection and false acceptance. A false rejection decision error would occur if it is determined that the soil is contaminated above action levels when it is not. The consequence of this decision is increased cost for the closure effort or post-closure requirements. A false acceptance decision error would occur if it is determined that the soil is not contaminated when, in fact, it is contaminated above action levels. The potential consequence is an increased risk to human health and the environment.

### **3.2.3 STATISTICAL MODEL**

A statistical model does not apply to closure of CAU 107.

### **3.2.4 DESIGN DESCRIPTION/OPTION**

Because historical data have been used to determine a closure path for the sites in CAU 107 and additional data will not be collected, a design option for sampling is not applicable.

**TABLE 48. SUMMARY OF DQO ANALYSIS**

CAS NUMBER/NAME	CAS CATEGORY	NAME AND YEAR OF ASSOCIATED DETONATION	TYPE OF RADIOLOGICAL RELEASE ASSOCIATED WITH UNDERGROUND DETONATION <sup>A</sup>	DETECTED IN 1994 AERIAL RADIOLOGICAL SURVEY? <sup>B</sup>	RADCON DEMARCATION <sup>C</sup>
01-23-02, Atmospheric Test Site - High Alt	Far Above Ground Surface	HA, 1955	N/A	No	None Required
02-23-02, Contaminated Areas (2)	Deep Underground	CALABASH, 1969	None	No	U-2av (CALABASH) #1 URMA
02-23-03, Contaminated Berm	Deep Underground	FLASK-RED, 1970	Cable-pull; short-lived gases from sampling, detected on site only	No	U-2az#3 (FLASK-RED) URMA
02-23-10, Gourd-Amber Contamination Area	Deep Underground	GOURD-AMBER, 1969	None	Only from nearby SEDAN	None
02-23-11, Sappho Contamination Area	Deep Underground	SAPPHO, 1972	Drill-back release; short-lived gases only	Only from nearby SHASTA	U2dh2 (SAPPHO) URMA
02-23-12, Scuttle Contamination Area	Deep Underground	SCUTTLE, 1969	Test release, detected off site	Only from nearby SEDAN	U2bh (SCUTTLE) URMA
03-23-24, Seaweed B Contamination Area	Deep Underground	SEAWEED B, 1969	Test release; short-lived gases detected on site only	No	U3hkd (SEAWEED-B) URMA
03-23-27, Adze Contamination Area	Deep Underground	ADZE, 1968	Cable-pull; short-lived gases only	No	U3fw (ADZE) URMA
03-23-28, Manzanias Contamination Area	Deep Underground	MANZANAS, 1970	Test release; short-lived gases detected on site only	No	U3gr (MANZANAS) URMA
03-23-29, Truchas-Chamisal Contamination Area	Deep Underground	TRUCHAS-CHAMISAL, 1970	Test release; short-lived gases only	No	U3ho (TRUCHAS-CHAMISAL) URMA
04-23-02, Atmospheric Test Site T4-a	Near Ground Surface	RAY, 1953	N/A	Only from nearby CAS 04-23-01 tests	None
05-23-06, Atmospheric Test Site	Far Above Ground Surface	Ranger Series, 1951	N/A	No	Kay Blockhouse RMA



CAS NUMBER/NAME	CAS CATEGORY	NAME AND YEAR OF ASSOCIATED DETONATION	TYPE OF RADIOLOGICAL RELEASE ASSOCIATED WITH UNDERGROUND DETONATION <sup>A</sup>	DETECTED IN 1994 AERIAL RADIOLOGICAL SURVEY? <sup>B</sup>	RADCON DEMARCATION <sup>C</sup>
09-23-06, Mound of Contaminated Soil	Deep Underground	PITON-A, 1970	Test release; short-lived gases detected on site only	Only from nearby HOOD and CHARLESTON tests	U-9 ITS Y-30 (PITON-A) URMA
10-23-04, Atmospheric Test Site M-10	Far Above Ground Surface	JOHN, 1957	N/A	Only from nearby SEDAN	None
18-23-02, U-18d Crater (Sulky)	Deep Underground	SULKY, 1964	Test release; detected off site	No	U-18d (SULKY) RMA

Notes:

a. Based on data from the reports listed below. N/A indicates atmospheric test.

U.S. Department of Energy, Nevada Operations Office, 1996. *Radiological Effluents Released from U.S. Continental Tests, 1961 through 1992*. Prepared by Bechtel Nevada. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office, 2000. *United States Nuclear Tests, July 1945 through September 1992*. DOE/NV-209-Rev 15. Las Vegas, NV.

b. Based on data from the following report:

Bechtel Nevada, 1999. *An Aerial Radiological Survey of the Nevada Test Site*, DOE/NV/11718--324. Prepared for the U.S. Department of Energy, Nevada Operations Office. Las Vegas, NV: Remote Sensing Laboratory.

c. Based on data from the following report and as updated through current RadCon Demarcation database:

Bechtel Nevada, 2000. *Nevada Test Site Contaminated Land Areas Report, Volume I*. DOE/NV/11718--481-VOL 1. Prepared for U.S. Department of Energy. Las Vegas, NV.



### **3.2.5 CONCEPTUAL SITE MODEL**

Through the review of the process knowledge and historical data presented in Section 2.0, the CSM for 13 of the 15 CASs is that a distinct, measurable release of radionuclides to the soils has not occurred as a result of the associated tests. Data are adequate to support a closure option of no further action for these sites.

Historical evidence indicates that there is limited contamination within the potential crater area of the TRUCHAS-CHAMISAL detonation associated with CAS 03-23-29. However, levels are too low to be seen in fly-over data and do not pose a risk to workers or the environment. Data are adequate to support a closure option of closure in place with administrative controls. The site is in a stable condition and requires no additional controls; therefore, no additional closure activities will be conducted. The site is currently posted in compliance with 10 CFR 835 as a URMA. The Demarcation Project will monitor the area for continued compliance with 10 CFR 835.

Historical evidence also indicates that there may be limited contamination present at the SULKY site associated with CAS 18-23-02. However, levels are too low to be seen in fly-over data and do not pose a risk to workers or the environment. Data are adequate to support a closure option of closure in place with administrative controls. The site is in a stable condition and requires no additional controls; therefore, no additional closure activities will be conducted. The site is currently posted in compliance with 10 CFR 835 as an RMA. The Demarcation Project will monitor the area for continued compliance with 10 CFR 835.

THIS PAGE INTENTIONALLY LEFT BLANK

## **APPENDIX B**

### **USE RESTRICTION DOCUMENTATION**

THIS PAGE INTENTIONALLY LEFT BLANK

## CAU Use Restriction Information

**CAU Number/Description:** CAU 107, Low Impact Soil Sites

**Applicable CAS Numbers/Descriptions:** CAS 03-23-29, Truchas-Chamisal Contamination Area

**Contact (organization/project):** NNSA/NSO Federal Soils Sub-Project Director

**Surveyed Area (UTM, Zone 11, NAD 27, meters):**

UR POINTS	NORTHING	EASTING
1	4,096,690.782	587,411.264
2	4,096,684.843	587,409.061
3	4,096,676.423	587,408.645
4	4,096,668.348	587,409.332
5	4,096,660.959	587,412.595
6	4,096,655.711	587,420.255
7	4,096,654.922	587,428.399
8	4,096,659.179	587,436.009
9	4,096,666.261	587,440.578
10	4,096,672.387	587,443.425
11	4,096,678.803	587,445.058
12	4,096,686.153	587,442.065
13	4,096,691.487	587,436.917
14	4,096,695.806	587,429.858
15	4,096,696.674	587,426.975
16	4,096,697.828	587,422.939
17	4,096,696.195	587,416.784

**Survey Date:** 04/22/2009      **Survey Method (GPS, etc):** GPS

**Site Monitoring Requirements:** Visual Inspections

**Required Frequency (quarterly, annually?):** Annual

**If Monitoring Has Started, Indicate last Completion Date:** N/A

### Use Restrictions

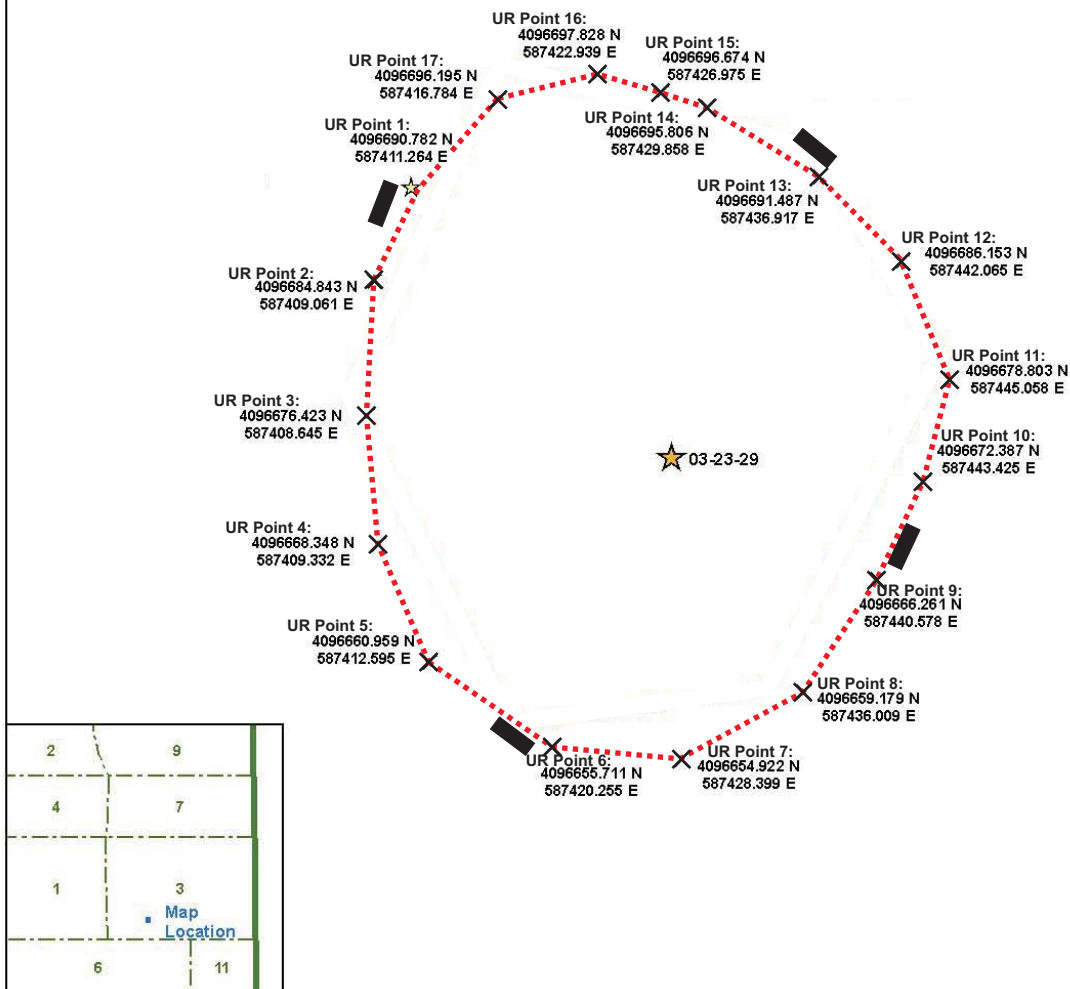
The future use of any land related to this Corrective Action Unit (CAU), as described by the above surveyed location, is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the state and identified in the CAU Closure Report or other CAU documentation unless appropriate concurrence is obtained in advance.

**Comments:** A use restriction (UR) has been implemented for assumed radioactive contamination that could cause a dose greater than 25 millirems per year. The future use of the UR area is restricted from any activity that may alter or modify the containment controls, unless appropriate concurrence is obtained in advance. Annual site inspections are required to ensure that the signs are intact and legible and that the UR is maintained. Maintenance or repair needs that are identified will be completed prior to the following inspection. Inspection results will be documented in the annual combined Nevada Test Site post-closure letter report.

**Submitted By:** \_\_\_\_\_/S/K Cabbie

**Date:** 6-22-09

**cc with copy of survey map (paper and digital (dgn) formats):**  
**CAU Files (2 copies)**



## EXPLANATION

**CAS 03-23-29**  
**Land Use Restriction**

0 5 10 15 Meters



Map projection: Nevada State Plane,  
(Central Zone, meters),  
North American Datum 1983

Map Produced by the NS Tec  
NTS Geographic Information Systems Group  
Product ID: 20090310-01-P010-R00

- CAS Marker
- Use Restriction Boundary
- Surveyed Location
- U-3ho Sign
- Use Restriction Warning Sign

- NTS Boundary
- NTS Operational Areas

Survey coordinates shown are  
UTM, NAD27, Zone 11, meters.

## CORRECTIVE ACTION SITE 03-23-29, TRUCHAS-CHAMISAL CONTAMINATION AREA, USE RESTRICTION BOUNDARY

## CAU Use Restriction Information

**CAU Number/Description:** CAU 107, Low Impact Soil Sites

**Applicable CAS Numbers/Descriptions:** CAS 18-23-02, U-18d Crater (Sulky)

**Contact (organization/project):** NNSA/NSO Federal Soils Sub-Project Director

**Surveyed Area (UTM, Zone 11, NAD 27, meters):**

UR POINTS	NORTHING	EASTING
1	4,104,023.018	558,454.515
2	4,104,031.600	558,462.026
3	4,104,038.755	558,464.615
4	4,104,045.205	558,465.805
5	4,104,054.236	558,464.857
6	4,104,062.951	558,461.336
7	4,104,068.665	558,456.962
8	4,104,073.591	558,450.627
9	4,104,077.290	558,438.425
10	4,104,076.875	558,429.150
11	4,104,073.763	558,420.499
12	4,104,068.193	558,413.237
13	4,104,065.966	558,411.302
14	4,104,047.264	558,404.375
15	4,104,041.512	558,404.639
16	4,104,036.056	558,405.921
17	4,104,027.441	558,410.827
18	4,104,021.149	558,417.753
19	4,104,017.822	558,424.938
20	4,104,016.679	558,429.358
21	4,104,016.046	558,435.564
22	4,104,016.496	558,441.352
23	4,104,018.607	558,447.337

**Survey Date:** 04/23/2009      **Survey Method (GPS, etc):** GPS

**Site Monitoring Requirements:** Visual Inspections

**Required Frequency (quarterly, annually?):** Annual

**If Monitoring Has Started, Indicate last Completion Date:** N/A



## Use Restrictions

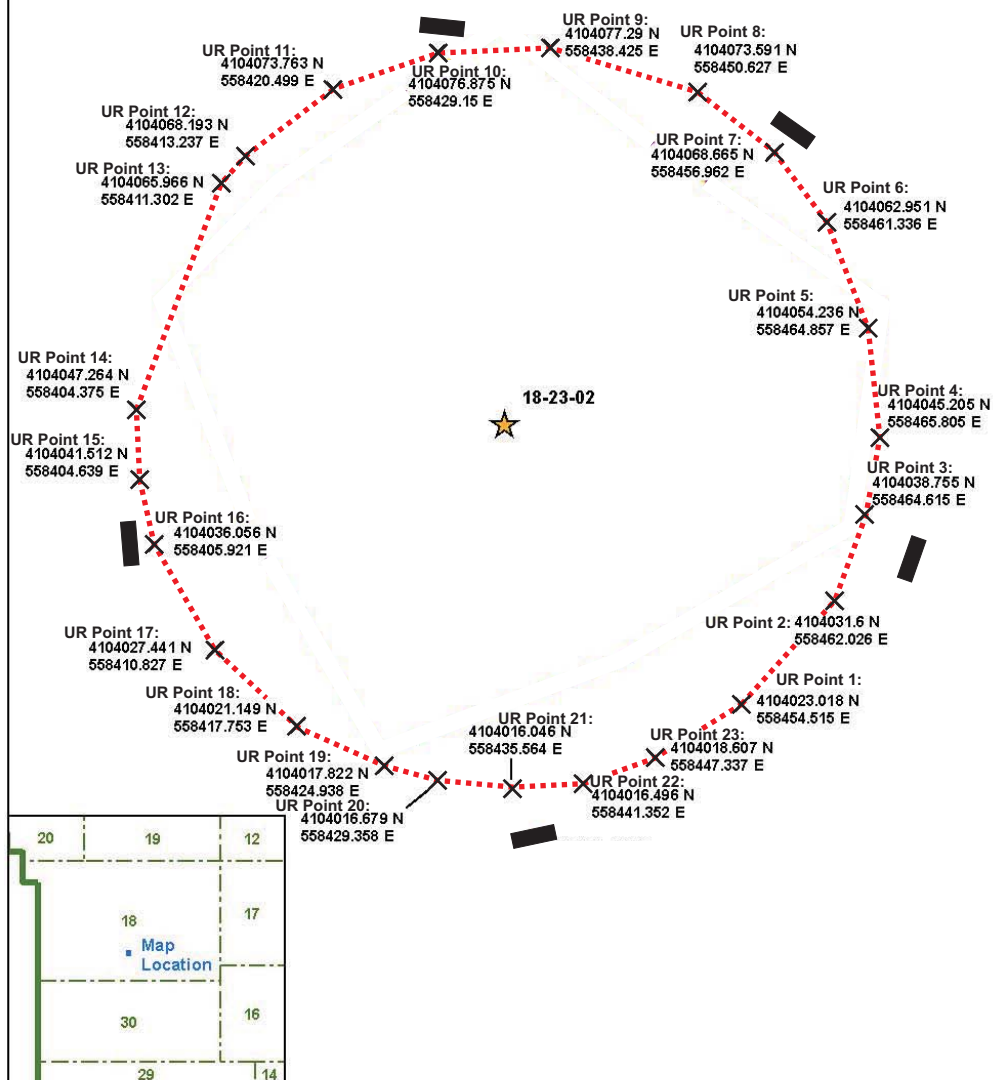
The future use of any land related to this Corrective Action Unit (CAU), as described by the above surveyed location, is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the state and identified in the CAU Closure Report or other CAU documentation unless appropriate concurrence is obtained in advance.

**Comments:** A use restriction (UR) has been implemented for assumed radioactive contamination that could cause a dose greater than 25 millirems per year. The future use of the UR area is restricted from any activity that may alter or modify the containment controls, unless appropriate concurrence is obtained in advance. Annual site inspections are required to ensure that the signs are intact and legible and that the UR is maintained. Maintenance or repair needs that are identified will be completed prior to the following inspection. Inspection results will be documented in the annual combined Nevada Test Site post-closure letter report.

**Submitted By:** \_\_\_\_\_ /S/K Cabbie

**Date:** 6-22-09

**cc with copy of survey map (paper and digital (dgn) formats):**  
**CAU Files (2 copies)**



## EXPLANATION

### CAS 18-23-02 Land Use Restriction

0 5 10 15 20 Meters

Map projection: Nevada State Plane,  
(Central Zone, meters),  
North American Datum 1983  
Map Produced by the NSTec  
NTS Geographic Information Systems Group  
Product ID: 20090428-02-P-002-R00

- CAS Marker
- Use Restriction Boundary
- Surveyed Location
- Use Restriction Warning Sign

- NTS Boundary
- NTS Operational Areas

Survey coordinates shown are  
UTM, NAD27, Zone 11, meters.

## CORRECTIVE ACTION SITE 18-23-02, U-18D CRATER (SULKY), USE RESTRICTION BOUNDARY

## **APPENDIX C**

### **SITE CLOSURE PHOTOGRAPHS**

THIS PAGE INTENTIONALLY LEFT BLANK

### PHOTOGRAPH LOG

PHOTOGRAPH NUMBER	DATE	CORRECTIVE ACTION SITE
1	02/17/2009	01-23-02, Atmospheric Test Site - High Alt
2	02/17/2009	02-23-02, Contaminated Areas (2)
3	02/17/2009	02-23-03, Contaminated Berm
4	02/17/2009	02-23-10, Gourd-Amber Contamination Area
5	02/17/2009	02-23-11, Sappho Contamination Area
6	02/17/2009	02-23-12, Scuttle Contamination Area
7	02/17/2009	03-23-24, Seaweed B Contamination Area
8	02/17/2009	03-23-27, Adze Contamination Area
9	12/11/2008	03-23-28, Manzanitas Contamination Area
10	04/20/2009	03-23-29, Truchas-Chamisal Contamination Area
11	02/17/2009	04-23-02, Atmospheric Test Site T4-a
12	02/17/2009	05-23-06, Atmospheric Test Site
13	02/17/2009	09-23-06, Mound of Contaminated Soil
14	02/17/2009	10-23-04, Atmospheric Test Site M-10
15	04/16/2009	18-23-02, U-18d Crater (Sulky)

THIS PAGE INTENTIONALLY LEFT BLANK



Photograph 1: CAS 01-23-02, Atmospheric Test Site - High Alt, 02/17/2009



Photograph 2: CAS 02-23-02, Contaminated Areas (2), 02/17/2009





Photograph 3: CAS 02-23-03, Contaminated Berm, 02/17/2009



Photograph 4: CAS 02-23-10, Gourd-Amber Contamination Area, 02/17/2009





Photograph 5: CAS 02-23-11, Sappho Contamination Area, 02/17/2009



Photograph 6: CAS 02-23-12, Scuttle Contamination Area, 02/17/2009



Photograph 7: CAS 03-23-24, Seaweed B Contamination Area, 02/17/2009



Photograph 8: CAS 03-23-27, Adze Contamination Area, 02/17/2009



Photograph 9: CAS 03-23-28, Manzanas Contamination Area, 12/11/2008



Photograph 10: CAS 03-23-29, Truchas-Chamisal Contamination Area, 04/20/2009





Photograph 11: CAS 04-23-02, Atmospheric Test Site T4-a, 02/17/2009



Photograph 12: CAS 05-23-06, Atmospheric Test Site, 02/17/2009



Photograph 13: CAS 09-23-06, Mound of Contaminated Soil, 02/17/2009



Photograph 14: CAS 10-23-04, Atmospheric Test Site M-10, 02/17/2009



Photograph 15: CAS 18-23-02, U-18d Crater (Sulky), 04/16/2009

## **LIBRARY DISTRIBUTION LIST**

THIS PAGE INTENTIONALLY LEFT BLANK



## **LIBRARY DISTRIBUTION LIST**

---

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

THIS PAGE INTENTIONALLY LEFT BLANK