Nevada
Environmental Management
Operations Activity

DOE/NV--1480-ADD

Addendum to the Closure Report for Corrective Action Unit 547: Miscellaneous Contaminated Waste Sites, Nevada National Security Site, Nevada

Controlled Copy No.: _____

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July 2013

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

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**ADDENDUM TO THE CLOSURE REPORT FOR
CORRECTIVE ACTION UNIT 547:
MISCELLANEOUS CONTAMINATED WASTE SITES,
NEVADA NATIONAL SECURITY SITE, NEVADA**

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

**Controlled Copy No. _____
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**ADDENDUM TO THE CLOSURE REPORT FOR
CORRECTIVE ACTION UNIT 547:
MISCELLANEOUS CONTAMINATED WASTE SITES,
NEVADA NATIONAL SECURITY SITE, NEVADA**

Approved By: /s/: Tiffany A. Lantow
Tiffany A. Lantow
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Date: 7/29/2013

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Robert F. Boehlecke
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Date: 7/30/13

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PREFACE

This addendum to the *Closure Report for Corrective Action Unit 547: Miscellaneous Contaminated Waste Sites, Nevada National Security Site, Nevada*, DOE/NV--1480, dated July 2012, documents repairs of erosion and construction of engineered erosion protection features at Corrective Action Site (CAS) 02-37-02 (MULLET) and CAS 09-99-06 (PLAYER). The final as-built drawings are included in Appendix A, and photographs of field work are included in Appendix B. Field work was completed on March 11, 2013.

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ADDENDUM TO THE CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 547, MISCELLANEOUS CONTAMINATED WASTE SITES

This addendum to the *Closure Report for Corrective Action Unit 547: Miscellaneous Contaminated Waste Sites, Nevada National Security Site, Nevada*, DOE/NV--1480, dated July 2012, documents repairs of erosion and construction of engineered erosion protection features and includes the final as-built drawings.

1.1 INTRODUCTION

On August 22, 2012, an unusually high volume of rain fell in a short period of time and caused erosion at Corrective Action Site (CAS) 02-37-02, Gas Sampling Assembly, (hereafter referred to as MULLET) and CAS 09-99-06, Gas Sampling Assembly, (hereafter referred to as PLAYER). At the nearest weather station, 1.13 inches of rainfall was recorded in 12 hours, and the majority of the precipitation (approximately 0.95 inches) occurred in less than 6 hours. There was no damage to the soil covers at these sites. At MULLET, multiple erosion rills formed outside the fence, and less significant erosion occurred near the cover. At PLAYER, significant erosion occurred along the crater slope next to the west side of the cover and at the toe of the cover. Although erosion control features were constructed at PLAYER, including diversion berms at the crater edge, the unusually intense rainfall in a relatively short period of time caused damage in the area between the benches and the cover. Photographs of the erosion damage are included in Appendix B.

In accordance with the Closure Report for Corrective Action Unit (CAU) 547, repairs are to be completed within 90 calendar days of discovery. Since the repair work was significant, a 4-month extension to this deadline was requested by the U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office on October 10, 2012. This extension was granted by the Nevada Division of Environmental Protection (NDEP) on October 22, 2012. With this extension, the deadline for repairs was March 21, 2013.

In the October 22, 2012, letter granting the 4-month extension to the repair deadline, NDEP requested that the plan for erosion control features be certified by a Professional Engineer. A Professional Engineer developed an engineering design that included additional erosion mitigation and runoff control structures for MULLET and PLAYER.

1.2 ENGINEERING DESIGN

An engineering design was developed for site restoration and drainage improvements at the MULLET and PLAYER sites. The objectives of the design included repairing existing erosion as well as providing grading and site improvements to control runoff and minimize future risk of erosion or undermining of the covers during a storm event. A hydrologic analysis of the sites that included available rainfall data from National Oceanic and Atmospheric Administration was performed to develop the design. A hydraulic analysis was performed on the proposed drainage ditches and berms to ensure that they would convey water away from the covers.

The engineering design included new protective berms and drainage ditches, and re-grading of the access roadways to control runoff and minimize erosion. The design was based on the following considerations:

- Feasibility to meet physical and regulatory constraints
- Long-term effectiveness, reliability, and maintenance
- Minimization of capital and lifetime costs
- Constructability given access constraints and available materials

1.2.1 Corrective Action Site 02-37-02, Gas Sampling Assembly (MULLET)

Erosion rills were present at the MULLET site downstream, near the cover, and adjacent to the monuments. The objective for this site was to convey water away from the cover to outside the fence line and monuments. To control runoff, the engineering design included three berms on each side of the cover constructed perpendicular to the cover. Berms were placed approximately 40 feet apart at a 1-percent slope towards the crater and compacted. This design minimized flow adjacent to the cover and redirected flow to minimize erosion. The berm design was trapezoidal in cross section with a typical 1-foot height, 2-foot top width, and 3:1 compacted side slope.

1.2.2 Corrective Action Site 09-99-06, Gas Sampling Assembly (PLAYER)

Extensive erosion was present at the PLAYER site along the side of the cover down the slope of the crater. The erosion rills were several feet deep, but did not damage the 2-foot protective soil cover. Erosion also occurred along the benches that are used to access the cover. These benches conveyed the storm runoff directly toward the toe of the cover. To minimize the flow adjacent to the cover, a primary drainage channel was designed to convey a majority of the runoff. This channel was designed to be located 25 to 65 feet away from the cover. To redirect flow to the primary channel, significant earthwork was required to fill low points next to the cover. To minimize the amount of fill required, a secondary channel was designed within 5 feet of the toe of the cover to capture runoff from the cover. Both channels were designed to be protected with geotextile fabric and rip rap to minimize flow velocity and erosion caused by runoff. A lined rip rap basin was also to be constructed at the bottom of the crater where the two channels converged.

Both channels were designed to be a minimum of 6 inches deep and 2 feet wide. Channel slopes would follow existing slopes down the crater. Capacity and rip rap calculations for both channels were included in the design. Available rip rap sources located on the NNSS included 6-inch minus rip rap.

Grading along the benches was designed to direct flow to the channels. The benches were to be re-graded to create a flow line along the inside of the bench towards the primary channel. Berms were designed on the outside of each bench to minimize sheet flow down the side of the crater in locations other than the channels.

To minimize run-on from outside the crater, two smaller compacted berms were designed along the crater lip. These berms were designed to extend approximately 50 feet from the cover to direct flow away from the cover at approximately 1 to 2 percent slope. The berm design was trapezoidal in cross section with a typical 1-foot height, 2-foot top width, and 3:1 compacted side slope.

Several options had been considered for the site restoration and drainage improvements at PLAYER. Removal of the benches was considered, since water had been conveyed along the benches toward the cover and contributed to the erosion near the toe of the cover. However, removal of the benches would increase erosion in the short term and provide no additional long-term benefit. Benches are often designed on steep slopes to break up slopes and allow for shorter slope lengths. To remove the benches and grade the crater slope back to its previous condition would have required additional grading, compaction, and slope stabilization, and the cost would have been significant. Instead, the two drainage paths designed through the benches and the re-grading of the slopes of the benches away from the cover were selected as a more feasible and beneficial solution. It is expected that erosion on the benches will be minimal with regular maintenance. In addition, removal of the benches would inhibit equipment access to the cover on the crater slope for future repairs since the benches are used as access roads to the cover.

Even though the protective soil cover was not damaged, strengthening the existing soil cover was also considered. The soil cover at PLAYER had been evaluated against other options prior to closure of CAU 547 and is the approved design for PLAYER final closure. However, after the erosion occurred, other options were again considered, and the soil cover was determined to be the best option for long-term closure. A more robust cover, such as concrete, poses a threat to damage the pipe and would hide breaches. Additionally, the soil cover is self-sealing and will readily indicate areas where there is settling or other soil movement. These areas can be repaired rapidly and effectively. Additionally, as documented for covers at the NNSS in many instances, the native soil readily seals and forms a desert pavement, thereby effectively protecting the cover against wind and water erosion.

1.3 FIELD ACTIVITIES

On March 11, 2013, repairs of erosion and construction of engineered erosion protection features were completed at MULLET and PLAYER. A site visit was held with NDEP and the engineering subcontractor on March 20, 2013. The following sections provide a summary of field activities at each site.

1.3.1 Corrective Action Site 02-37-02, Gas Sampling Assembly (MULLET)

Erosion rills were repaired at MULLET, and berms were constructed on both sides of the cover according to the engineering design to divert water away from the cover. Three berms were constructed perpendicular to the cover on the north, and three berms were constructed perpendicular to the cover on the south. The berms were tested by flowing water over them to simulate runoff and confirm that the water flowed away from the cover. The site was surveyed, and the final as-built drawing is included in Appendix A. Photographs of field work are included in Appendix B. Construction of the berms at MULLET and demobilization from the site was completed on March 11, 2013. No waste was generated during these activities.

1.3.2 Corrective Action Site 09-99-06, Gas Sampling Assembly (PLAYER)

At PLAYER, erosion at the toe of the cover was repaired, and erosion protection features were constructed according to the engineering design. The area between the cover and the benches was compacted, and the inner drainage channel was built parallel to the cover down the crater slope. Geotextile fabric and rip rap were placed in the drainage channel. The benches were

sloped away from the cover and compacted, and berms were constructed on the edges of the benches. The outer drainage channel was built to intersect the low point on the benches. Geotextile fabric and rip rap were also placed in the outer drainage channel. A drainage basin was constructed in the bottom of the crater where the two drainage channels converged. Geotextile fabric and rip rap were placed in the drainage basin. Berms were constructed along the crater lip on both sides of the cover. The drainage channels and berms were tested by flowing water over them to simulate runoff and confirm that the water flowed away from the cover. The site was surveyed, and the final as-built drawing is included in Appendix A. Photographs of field work are included in Appendix B. Construction of erosion protection features at PLAYER and demobilization from the site was completed on March 4, 2013. No waste was generated during these activities.

APPENDIX A

AS-BUILT DRAWINGS

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GENERAL NOTES

1. CONTOURS SHOWN ARE FINAL GRADES.
2. CONC PAD REPAIRED AND EXTENDED PRIOR TO INSTALLATION OF PIPE CASING.

CONSTRUCTION NOTES

1. TYPE F CONCRETE BARRIER PER NEVADA DEPARTMENT OF TRANSPORTATION (NDOT).
2. 3-STRAND PLASTIC COATED WIRE FENCING WITH T-POSTS.
3. BOUNDARY MONUMENT.
4. 12" DIA X 12" HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL, 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING.
5. 6" DIA X 5' HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL, 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING.
6. 12" DIA X 12" HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL, 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING. SEE DRAWING C-1005.
7. PIPE ANCHOR. SEE DRAWING C-3002 & C-3003 FOR SPACING.

CONTROL POINTS		
POINT #	NORTHING	EASTING
1	862255.7	862240.0
2	862255.7	862240.0
3	862255.7	862240.0

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

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Signature on File
5 May 2013

15/13	REVISED TO SHOW ADDITIONAL DRAINAGE FEATURES. ADDED RIP-RAP SWALES, DIVERSION BEAMS, GRADING ALONG SIDE SLOPE TO DIRECT FLOW TO RIP-RAP SWALES.	JAS	JAS	SCG	RC	TAT
07/12/12	AS CONSTRUCTED	JAS	JAS	SCG	RC	TAT

NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA NATIONAL SECURITY SITE AREA 2,3,9
CORRECTIVE ACTION UNIT 647 CONTAMINATED WASTE SITES
TEJON, MULLEN AND PLAYER

PLAYER SITE GRADING PLAN					
DESIGNED BY S. DOMBOVARY 6/8	CHECKED BY S. DOMBOVARY 6/8	DRAWN BY J. GOODRICH 5/15	APPROVED BY G. NGUYEN 6/8	DATE 5/15/11	DATE 5/15/11
National Security Technologies, LLC 10000 S. DOUGLAS AVE., SUITE 100 D. BOX 88021 LAS VEGAS, NV 89133-8821					PROJECT NUMBER 00424-C-1004

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GENERAL NOTES

1. CONTOURS SHOWN ARE FINAL GRADES.
2. EXIST CONC PAD REPAIRED AND EXTENDED PRIOR TO INSTALLATION OF PIPE CASING.

CONSTRUCTION NOTES

- 1 TYPE F CONCRETE BARRIER PER NEVADA DEPARTMENT OF TRANSPORTATION (NDOT).
- 2 3-STRAND PLASTIC COATED WIRE FENCING WITH T-POSTS.
- 3 BOUNDARY MONUMENT.
- 4 -INSTALL CASING PER DETAIL A ON DRAWING C-5004- SEE DRAWING C-1004.
- 5 -INSTALL CASING PER DETAIL B ON DRAWING C-5004- SEE DRAWING C-1004.
- 6 12" DIA X 12" HIGH X 1/2" THK WELDED STEEL PIPE CASING WITH CONCRETE BACKFILL. 1/2" STEEL COVER WITH 2" OVERHANG WELDED TO TOP OF CASING.
- 7 PIPE ANCHOR. SEE DRAWING C-3002 & C-3003 FOR SPACING.

CONTROL POINTS			
POINT #	NORTHING	EASTING	ELEVATION
306	862786.716	682940.592	2119.141
307	862942.832	682703.100	2118.100
308	862942.381	682939.581	2120.078

BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM (NAD) OF 1927. BASIS OF VERTICAL CONTROL IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1929. NORTHINGS, EASTINGS, AND ELEVATIONS INDICATED ON THESE DRAWINGS ARE ACCURATE TO WITHIN +/- 0.1 FOOT.

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Revision 1.0
Date: 8 May 2013
Signature on File

REVISIONS	DATE	REVISIONS	DATE	REVISIONS	DATE
1	8/1/13	REVISED TO SHOW ADDITIONAL DRAINAGE FEATURES. ADDED RIP-RAP SWALES. OTHERS TO BE GRADING ALONG SIDE SLOPE TO DIRECT FLOW TO RIP-RAP SWALES.			
2		AS-CONSTRUCTED. DRAWING CREATED FROM 00424-C-1004			

NATIONAL NUCLEAR SECURITY ADMINISTRATION

NEVADA NATIONAL SECURITY SITE AREA 2.3.9

CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES TEJON, MULLET AND PLAYER

PLAYER SITE GRADING PLAN

PROJECT	7/11/12	DESIGNER	7/11/12	PROJECT MANAGER	7/11/12	APPROVAL	7/12/12
JULIE A. SOROLA	DATE	JULIE A. SOROLA	DATE	STEVEN C. GOOD	DATE	RYAN CLIFFORD	DATE

National Security Technologies LLC
3000 S. Service Road, Suite 100
P.O. BOX 8021 LAS VEGAS, NV 89103-8021

00424-C-1005

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OVERALL DRAINAGE PLAN
SCALE: 1" = 10'

GS		AS CONSTRUCTED - NEW DRAWING TO SHOW OVERALL PLAN OF DRAINAGE MODIFICATIONS				DATE	REVISION	APPROVED	DESIGNED	DRAWN	CHECKED	IN CHARGE	
		NATIONAL NUCLEAR SECURITY ADMINISTRATION NEVADA NATIONAL SECURITY SITE AREA 2.3.9 CORRECTIVE ACTION UNIT 547 CONTAMINATED WASTE SITES TEJON, MULLET AND PLAYER PLAYER OVERALL DRAINAGE PLAN											
DATE: 5/2/11 /s/ Signature on File		DATE: 5/2/11 /s/ Signature on File		DATE: 5/2/11 /s/ Signature on File		DATE: 5/2/11 /s/ Signature on File		DATE: 5/2/11 /s/ Signature on File		DATE: 5/2/11 /s/ Signature on File		DATE: 5/2/11 /s/ Signature on File	
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APPENDIX B

PHOTOGRAPHS

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PHOTOGRAPH LOG

PHOTOGRAPH NUMBER	DATE	DESCRIPTION
1	08-23-2012	Erosion Rills at MULLET
2	08-23-2012	Erosion Rills at MULLET
3	08-23-2012	Erosion Rills at MULLET
4	03-05-2013	Constructing Berms at MULLET
5	03-05-2013	Constructing Berms at MULLET
6	03-05-2013	Flow Testing the Berms at MULLET
7	03-05-2013	Constructing Berms at MULLET
8	03-05-2013	Constructing Berms at MULLET
9	03-06-2013	Constructing Berms at MULLET
10	03-07-2013	Flow Testing the Berms at MULLET
11	08-23-2012	Erosion at the Toe of the Cover on the Crater Slope at PLAYER
12	08-23-2012	Erosion at the Toe of the Cover on the Crater Slope at PLAYER
13	08-23-2012	Erosion at the Toe of the Cover on the Crater Slope at PLAYER
14	08-23-2012	Erosion at the Toe of the Cover on the Crater Slope at PLAYER
15	08-23-2012	Standing Water at the Bottom of the Crater at PLAYER
16	02-13-2013	Repairing Erosion at PLAYER
17	02-13-2013	Repairing Erosion at PLAYER
18	02-13-2013	Constructing the Inner Drainage Channel at PLAYER
19	02-19-2013	Sloping and Compacting the Benches at PLAYER
20	02-19-2013	Compacting the Benches at PLAYER
21	02-25-2013	Constructing the Inner Drainage Channel at PLAYER
22	02-26-2013	Geotextile Fabric and Rip Rap in the Inner Drainage Channel at PLAYER
23	02-26-2013	Geotextile Fabric and Rip Rap in the Inner Drainage Channel at PLAYER
24	02-26-2013	Geotextile Fabric and Rip Rap in the Inner Drainage Channel at PLAYER
25	02-26-2013	Compacted Benches and Berms at PLAYER
26	02-27-2013	Constructing the Outer Drainage Channel at PLAYER
27	02-27-2013	Constructing the Outer Drainage Channel at PLAYER
28	02-27-2013	Geotextile Fabric and Rip Rap in the Outer Drainage Channel at PLAYER
29	02-28-2013	Constructing the Drainage Basin at PLAYER
30	02-28-2013	Constructing the Drainage Basin at PLAYER
31	02-28-2013	Geotextile Fabric and Rip Rap in the Drainage Basin at PLAYER
32	02-28-2013	Completed Drainage Channels and Basin at PLAYER
33	02-28-2013	Constructing Berms on the Lip of the Crater at PLAYER
34	02-28-2013	Constructing Berms on the Lip of the Crater at PLAYER
35	03-04-2013	Completed Work at PLAYER

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Photograph 1: Erosion Rills at MULLET, 08-23-2012

Photograph 2: Erosion Rills at MULLET, 08-23-2012

Photograph 3: Erosion Rills at MULLET, 10-15-2012

Photograph 4: Constructing Berms at MULLET, 03-05-2013

Photograph 5: Constructing Berms at MULLET, 03-05-2013

Photograph 6: Flow Testing the Berms at MULLET, 03-05-2013

Photograph 7: Constructing Berms at MULLET, 03-05-2013

Photograph 8: Constructing Berms at MULLET, 03-05-2013

Photograph 9: Constructing Berms at MULLET, 03-06-2013

Photograph 10: Flow Testing the Berms at MULLET, 03-07-2013

Photograph 11: Erosion at the Toe of the Cover on the Crater Slope at PLAYER, 08-23-2012

Photograph 12: Erosion at the Toe of the Cover on the Crater Slope at PLAYER, 08-23-2012

Photograph 13: Erosion at the Toe of the Cover on the Crater Slope at PLAYER, 08-23-2012

Photograph 14: Erosion at the Toe of the Cover on the Crater Slope at PLAYER, 08-23-2012

Photograph 15: Standing Water at the Bottom of the Crater at PLAYER, 08-23-2012

Photograph 16: Repairing Erosion at PLAYER, 02-13-2013

Photograph 17: Repairing Erosion at PLAYER, 02-13-2013

Photograph 18: Constructing the Inner Drainage Channel at PLAYER, 02-13-2013

Photograph 19: Sloping and Compacting the Benches at PLAYER, 02-19-2013

Photograph 20: Compacting the Benches at PLAYER, 02-19-2013

Photograph 21: Constructing the Inner Drainage Channel at PLAYER, 02-25-2013

Photograph 22: Geotextile Fabric and Rip Rap in the Inner Drainage Channel at PLAYER,
02-26-2013

Photograph 23: Geotextile Fabric and Rip Rap in the Inner Drainage Channel at PLAYER,
02-26-2013

Photograph 24: Geotextile Fabric and Rip Rap in the Inner Drainage Channel at PLAYER, 02-26-2013

Photograph 25: Compacted Benches and Berms at PLAYER, 02-26-2013

Photograph 26: Constructing the Outer Drainage Channel at PLAYER, 02-27-2013

Photograph 27: Constructing the Outer Drainage Channel at PLAYER, 02-27-2013

Photograph 28: Geotextile Fabric and Rip Rap in the Outer Drainage Channel at PLAYER, 02-27-2013

Photograph 29: Constructing the Drainage Basin at PLAYER, 02-28-2013

Photograph 30: Drainage Basin at PLAYER, 02-28-2013

Photograph 31: Geotextile Fabric and Rip Rap in the Drainage Basin at PLAYER, 02-28-2013

Photograph 32: Completed Drainage Channels and Basin at PLAYER, 02-28-2013

Photograph 33: Constructing Berms on the Lip of the Crater at PLAYER, 02-28-2013

Photograph 34: Constructing Berms on the Lip of the Crater at PLAYER, 02-28-2013

Photograph 35: Completed Work at PLAYER, 03-04-2013

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