FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 568
CAU Description: Area 3 Plutonium Dispersion Sites
CAU Owner: Soils - Environmental Restoration (ER)

ROTC No. DOE/NV--1573-ROTC 1 **Page** 1 of 57

Document Type Closure Report (CR) **Date** 02/20/2020

The following technical changes (including justification) are requested by:

Tiffany Gamero
Requestor Name

Long-Term Monitoring Activity Lead
Requestor Title

Description of Change:

1. This ROTC replaces the Use Restriction (UR) information listed in the documentation for CAU 568.

   UR forms have been updated to list all UR requirements, including but not limited to: post-closure site controls (signs, fencing, etc.), inspection and maintenance requirements, and Geographic Information Systems (GIS) coordinate information. The UR requirements and form(s) included in this ROTC represent the current corrective action requirements for each Corrective Action Site (CAS) in this CAU and supersede information concerning corrective action and post-closure requirements in existing documentation.

Justification:

1. Some changes in the UR requirements from those found in closure documents have been subsequently modified in letters, memos, and inspection reports. This has resulted in difficulty in determining current post-closure requirements. A review of the post-closure requirements for this CAU has been conducted to ensure that all requirements have been identified and documented on the new UR form. The new UR form was developed to be inclusive of all requirements for long-term monitoring and standardize information contained in the URs consistent with current protocols.

Schedule Impacts:

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 568
CAU Description: Area 3 Plutonium Dispersion Sites
CAU Owner: Soils - Environmental Restoration (ER)

ROTC No. DOE/NV--1573-ROTC 1 **Page** 2 of 57

Document Type Closure Report (CR) **Date** 02/20/2020

No impacts to schedule.

ROTC applies to the following document(s):

- U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

UNCONTROLLED

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 568
CAU Description: Area 3 Plutonium Dispersion Sites
CAU Owner: Soils - Environmental Restoration (ER)

ROTC No. DOE/NV--1573-ROTC 1 **Page** 3 of 57

Document Type Closure Report (CR) **Date** 02/20/2020

Approvals:

/s/ Kevin Cabble
Date 2-27-2020
Kevin Cabble
Activity Lead
Environmental Management (EM) Nevada Program

/s/ Wilhelm R. Wilborn
Date 2/27/2020
Bill Wilborn
Deputy Program Manager, Operations
Environmental Management (EM) Nevada Program

/s/ Christine Andres
Date 3/2/2020
Christine Andres
Chief, Bureau of Federal Facilities
Nevada Division of Environmental Protection (NDEP)

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): Both FFACO and Administrative

Corrective Action Unit (CAU) Number & Description: 568 - Area 3 Plutonium Dispersion Sites

Corrective Action Site (CAS) Number & Description: 03-23-19 - T-3U Contamination Area

CAU/CAS Owner: Soils - ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	586,218	4,100,175
	2	586,170	4,100,236
	3	586,199	4,100,260
	4	586,251	4,100,192
	5	586,218	4,100,175

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Both Surface and Subsurface

Depth is unknown.

Survey Source: GIS

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: N/A

Section II. Administrative UR

Basis for Administrative UR

Summary Statement: This Administrative UR is established to protect workers should future land use result in increased exposure to site contaminants. Radiological contaminants are present that exceed action levels under the Industrial Area (2,000 hours per year) exposure scenario.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Administrative UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
Admin Boundary	1	586,248	4,100,091
	2	586,254	4,100,119
	3	586,180	4,100,202
	4	586,158	4,100,231
	5	586,131	4,100,258
	6	586,064	4,100,274
	7	586,022	4,100,257
	8	586,003	4,100,219
	9	585,993	4,100,226
	10	585,999	4,100,250
	11	585,999	4,100,335
	12	585,997	4,100,395
	13	585,989	4,100,468
	14	586,008	4,100,477
	15	586,086	4,100,407
	16	586,179	4,100,321
	17	586,228	4,100,262
	18	586,275	4,100,197
	19	586,313	4,100,130
	20	586,248	4,100,091

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Surface

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Starting Depth: 0 **Ending Depth:** 15

Depth Unit: Centimeters

Survey Source: GIS

Administrative UR Requirements

Administrative URs do not require onsite postings or other physical barriers, and they do not require periodic inspections or maintenance.

Site Controls:

This Administrative UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area defined by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)
- Administrative UR Boundary Map (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Date: 2/27/2020

Tiffany Gamero

Activity Lead

EM Nevada Program

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Source: Navarro GIS, 2020

CAU 568, CAS 03-23-19
T-3U Contamination Area
FFACO UR Boundary

Explanation

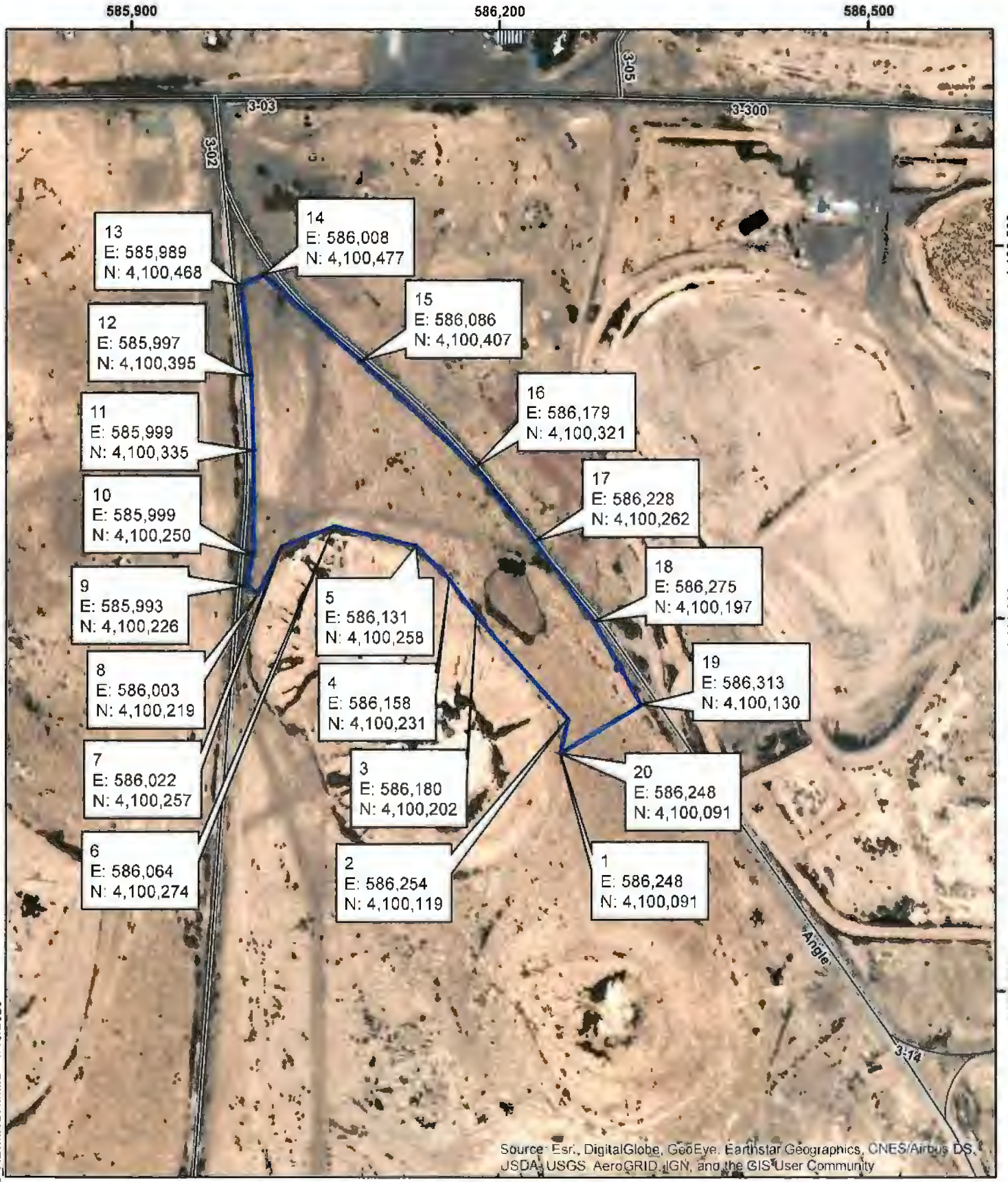
- FFACO UR
- Light Duty Road
- Unimproved Road

0 50 100 200 Meters

0 150 300 600 Feet

N

Coordinate System: NAD 1983 UTM Zone 11N, Meter



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CAU 568, CAS 03-23-19
T-3U Contamination Area
Administrative UR Boundary

Explanation

- Administrative UR
- Light Duty Road
- Unimproved Road

0 40 80 160 Meters

0 125 250 500 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): FFACO Only

Corrective Action Unit (CAU) Number & Description: 568 - Area 3 Plutonium Dispersion Sites

Corrective Action Site (CAS) Number & Description: 03-23-20 - Otero Contamination Area

CAU/CAS Owner: Soils - ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	586,004	4,100,822
	2	586,003	4,100,844
	3	586,024	4,100,845
	4	586,026	4,100,823
	5	586,004	4,100,822

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Subsurface

Starting Depth: 30 **Ending Depth:**

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Depth Unit: Centimeters

Survey Source: GIS

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: Ending depth is unknown.

Section II. Administrative UR

An Administrative UR is not identified for this site.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Tiffany Gamero

Date: 2/20/2020

Activity Lead

EM Nevada Program

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CAU 568, CAS 03-23-20
Otero Contamination Area
FFACO UR Boundary

Explanation

FFACO UR

0 15 30 60 Meters

0 50 100 200 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s):	Both FFACO and Administrative
Corrective Action Unit (CAU) Number & Description:	568 - Area 3 Plutonium Dispersion Sites
Corrective Action Site (CAS) Number & Description:	03-23-23 - San Juan Contamination Area
CAU/CAS Owner:	Soils – ER
Note:	N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary 1 (San Juan)	1	585,936	4,100,819
	2	585,941	4,100,838
	3	585,960	4,100,838
	4	585,962	4,100,820
	5	585,936	4,100,819
FFACO Boundary 2 (Pascal-C)	1	586,096	4,100,836
	2	586,088	4,100,851
	3	586,101	4,100,857
	4	586,114	4,100,849
	5	586,096	4,100,836

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Subsurface

Starting Depth: 30 **Ending Depth:**

Depth Unit: Centimeters

Survey Source: GIS

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: Ending depth is unknown.

Section II. Administrative UR

Basis for Administrative UR

Summary Statement: This Administrative UR is established to protect workers should future land use result in increased exposure to site contaminants. Radiological contaminants are present that exceed action levels under the Industrial Area (2,000 hours per year) exposure scenario.

Administrative UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
Admin Boundary	1	585,996	4,100,812
	2	585,917	4,100,816
	3	585,864	4,100,863
	4	586,031	4,100,964
	5	586,125	4,100,964
	6	586,174	4,100,906
	7	586,119	4,100,836
	8	586,057	4,100,816
	9	585,996	4,100,812

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Surface

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Starting Depth: 0 **Ending Depth:** 15

Depth Unit: Centimeters

Survey Source: GIS

Administrative UR Requirements

Administrative URs do not require onsite postings or other physical barriers, and they do not require periodic inspections or maintenance.

Site Controls:

This Administrative UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area defined by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)
- Administrative UR Boundary Map (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Date: 2/27/2020

Tiffany Gamero

Activity Lead

EM Nevada Program

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CAU 568, CAS 03-23-23
San Juan Contamination Area
FFACO UR Boundaries

Explanation

FFACO UR

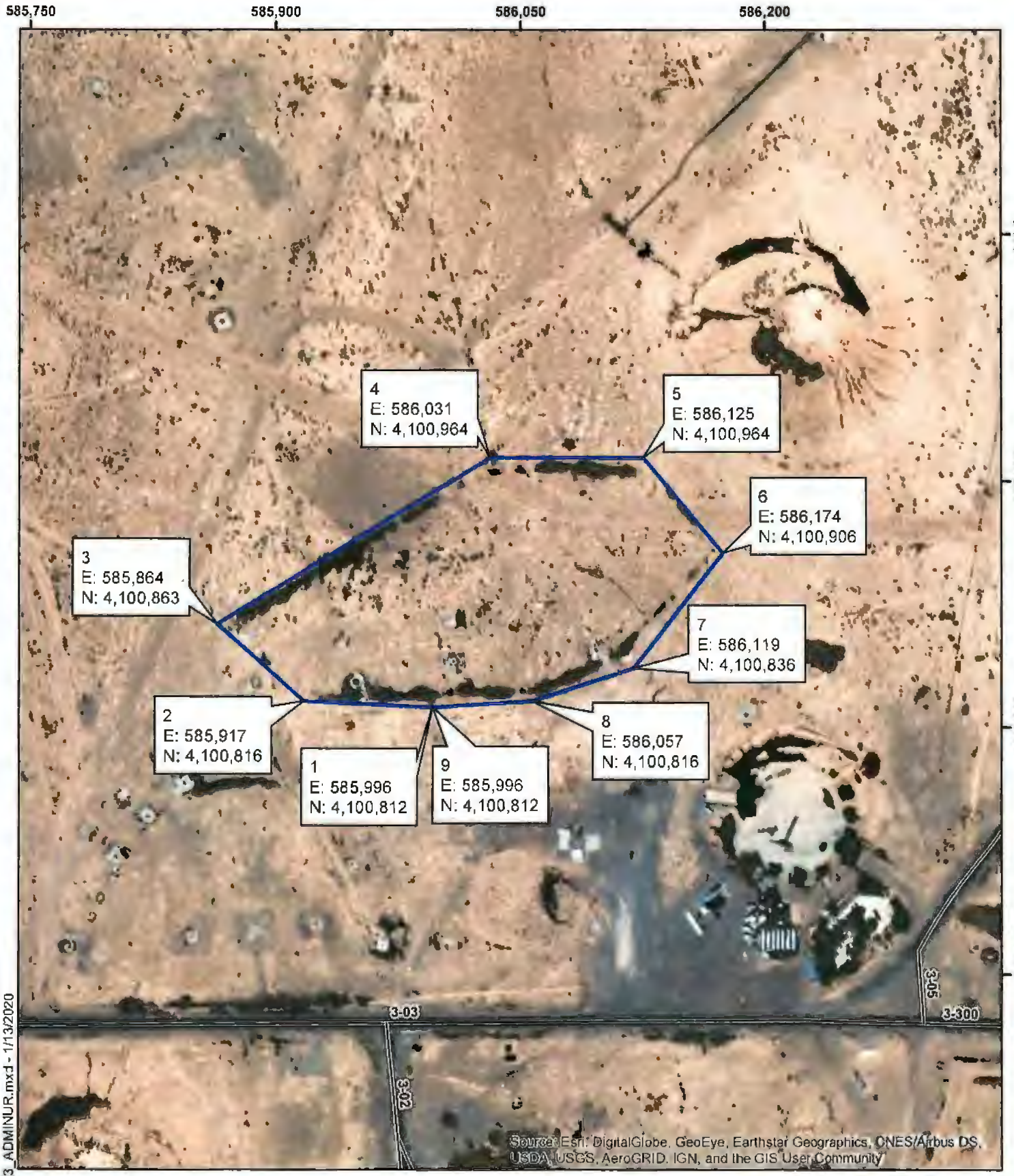
0 15 30 60 Meters

0 50 100 200 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter



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CAU 568, CAS 03-23-23
San Juan Contamination Area
Administrative UR Boundary

Explanation

- Administrative UR
- Light Duty Road

0 25 50 100 Meters

0 100 200 400 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s):	Administrative Only
Corrective Action Unit (CAU) Number & Description:	568 - Area 3 Plutonium Dispersion Sites
Corrective Action Site (CAS) Number & Description:	03-23-30 - HCA Soil Pile
CAU/CAS Owner:	Soils - ER
Note:	N/A

Section I. Federal Facility Agreement and Consent Order (FFACO) UR

An FFACO UR is not identified for this site.

Section II. Administrative UR

Basis for Administrative UR

Summary Statement: This Administrative UR is established to protect workers should future land use result in increased exposure to site contaminants. Radiological contaminants are present that exceed action levels under the Industrial Area (2,000 hours per year) exposure scenario.

Administrative UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
Admin Boundary	1	586,231	4,100,862
	2	586,225	4,100,864
	3	586,229	4,100,877
	4	586,236	4,100,875
	5	586,231	4,100,862

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Surface

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Starting Depth: 0 **Ending Depth:** 15

Depth Unit: Centimeters

Survey Source: GIS

Administrative UR Requirements

Administrative URs do not require onsite postings or other physical barriers, and they do not require periodic inspections or maintenance.

Site Controls:

This Administrative UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area defined by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

Attachments

- Administrative UR Boundary Map (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Date: 2/27/2020

Tiffany Gamero

Activity Lead

EM Nevada Program

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CAU 568, CAS 03-23-30
HCA Soil Pile
Administrative UR Boundary

Explanation
- Administrative UR
- Light Duty Road

0 10 20 40 Meters
0 25 50 100 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): Both FFACO and Administrative

Corrective Action Unit (CAU) Number & Description: 568 - Area 3 Plutonium Dispersion Sites

Corrective Action Site (CAS) Number & Description: 03-23-31 - U-3d Contamination Area

CAU/CAS Owner: Soils - ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	585,806	4,100,712
	2	585,792	4,100,723
	3	585,801	4,100,743
	4	585,825	4,100,766
	5	585,850	4,100,782
	6	585,859	4,100,768
	7	585,827	4,100,743
	8	585,806	4,100,712

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Both Surface and Subsurface

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Depth is unknown.

Survey Source: GIS

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: N/A

Section II. Administrative UR

Basis for Administrative UR

Summary Statement: This Administrative UR is established to protect workers should future land use result in increased exposure to site contaminants. Radiological contaminants are assumed to be present that exceed action levels under the Industrial Area (2,000 hours per year) exposure scenario. Removable contamination is present that exceeds the criteria for establishing a Contamination Area.

Administrative UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
Admin Boundary	1	585,893	4,100,624
	2	585,806	4,100,627
	3	585,796	4,100,653

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
Admin Boundary	4	585,793	4,100,676
	5	585,800	4,100,711
	6	585,778	4,100,730
	7	585,767	4,100,734
	8	585,775	4,100,755
	9	585,795	4,100,778
	10	585,832	4,100,809
	11	585,849	4,100,793
	12	585,863	4,100,768
	13	585,882	4,100,770
	14	585,902	4,100,768
	15	585,890	4,100,791
	16	585,883	4,100,802
	17	585,887	4,100,810
	18	585,900	4,100,811
	19	585,904	4,100,804
	20	585,905	4,100,797
	21	585,922	4,100,764
	22	585,947	4,100,748
	23	585,967	4,100,725
	24	585,980	4,100,696
	25	585,984	4,100,674
	26	585,979	4,100,652
	27	585,969	4,100,628
	28	585,944	4,100,624
	29	585,893	4,100,624

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Surface

Starting Depth: 0 **Ending Depth:** 15

Depth Unit: Centimeters

Survey Source: GIS

Administrative UR Requirements

Administrative URs do not require onsite postings or other physical barriers, and they do not require periodic inspections or maintenance.

Site Controls:

This Administrative UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area defined by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)
- Administrative UR Boundary Map (UTM, Zone 11, NAD 83 meters)

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

Section V. EM Nevada Program Approval

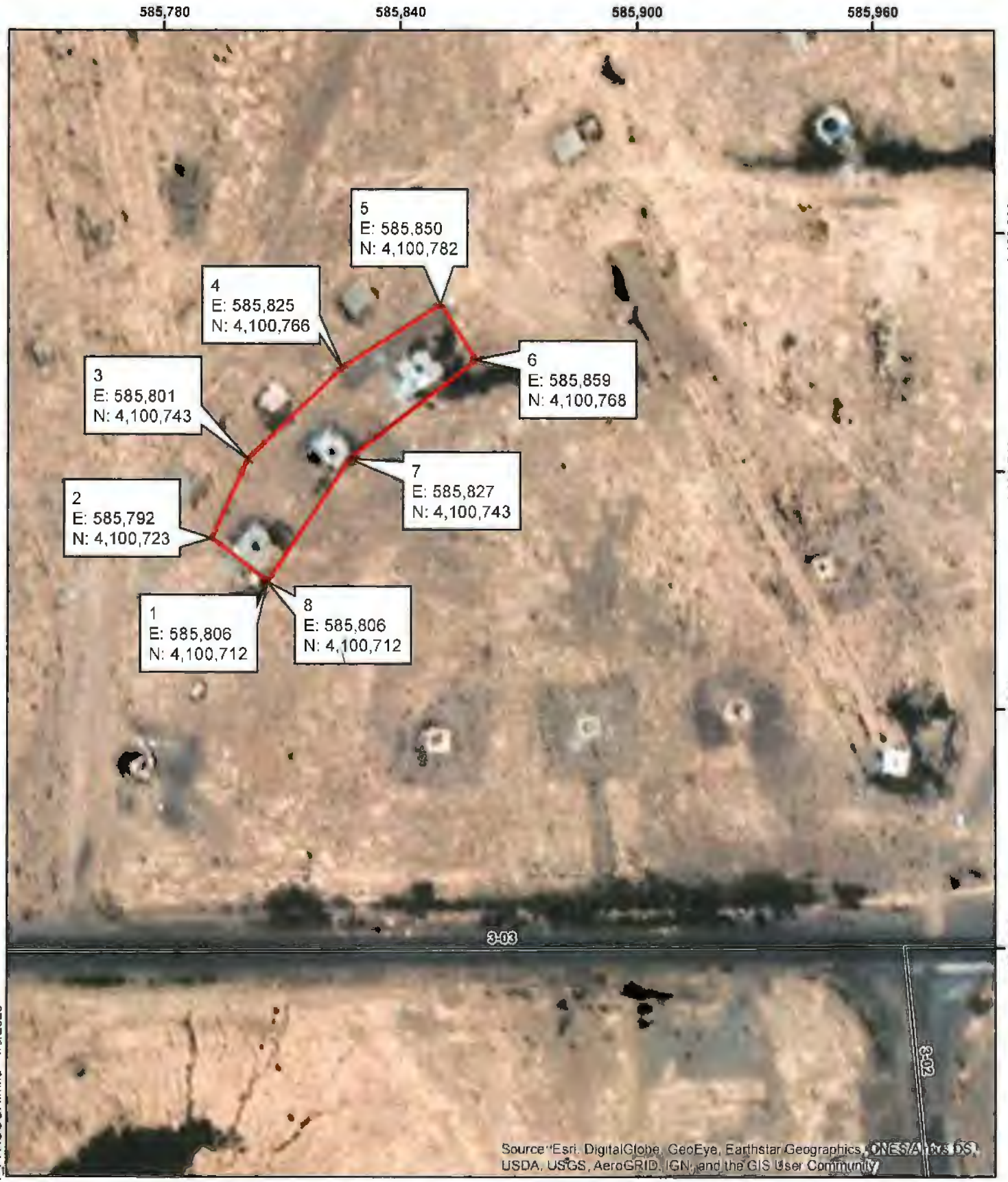
/s/ Tiffany Gamero

Date: 2/20/2020

Tiffany Gamero

Activity Lead

EM Nevada Program



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CAU 568, CAS 03-23-31
U-3d Contamination Area
FFACO UR Boundary

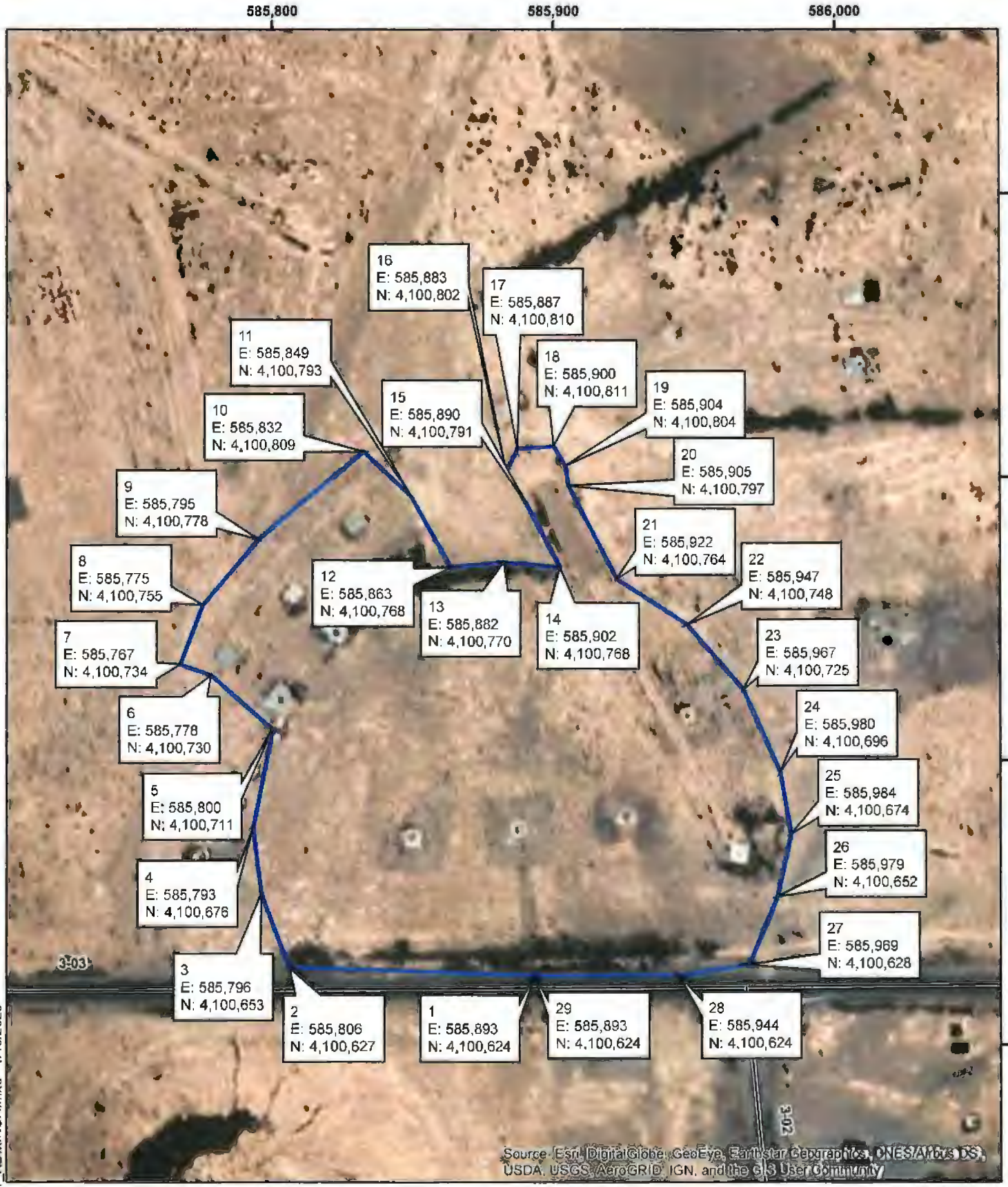
Explanation
- FFACO UR
- Light Duty Road

0 15 30 60 Meters
0 50 100 200 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter



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CAU 568, CAS 03-23-31
U-3d Contamination Area
Administrative UR Boundary

Explanation

- Administrative UR
- Light Duty Road

0 15 30 60 Meters

0 75 150 300 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): FFACO Only

Corrective Action Unit (CAU) Number & Description: 568 - Area 3 Plutonium Dispersion Sites

Corrective Action Site (CAS) Number & Description: 03-23-32 - U-3j Test Release

CAU/CAS Owner: Soils - ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	585,861	4,101,038
	2	585,857	4,101,053
	3	585,874	4,101,057
	4	585,878	4,101,043
	5	585,861	4,101,038

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Subsurface

Starting Depth: 15 **Ending Depth:**

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Depth Unit: Centimeters

Survey Source: GIS

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: Ending depth is unknown.

Section II. Administrative UR

An Administrative UR is not identified for this site.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Date: 2/26/2026

Tiffany Gamero

Activity Lead

EM Nevada Program

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CAU 568, CAS 03-23-32
U-3j Test Release
FFACO UR Boundary

Explanation

FFACO UR

0 10 20 40 Meters

0 40 80 160 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): FFACO Only

Corrective Action Unit (CAU) Number & Description: 568 - Area 3 Plutonium Dispersion Sites

Corrective Action Site (CAS) Number & Description: 03-23-33 - U-3r Contamination Area

CAU/CAS Owner: Soils - ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	586,193	4,100,797
	2	586,179	4,100,802
	3	586,188	4,100,818
	4	586,200	4,100,812
	5	586,193	4,100,797

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Subsurface

Starting Depth: 30 **Ending Depth:**

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Depth Unit: Centimeters

Survey Source: GIS

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: Ending depth is unknown.

Section II. Administrative UR

An Administrative UR is not identified for this site.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Date: 2/27/2020

Tiffany Gamero

Activity Lead

EM Nevada Program

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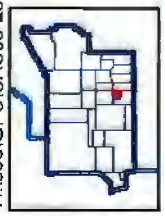

CAU 568, CAS 03-23-33
U-3r Contamination Area
FFACO UR Boundary

Explanation
- FFACO UR
- Light Duty Road

0 10 20 40 Meters
0 40 80 160 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): FFACO Only

Corrective Action Unit (CAU) Number & Description: 568 - Area 3 Plutonium Dispersion Sites

Corrective Action Site (CAS) Number & Description: 03-23-34 - U-3ay Contamination Area

CAU/CAS Owner: Soils – ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	586,021	4,100,738
	2	586,015	4,100,739
	3	586,016	4,100,745
	4	586,023	4,100,744
	5	586,021	4,100,738

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Subsurface

Starting Depth: 30 **Ending Depth:**

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Depth Unit: Centimeters

Survey Source: GIS

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: Ending depth is unknown.

Section II. Administrative UR

An Administrative UR is not identified for this site.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Date: 2/27/2020

Tiffany Gamero

Activity Lead

EM Nevada Program

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CAU 568, CAS 03-23-34
U-3ay Contamination Area
FFACO UR Boundary

Explanation
- FFACO UR
- Light Duty Road

0 10 20 40 Meters
0 30 60 120 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): FFACO Only

Corrective Action Unit (CAU) Number & Description: 568 - Area 3 Plutonium Dispersion Sites

Corrective Action Site (CAS) Number & Description: 03-45-01 - Test Surface Releases

CAU/CAS Owner: Soils - ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to radiological contaminants that were released at this site. Radiological contaminants are assumed to be present that exceed final action levels under the Occasional Use Area (80 hours per year) exposure scenario.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	585,778	4,100,662
	2	585,766	4,100,663
	3	585,769	4,100,672
	4	585,778	4,100,672
	5	585,778	4,100,662

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Both Surface and Subsurface

Depth is unknown.

Survey Source: GIS

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: N/A

Section II. Administrative UR

An Administrative UR is not identified for this site.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 568 CR (DOE/NV--1573), dated 02/20/2020.

U.S. Department of Energy, Environmental Management Nevada Program. 2017. Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1573. Las Vegas, NV.

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- EM Nevada Program CAU/CAS Files

Section V. EM Nevada Program Approval

/s/ Tiffany Gamero

Date: 2/26/2020

Tiffany Gamero

Activity Lead

EM Nevada Program

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CAU 568, CAS 03-45-01
Test Surface Releases
FFACO UR Boundary

Explanation

- FFACO UR
- Light Duty Road

0 5 10 20 Meters

0 20 40 80 Feet

N

Source: Navarro GIS, 2020

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

Additional supplemental information on site features was not present in previous iterations of this Use Restriction (UR), therefore a supplemental information figure is not attached. If additional information on site features is required for this site, please contact the *Federal Facility Agreement and Consent Order* (FFACO) Database Administrator.

Environmental
Management
Nevada Program

DOE/NV--1573

Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites Nevada National Security Site, Nevada

Controlled Copy No.: UNCONTROLLED
Revision No.: 0

June 2017

Approved for public release; further dissemination unlimited.

U.S. Department of Energy
Environmental Management Nevada Program

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DOE/NV--1573

CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 568: AREA 3 PLUTONIUM DISPERSION SITES NEVADA NATIONAL SECURITY SITE, NEVADA

U.S. Department of Energy,
Environmental Management Nevada Program
Las Vegas, Nevada

Controlled Copy No.: UNCONTROLLED

Revision No.: 0

June 2017

Approved for public release; further dissemination unlimited.

CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 568:
AREA 3 PLUTONIUM DISPERSION SITES
NEVADA NATIONAL SECURITY SITE, NEVADA

Approved by: /s/ Tiffany A. Lantow Date: 06/20/2017

Tiffany A. Lantow
Soils Activity Lead
EM Nevada Program

Approved by: /s/ Robert F. Boehlecke Date: 06/20/2017

Robert F. Boehlecke
Deputy Program Manager, Operations
EM Nevada Program

Table of Contents

Table of Contents *(Continued)*

Table of Contents *(Continued)*

List of Figures

List of Tables

List of Acronyms and Abbreviations

Ac	Actinium
Am	Americium
BMP	Best management practice
BOL	Bill of Lading
CA	Contamination area
CAA	Corrective action alternative
CADD	Corrective action decision document
CAI	Corrective action investigation
CAIP	Corrective action investigation plan
CAP	Corrective action plan
CAS	Corrective action site
CAU	Corrective action unit
CD	Certificate of Disposal
CFR	*Code of Federal Regulations*
cm	Centimeter
COC	Contaminant of concern
COPC	Contaminant of potential concern
cpm	Counts per minute
CR	Closure report
Cs	Cesium
CSM	Conceptual site model
DCB	Default contamination boundary
DOE	U.S. Department of Energy
dpm/100 cm^2	Disintegrations per minute per 100 square centimeters

List of Acronyms and Abbreviations (Continued)

DQA	Data quality assessment
DQI	Data quality indicator
DQO	Data quality objective
EM	Environmental Management
EPA	U.S. Environmental Protection Agency
FAL	Final action level
FFACO	*Federal Facility Agreement and Consent Order*
FIDLER	Field instrument for the detection of low-energy radiation
ft	Foot
ft^3	Cubic foot
GIS	Geographic Information Systems
GPS	Global Positioning System
HCA	High contamination area
IDW	Investigation-derived waste
LLW	Low-level waste
LVF	Load Verification Form
m	Meter
MDC	Minimum detectable concentration
MDL	Minimum detectable level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MLLW	Mixed low-level waste
M&O	Management and operating
MOB	Multiples of background

List of Acronyms and Abbreviations *(Continued)*

mrem	Millirem
mrem/IA-yr	Millirem per Industrial Area year
mrem/OU-yr	Millirem per Occasional Use Area year
mrem/yr	Millirem per year
NAD	North American Datum
NDEP	Nevada Division of Environmental Protection
NNSA/NFO	U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office
NNSS	Nevada National Security Site
PAL	Preliminary action level
PCB	Polychlorinated biphenyl
pCi/g	Picocuries per gram
POC	Performance Objective Criteria
PPE	Personal protective equipment
PRG	Preliminary Remediation Goal
psi	Pounds per square inch
PSM	Potential source material
Pu	Plutonium
QA	Quality assurance
QAP	Quality Assurance Plan
QC	Quality control
RBCA	Risk-based corrective action
RCRA	*Resource Conservation and Recovery Act*
ROTC-1	Record of Technical Change Number 1
RRMG	Residual radioactive material guideline

List of Acronyms and Abbreviations (Continued)

RSL	Regional Screening Level
RWMC	Radioactive waste management complex
SCO	Surface contaminated object
SE	Safety experiment
TBD	To be determined
TCLP	Toxicity Characteristic Leaching Procedure
TED	Total effective dose
Th	Thorium
TLD	Thermoluminescent dosimeter
U	Uranium
UR	Use restriction
UTM	Universal Transverse Mercator
yd^3	Cubic yard

Executive Summary

This Closure Report (CR) presents information supporting the closure of Corrective Action Unit (CAU) 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada. This CR complies with the requirements of the *Federal Facility Agreement and Consent Order* (FFACO) that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense; and DOE, Legacy Management. The *Corrective Action Plan* (CAP) *for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada;* and the *Record of Technical Change Number 1* (ROTC-1) *to Corrective Action Plan for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada* (NNSA/NFO, 2016c) present the plan for conducting corrective actions for 20 releases associated with the 11 corrective action sites (CASs) listed in Table ES-1.

Table ES-1
CAU 568 CASs and Corrective Actions
(Page 1 of 2)

CAS Number	CAS Description	Release Name	Corrective Action
03-08-04	Soil and Debris Piles	PSM within Soil and Debris Pile	Clean Closure
03-23-19	T-3U Contamination Area	Chavez HCA (DCB)	Closure in Place
03-23-20	Otero Contamination Area	Otero Well Head Cover	Clean Closure
		Subsurface Contamination within Otero SE DCB	Closure in Place
03-23-23	San Juan Contamination Area	San Juan Well Head Cover	Closure in Place
		Subsurface Contamination within San Juan SE DCB	Closure in Place
		Subsurface Contamination within Pascal-C SE DCB	Closure in Place
03-23-30	HCA Soil Pile	Release from Debris	Clean Closure
03-23-31	U-3d Contamination Area	Luna Well Head Cover	Closure in Place
		Pascal-B HCA	Closure in Place
		Subsurface Contamination within Pascal-B SE DCB	Closure in Place
		Subsurface Contamination within Luna SE DCB	Closure in Place
		Subsurface Contamination within Colfax SE DCB	Closure in Place
03-23-32	U-3j Test Release	Subsurface Contamination within Pascal-A SE DCB	Closure in Place
03-23-33	U-3r Contamination Area	Valencia Well Head Cover	Clean Closure
		Subsurface Contamination within Valencia SE DCB	Closure in Place

Table ES-1
CAU 568 CASs and Corrective Actions
(Page 2 of 2)

CAS Number	CAS Description	Release Name	Corrective Action
03-23-34	U-3ay Contamination Area	Subsurface Contamination within Chipmunk SE DCB	Closure in Place
03-26-04	Test-Related Debris	Lead from Broken Lead-Acid Battery	Clean Closure
		Lead from Lead Shot	Clean Closure
03-45-01	Test Surface Releases	Boomer Test Surface Release	Closure in Place

DCB = Default contamination boundary
HCA = High contamination area
PSM = Potential source material
SE = Safety experiment

No additional corrective actions were identified in the CAP for the "no further action" CASs (CASs 03-23-17, 03-23-22, and 03-23-26). Therefore, those CASs are not addressed in this document. The purpose of this CR is to provide justification and documentation supporting the recommendation that no further corrective action is needed for CAU 568 based on the implementation of the corrective actions listed in Table ES-1.

Corrective action activities were performed from August 23, 2016, through December 21, 2016, as set forth in the CAP (with minor deviations as described in this document); and in accordance with the *Soils Activity Quality Assurance Plan* and approved quality assurance programs that establish requirements, technical planning, and general quality practices.

Closure in place of the safety experiment DCBs and well head assemblies was accomplished by placing carbon-steel casings over the well head assemblies and filling with concrete/grout, and by posting signs containing a warning label and recording the FFACO use restriction and administrative use restriction in the FFACO database; the DOE, Environmental Management (EM) Nevada Program CAU/CAS files; and the management and operating contractor's Geographic Information Systems.

Clean closure was accomplished at the lead shot, lead-acid battery, Valencia and Otero well head covers, and soil/debris piles sites by removing and disposing of the contaminants and associated contaminated soil. Verification sample results were evaluated against data quality objective criteria that were developed by representatives from the Nevada Division of Environmental Protection and

DOE, National Nuclear Security Administration Nevada Field Office during a meeting held on December 7, 2015.

The corrective actions were implemented as stipulated in the CAP (with minor deviations as described in this document), and verification sample results confirm that the criteria for the completion of corrective actions have been met. Based on the implementation of these corrective actions, the EM Nevada Program provides the following recommendations:

- No further corrective actions are necessary for CAU 568.
- The Nevada Division of Environmental Protection should issue a Notice of Completion to the EM Nevada Program for closure of CAU 568.
- CAU 568 should be moved from Appendix III to Appendix IV of the FFACO.

1.0 Introduction

This Closure Report (CR) documents closure activities for Corrective Action Unit (CAU) 568, Area 3 Plutonium Dispersion Sites, located at the Nevada National Security Site (NNSS), Nevada, in accordance with the *Federal Facility Agreement and Consent Order* (FFACO) (1996, as amended) that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense; and DOE, Legacy Management.

CAU 568 is located in the western portion of Area 3 and consists of the releases of radionuclides to the surface and subsurface soil from the conduct of two underground safety experiments (Otero and San Juan); three underground weapons-related tests (Platypus, Shrew, and Wolverine); and one atmospheric safety experiment (Chavez). The CAU 568 sites were used to support nuclear testing conducted in the Yucca Flat area from the 1950s through the early 1960s. The steel well head covers were originally welded onto the emplacement holes, and were removed and placed near the emplacement holes after testing activities ended. The *Corrective Action Plan* (CAP) *for Corrective Action Unit 568: Area 3 Dispersion Sites, Nevada National Security Site, Nevada* (NNSA/NFO, 2016a) and the *Record of Technical Change Number 1* (ROTC-1) *to Corrective Action Plan for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada* (NNSA/NFO, 2016c) present the plan for conducting corrective actions for 20 releases associated with the 11 corrective action sites (CASs) listed in Table 1-1.

Table 1-1
CAU 568 CASs and Corrective Actions
(Page 1 of 2)

CAS Number	CAS Description	Release Name	Corrective Action
03-08-04	Soil and Debris Piles	PSM within Soil and Debris Pile	Clean Closure
03-23-19	T-3U Contamination Area	Chavez HCA (DCB)	Closure in Place
03-23-20	Otero Contamination Area	Otero Well Head Cover	Clean Closure
		Subsurface Contamination within Otero SE DCB	Closure in Place
03-23-23	San Juan Contamination Area	San Juan Well Head Cover	Closure in Place
		Subsurface Contamination within San Juan SE DCB	Closure in Place
		Subsurface Contamination within Pascal-C SE DCB	Closure in Place
03-23-30	HCA Soil Pile	Release from Debris	Clean Closure

Table 1-1
CAU 568 CASs and Corrective Actions
(Page 2 of 2)

CAS Number	CAS Description	Release Name	Corrective Action
03-23-31	U-3d Contamination Area	Luna Well Head Cover	Closure in Place
		Pascal-B HCA	Closure in Place
		Subsurface Contamination within Pascal-B SE DCB	Closure in Place
		Subsurface Contamination within Luna SE DCB	Closure in Place
		Subsurface Contamination within Colfax SE DCB	Closure in Place
03-23-32	U-3j Test Release	Subsurface Contamination within Pascal-A SE DCB	Closure in Place
03-23-33	U-3r Contamination Area	Valencia Well Head Cover	Clean Closure
		Subsurface Contamination within Valencia SE DCB	Closure in Place
03-23-34	U-3ay Contamination Area	Subsurface Contamination within Chipmunk SE DCB	Closure in Place
03-26-04	Test-Related Debris	Lead from Broken Lead-Acid Battery	Clean Closure
		Lead from Lead Shot	Clean Closure
03-45-01	Test Surface Releases	Boomer Test Surface Release	Closure in Place

DCB = Default contamination boundary
HCA = High contamination area
PSM = Potential source material
SE = Safety experiment

No additional corrective actions were identified in the CAP for the "no further action" CASs (CASs 03-23-17, 03-23-22, and 03-23-26). Therefore, those CASs are not addressed in this document. The locations of the "clean closure" and "closure in place" CASs addressed by this document are shown in Figure 1-1. Except as described in Section 2.2 of this document, the corrective actions described herein were implemented in accordance with the CAP and ROTC-1. A discussion of the history of this CAU is presented in Section 2.2 of the *Corrective Action Investigation Plan* (CAIP) *for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada* (NNSA/NFO, 2014a). The Corrective Action Decision Document (CADD) for CAU 568 (NNSA/NFO, 2015) identifies the release sites that require additional corrective action and presents information supporting the selection of corrective action alternatives (CAAs).

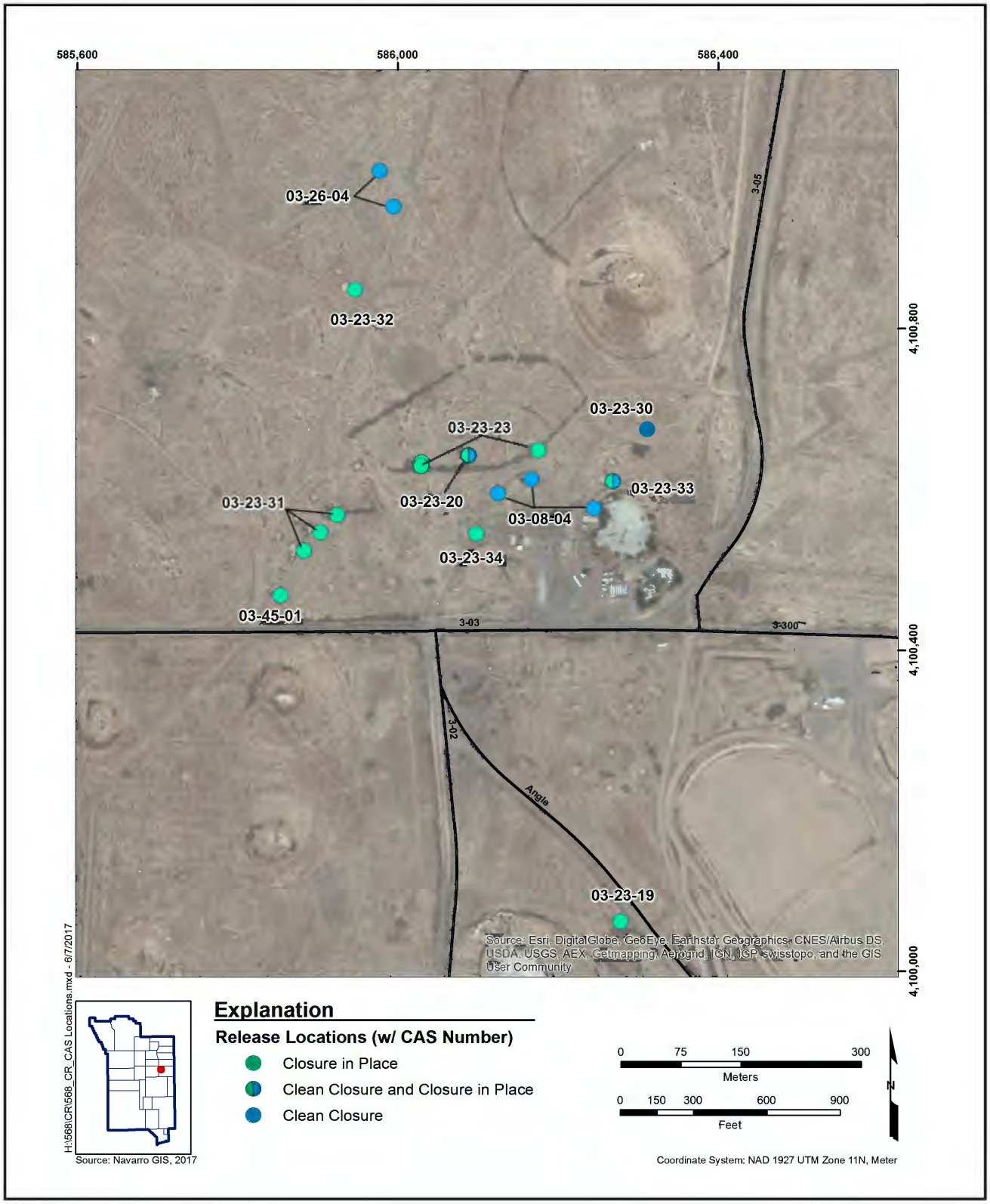

Figure 1-1
CAU 568 CAS Location Map

1.1 Purpose

The purpose of this CR is to provide documentation and justification that no further corrective action is needed for the closure of CAU 568 based on the implementation of corrective actions. This includes a description of closure activities that were performed and an evaluation of the verification data. The CAP (NNSA/NFO, 2016a) and ROTC-1 (NNSA/NFO, 2016c) provide information relating to the selection of CAAs and the reasoning behind their selection. The CADD (NNSA/NFO, 2015) identifies the release sites that require additional corrective action and presents information supporting the selection of CAAs.

1.2 Scope

The Otero, San Juan, Pascal-A, Pascal-B, Pascal-C, Luna, Colfax, Valencia, and Chipmunk shaft safety experiments were closed in place by covering all exposed sections of the well head assembly components with concrete. FFACO use restrictions (URs) were implemented for all closure in place CASs. The Otero and Valencia well head covers were clean closed by removal and disposal of the covers. Clean closure at the debris and lead locations was accomplished by excavation, containerization, and disposal of the debris, lead, and affected soils.

Except as described in Section 2.2, the closure activities were completed in accordance with the CAP (NNSA/NFO, 2016a) and ROTC-1 (NNSA/NFO, 2016c), and in accordance with the *Soils Activity Quality Assurance Plan* (QAP) (NNSA/NSO, 2012b) and approved quality assurance (QA) programs that establish requirements, technical planning, and general quality practices. The verification sample results and the risk associated with site contamination were evaluated in accordance with the *Soils Risk-Based Corrective Action* (RBCA) *Evaluation Process* (NNSA/NFO, 2014b).

1.3 CR Contents

This CR is divided into the following sections and appendices:

- Section 1.0, "Introduction," summarizes the purpose, scope, and contents of this CR.
- Section 2.0, "Closure Activities," summarizes the closure activities, deviations from the CAP and ROTC-1, the actual schedule, and the site conditions following completion of corrective actions.

- Section 3.0, "Waste Disposition," discusses the wastes generated and entered into an approved waste management system as a result of the corrective action.
- Section 4.0, "Closure Verification Results," describes verification activities and results.
- Section 5.0, "Conclusions and Recommendations," provides the conclusions and recommendations along with the rationale for their determination.
- Section 6.0, "References," provides a list of all referenced documents used in the preparation of this CR.
- Appendix A, *DQOs as Developed in the CAP,* provides the DQOs as presented in Appendix B of the CAU 568 CAP.
- Appendix B, *Closure Certification*, documents the specific closure activities completed for the CAU.
- Appendix C, *As-Built Documentation*, identifies the as-built drawings for each CAS.
- Appendix D, *Confirmation Sampling Test Results*, provides a description of the project objectives, field closure and sampling activities, and closure results.
- Appendix E, *Waste Disposition Documentation*, documents disposal of items removed during closure activities.
- Appendix F, *Modifications to the Post-Closure Plan*, documents any modifications to the Post-Closure Plan.
- Appendix G, *Use Restrictions*, documents the URs.
- Appendix H, *Sample Location Coordinates*, provides the coordinates of the sample locations.
- Appendix I, *Nevada Division of Environmental Protection* (NDEP) comments, contains NDEP comments on the draft version of this document.

1.3.1 Applicable Programmatic Plans and Documents

All investigation activities were performed in accordance with the following documents:

- CAP for CAU 568, Area 3 Plutonium Dispersion Sites (NNSA/NFO, 2016a)
- ROTC-1 to the CAP for CAU 568, Area 3 Plutonium Dispersion Sites (NNSA/NFO, 2016c)
- Soils QAP (NNSA/NSO, 2012b)
- Soils RBCA document (NNSA/NFO, 2014b)
- FFACO (1996, as amended)

1.3.2 Data Quality Objectives

This section contains a summary of the data quality objective (DQO) process that is presented in Appendix A. The DQOs were developed to identify data needs, clearly define the intended use of the environmental data, and design a data collection program that will satisfy these purposes.

The problem statement for CAU 568 is as follows: "Existing sample information is insufficient to determine whether contaminants of concern (COCs) are present following completion of the clean closure corrective actions." To address this problem, the resolution of the following decision statement is required:

- "Do COCs remain following completion of the clean closure corrective action?" For the purposes of these DQOs, a COC is defined as the presence of contamination exceeding the final action levels (FALs) established in the CADD (NNSA/NFO, 2015) or the presence of removable contamination exceeding the threshold for establishing an HCA.

After removal actions, if COCs are not present, further corrective action is not required. If COCs are present, additional contamination will be removed.

1.3.3 Data Quality Assessment Summary

The CAP (NNSA/NFO, 2016a) contains the DQOs for the additional sampling required to verify that clean closure activities were sufficient to reduce contamination below FALs. These DQOs were agreed to by stakeholders before corrective actions were implemented. The DQO process ensures that the right type, quality, and quantity of data will be available to support the resolution of those decisions with an appropriate level of confidence. A data quality assessment (DQA) was conducted that evaluated the degree of acceptability and usability of the reported verification data. This DQA is presented in Section 4.1. Using both the DQO and DQA processes helps to ensure that DQO decisions are sound and defensible.

The verification data support the conceptual site model (CSM) assumptions, and the data collected met the DQOs and support their intended use in the decision-making process. Based on this assessment, the verification data were adequate to verify the completion of corrective actions.

2.0 Closure Activities

The CAP (NNSA/NFO, 2016a) and ROTC-1 (NNSA/NFO, 2016c) corrective actions listed in Table 2-1 were implemented at CAU 568. In order to supplement existing data and determine whether site closure objectives have been achieved, additional data were collected at CAU 568 as part of the closure activities. Results of verification sampling for individual CAU 568 CASs are presented in Appendix D.

Table 2-1
CAU 568 Closure Activities
(Page 1 of 3)

CAS	Name	Release	Closure Method	COCs[a]	Scope of Work
03-08-04	Soil and Debris Piles	PSM within Soil and Debris Pile	Clean Closure	Assumed radiological dose; lead	Segregate, remove, and dispose of the soil/debris piles; perform radiological survey; and collect confirmation samples.
03-23-19	T-3U Contamination Area	Chavez HCA (DCB)	Closure in Place	Assumed radiological dose based on HCA conditions	Implement an FFACO UR for the HCA associated with the Chavez test, and post UR warning signs.
03-23-20	Otero Contamination Area	Otero Well Head Cover	Clean Closure	None	Remove, package, and dispose of well head cover.
		Subsurface Contamination within Otero Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.
03-23-23	San Juan Contamination Area	San Juan Well Head Cover	Closure in Place [b]	Assumed radiological dose based on HCA conditions	Construct a barrier over the safety experiment emplacement hole and well head cover; implement an FFACO UR; and post UR warning signs.
		Subsurface Contamination within San Juan Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	

Table 2-1
CAU 568 Closure Activities
(Page 2 of 3)

CAS	Name	Release	Closure Method	COCs[a]	Scope of Work
03-23-23	San Juan Contamination Area	Subsurface Contamination within Pascal-C Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.
03-23-30	HCA Soil Pile	Release from Debris	Clean Closure	Assumed radiological dose based on HCA conditions	Segregate, remove, and dispose of the soil/debris pile; perform radiological survey; and collect confirmation samples.
03-23-31	U-3d Contamination Area	Luna Well Head Cover	Closure in Place [c]	Assumed radiological dose based on HCA conditions	Construct a barrier over the safety experiment emplacement hole and well head cover; implement an FFACO UR; and post UR warning signs.
		Pascal-B HCA	Closure in Place	Assumed radiological dose based on HCA conditions	Implement an FFACO UR, and post UR warning signs.
		Subsurface Contamination within Pascal-B Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.
		Subsurface Contamination within Luna Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.
		Subsurface Contamination within Colfax Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.

Table 2-1
CAU 568 Closure Activities
(Page 3 of 3)

CAS	Name	Release	Closure Method	COCs[a]	Scope of Work
03-23-32	U-3j Test Release	Subsurface Contamination within Pascal-A Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.
03-23-33	U-3r Contamination Area	Valencia Well Head Cover	Clean Closure	Assumed radiological dose based on HCA conditions	Remove, package, and dispose of well head cover.
		Subsurface Contamination within Valencia Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.
03-23-34	U-3ay Contamination Area	Subsurface Contamination within Chipmunk Safety Experiment Emplacement Hole	Closure in Place	Assumed radiological dose	Construct a barrier over the safety experiment emplacement hole; implement an FFACO UR; and post UR warning signs.
03-26-04	Test-Related Debris	Lead from Broken Lead-Acid Battery	Clean Closure	Lead	Remove lead PSM, including soil containing PSM; and collect confirmation sample.
		Lead from Lead Shot	Clean Closure	Lead	Remove lead PSM, including soil containing PSM; perform visual inspection of PSM removal; and collect confirmation samples.
03-45-01	Test Surface Releases	Boomer Test Surface Release	Closure in Place	Assumed radiological dose	Implement an FFACO UR, and post UR warning signs.

[a] A radiological dose COC is the combined dose from radionuclides that exceeds the FAL of 25 mrem/yr.
[b] See ROTC-1 (NNSA/NFO, 2016c).
[c] Deviation from the CAP (NNSA/NFO, 2016a); see Section 2.2.

mrem/yr = Millirem per year

2.1 Description of Corrective Action Activities

The following subsections describe specific investigation activities conducted at each CAS. The locations of these activities are shown in Figure 2-1.

2.1.1 Closure in Place

2.1.1.1 Chavez Surface Release

The Chavez Surface Release (Figure 2-1) is composed of CAS 03-23-17 (contamination area [CA] conditions from a tower shot surface release) and CAS 03-23-19 (a DCB defined by the HCA boundary). This site exhibits HCA conditions (more than 2,000 disintegrations per minute per 100 square centimeters [dpm/100 cm^2] removable alpha contamination) and is assumed to exceed the FAL of 25 millirem per Occasional Use Area year (mrem/OU-yr). An FFACO UR was established at the corrective action boundary, and UR warning signs were posted. The FFACO UR for these CASs is included in Attachment G-1. An example of a UR sign for CAU 568 is shown in Figure 2-2.

2.1.1.2 Subsurface Contamination within Safety Experiment DCBs

Corrective action activities were implemented for the subsurface contamination within the following nine shaft safety experiments (Figure 2-1):

- Otero, CAS 03-23-20
- San Juan, CAS 03-23-23
- Pascal-C, CAS 03-23-23
- Pascal-B, CAS 03-23-31
- Luna, CAS 03-23-31
- Colfax, CAS 03-23-31
- Pascal-A, CAS 03-23-32
- Valencia, CAS 03-23-33
- Chipmunk, CAS 03-23-34

These activities included covering all exposed sections of the well head assembly components with concrete and posting UR signs. Steel casings were used as forms for containing and forming the concrete barriers. The concrete covering at San Juan and Luna included the well head cover adjacent to the emplacement hole. Figures 2-3 through 2-11 show before and after corrective action photos of each of these well head sites. The engineering specifications, as-built construction details, and

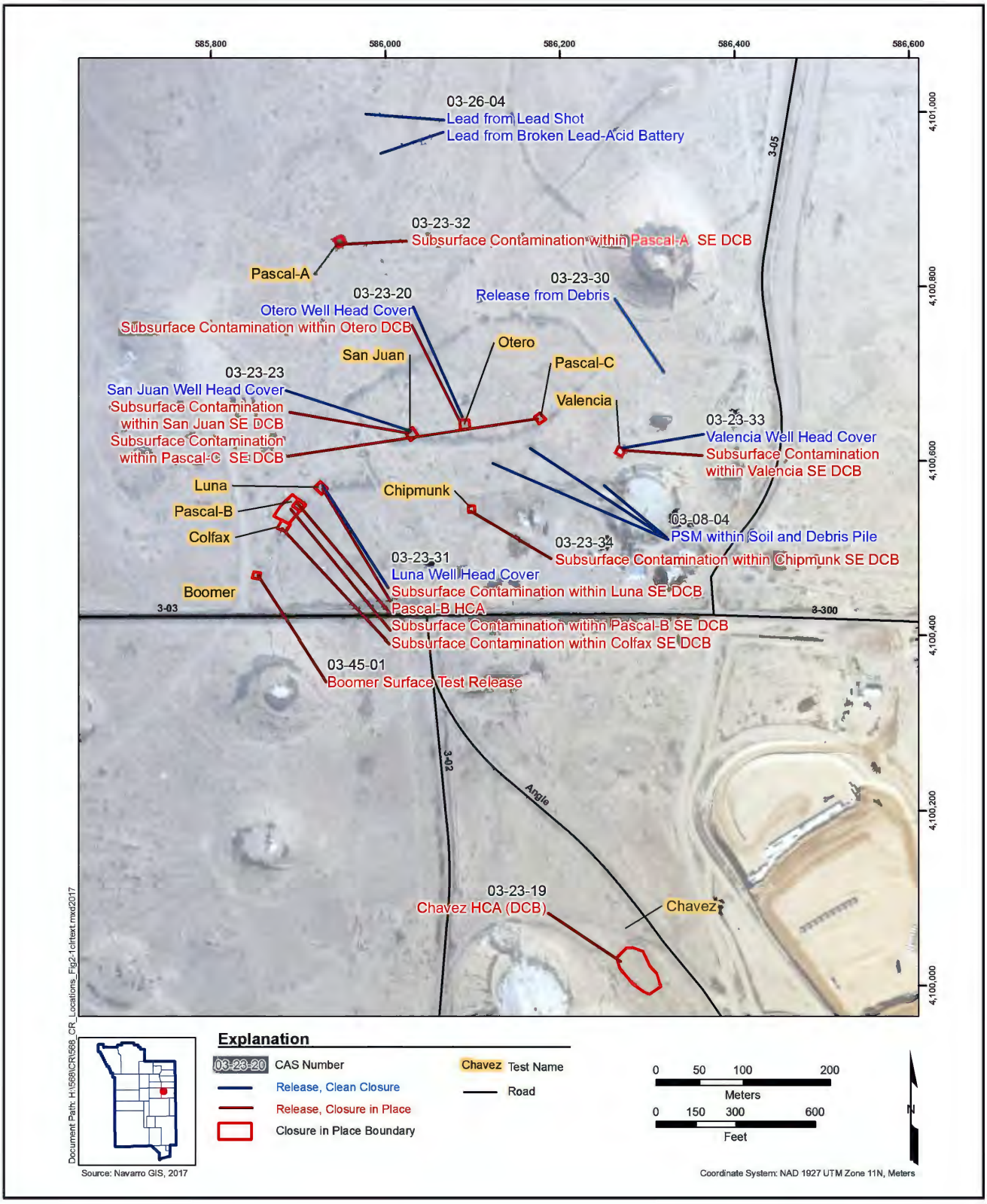

Figure 2-1
Locations of Corrective Action Sites

Figure 2-2
Example of CAU 568 UR Sign

concrete compressive strength test results are provided in Appendix C. Long-term maintenance will be conducted as specified in the UR. The FFACO URs for these CASs are included in Attachment G-1.

2.1.1.3 Pascal-B Surface Release

Corrective action activities for the Pascal-B Surface Release (CAS 03-23-31) (Figure 2-1) included implementing an FFACO UR at the corrective action boundary and posting UR warning signs. The FFACO UR for this CAS is included in Attachment G-1.

2.1.1.4 Boomer Test Surface Release

Corrective action activities for the Boomer Test Surface Release (CAS 03-45-01) (Figure 2-1) included implementing an FFACO UR at the corrective action boundary and posting UR warning signs. The FFACO UR for this CAS is included in Attachment G-1.

Figure 2-3
Otero Well Head Assembly before and after Corrective Action

Figure 2-4
San Juan Well Head Assembly before and after Corrective Action

Figure 2-5
Pascal-C Well Head Assembly before and after Corrective Action

Figure 2-6
Pascal-B Well Head Assembly before and after Corrective Action

Figure 2-7
Luna Well Head Assembly before and after Corrective Action

Figure 2-8
Colfax Well Head Assembly before and after Corrective Action

Figure 2-9
Pascal-A Well Head Assembly before and after Corrective Action

Figure 2-10
Valencia Well Head Assembly before and after Corrective Action

Figure 2-11
Chipmunk Well Head Assembly before and after Corrective Action

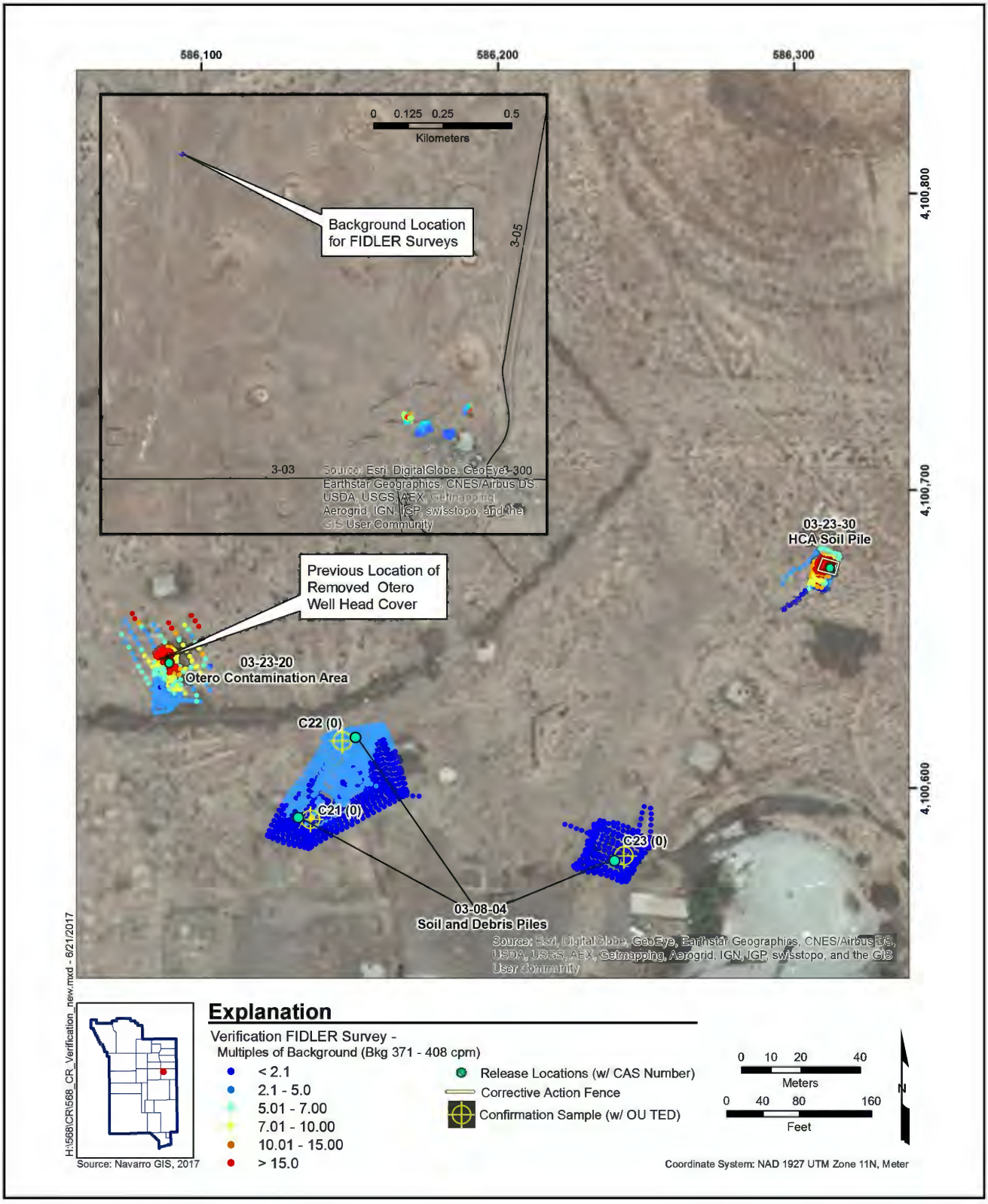

Figure 2-12
FIDLER Survey of CAU 568 Area after Corrective Action

Figure 2-13
CAS 03-08-04 Soil Pile #1 before and after Corrective Action

Figure 2-14
CAS 03-08-04 Soil Pile #2 before and after Corrective Action

Figure 2-15
CAS 03-08-04 Soil Pile #3 before and after Corrective Action

Figure 2-16
Before and after Photos of the Broken Lead-Acid Battery Location

Figure 2-17
Before and after Photos of the Lead Shot Location

2.1.2 Clean Closure

2.1.2.1 Well Head Covers

Corrective action activities for the well head covers associated with the testing at the Otero (CAS 03-23-20) and Valencia (CAS 03-23-33) shaft safety experiments (Figure 2-1) included the removal and placement of the covers in roll-off containers, and disposal at the Area 5 Radioactive Waste Management Complex (RWMC). As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by a visual inspection of the site. A radiological survey of the area immediately underneath each well head cover was performed and is shown in Figure 2-12. While elevated radioactivity is present in the area of CAS 03-23-20, radioactivity in the area where the well head cover was removed is not higher than the surrounding area as reported in the CADD (NNSA/NFO, 2015). For the Otero site, the field instrument for the detection of low-energy radiation (FIDLER) survey conducted after removal of the well head cover showed that radiological conditions beneath the well head cover were consistent with conditions in the surrounding areas (Figure 2-12). For the Valencia well head cover site, the removable contamination survey conducted after removal of the well head cover showed maximum readings of 1,050 dpm/100 cm^2 removable alpha. As this area was previously identified as a CA, this demonstrates no significant differences in conditions after removal of the well head cover. Disposal documentation is located in Appendix E.

2.1.2.2 Soil and Debris Piles

Soil and debris associated with CAS 03-08-04 (Figure 2-1) were removed as part of the corrective action activities. Soil and debris were excavated and disposed of as low-level waste (LLW) at the Area 5 RWMC. As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by conducting a visual inspection, conducting a radiological survey, and collecting a verification soil sample if needed. Waste disposal documentation is located in Appendix E. Figures 2-13 through 2-15 show the three soil/debris piles associated with CAS 03-08-04 before, during, and after the removal of the soil and debris piles. A FIDLER radiation survey was conducted over the excavated areas after the removal activities were complete. The results of the FIDLER survey are presented in Figure 2-12. A verification sample was collected from each of the three soil piles (AA6C602 at location C21, AA6C603 at location C22, and AA6C604 at location C23). Each sample was collected from a 2-by-2-meter (m) sample plot using the methodology defined in the Soils RBCA

document for sample plots (NNSA/NFO, 2014b). The locations of these sample plots were selected as the areas with the highest radiological readings within the footprint of each removed pile. Each verification sample was composed of nine aliquots (i.e., subsamples that were blended together and from which the verification sample was collected). The locations within the sample plots (from which the nine aliquots were collected) were selected using an unbiased random start, triangular grid technique. Sample results are located in Appendix D.

2.1.2.3 HCA Soil Pile

Soil and debris associated with CAS 03-23-30 (Figure 2-1) were removed as part of the corrective action activities. Soil and debris were excavated and disposed of as LLW at the Area 5 RWMC. As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by conducting a visual inspection, conducting a radiological survey, and collecting a verification soil sample if needed. Waste disposal documentation is located in Appendix E. A FIDLER radiation survey was conducted over the excavated areas after the removal activities were complete. The results of the FIDLER survey are presented in Figure 2-12. Note that although relative levels of radioactivity are elevated at the HCA pile, dose is still well below the FAL, and the area is controlled as a CA.

As documented in the CADD (NNSA/NFO, 2015) and the CAP (NNSA/NFO, 2016a), only the metallic debris exhibited HCA conditions and was the subject of the corrective action. After the metallic debris was removed using FIDLER screening as specified in the CAP, additional FIDLER screening did not indicate the presence of additional debris items. The removal of all radioactivity exceeding the HCA criteria was confirmed by removable contamination surveys. Results of removable contamination surveys at six locations were all less than HCA criteria. The maximum readings from the removable surveys were 890 dpm/100 cm^2 removable alpha and 400 dpm/100 cm^2 beta/gamma. Because metallic debris was completely removed (along with some associated soil), the planned verification soil sample was not necessary, as soil in the area was already characterized in the CADD and shown to be below the radiological FAL. This deviation does not affect the DQO decision criteria, as all material that exceeded HCA criteria was removed during the corrective action. Therefore, it is no longer necessary to assume that dose is present at levels exceeding the FAL.

2.1.2.4 Lead Locations

Lead and lead-contaminated soil (i.e., soil inadvertently collected with the debris) at the site of a broken lead-acid battery (CAS 03-26-04) (Figure 2-1) were removed as part of the corrective action activities. Before and after photos of the broken lead-acid battery location are presented in Figure 2-16. As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by collecting a verification soil sample. A composite verification sample (AA6C040) consisting of nine aliquots collected from unbiased locations within a 2-by-2-m sample plot at the former location (C17) of the broken battery was analyzed for *Resource Conservation and Recovery Act* (RCRA) metals. Sample results are located in Appendix D.

Lead shot and associated soil (CAS 03-26-04) were removed as part of the corrective action activities. Before and after photos of the lead shot location are presented in Figure 2-17. As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by collecting two verification soil samples (AA6C041 and AA6C042). Each sample was collected from a 2-by-2-m sample plot (locations C91 and C92) using the methodology defined in the Soils RBCA document for sample plots (NNSA/NFO, 2014b). The locations of these sample plots were selected as the areas with the greatest accumulation of lead shot (biased locations determined judgmentally from a visual survey). Each verification sample was composed of nine aliquots (i.e., subsamples that were blended together and from which the verification sample was collected). The locations within the sample plots (from which the nine aliquots were collected) were selected using an unbiased random start, triangular grid technique. Sample results are located in Appendix D.

The characterization, management, and disposal of the wastes generated by this corrective action are described in Section 3.2.

2.2 Deviations from CAP as Approved

The CAP (NNSA/NFO, 2016a) specified the CAA of clean closure for the Luna well head cover portion of CAS 03-23-31. While preparing to remove this well head cover, safety concerns were raised during a scoping survey regarding the potential to expose workers to airborne radioactivity due to the disturbance of high levels of removable contamination (mainly composed of americium [Am]-241 and plutonium isotopes). Therefore, the Luna well head cover was closed in place by

encompassing the cover using a carbon-steel casing and grouting it in place using the same engineering specifications and design that was implemented for the San Juan well head cover. This deviation prevented the potential risk to site workers while still being protective of exposure to future potential receptors.

The CAP specified that a confirmation composite sample would be collected in the area of highest radiological survey levels at the HCA Soil Pile associated with CAS 03-23-30. As explained in the CADD (NNSA/NFO, 2015) and the CAP (NNSA/NFO, 2016a), the contamination that required corrective action at this site was the presence of high levels of removable contamination associated with metal debris on the pile. As was shown in the CADD, radiological dose from soil at the HCA Soil Pile is well below the FAL. The maximum of the 95 percent upper confidence limit results from composite soil samples taken from this site (samples C507 and C685 to C688) was 9 mrem/OU-yr. As documented in the CADD and the CAP, only the metallic debris exhibited HCA conditions and was the subject of the corrective action. After the metallic debris was removed using FIDLER screening as specified in the CAP, additional FIDLER screening did not indicate the presence of additional debris items. The removal of all radioactivity exceeding the HCA criteria was confirmed by removable contamination surveys. Because metallic debris was completely removed (along with some associated soil), the planned verification soil sample was not necessary, as soil in the area was already characterized in the CADD and shown to be below the radiological FAL. This deviation does not affect the DQO decision criteria, as all material that exceeded HCA criteria was removed during the corrective action. Therefore, it is no longer necessary to assume that dose is present at levels exceeding the FAL.

2.3 Corrective Action Schedule as Completed

The CAU 568 site closure activities took place from August 23, 2016, through December 21, 2016. Table 2-2 presents a summary of closure activity dates.

2.4 Site Plans/Survey Plat

An as-built construction contractor drawing and table detailing the closure in place design for the safety experiment well head assemblies is presented in Appendix C. UR maps are presented in Attachment G-1.

Table 2-2
Corrective Action Schedule for CAU 568

Date	Corrective Action
08/23/2016 - 09/21/2016	**Surface debris removal and shipping.**
08/23/2016 - 09/13/2016	Stage equipment and intermodal containers.
08/23/2016 - 09/13/2016	Load intermodals with site debris and soil.
08/23/2016 - 09/21/2016	Conduct radiation surveys.
08/29/2016 - 09/13/2016	Ship intermodal containers to Area 5 RWMC.
09/14/2016	Conduct soil verification sampling.
09/16/2016 - 09/21/2016	Remove well head debris.
09/21/2016	Survey equipment out of CAs.
09/21/2016	Demobilize from site.
11/28/2016 - 12/21/2016	**Set casings over well head assemblies and fill with concrete.**
11/28/2016 - 12/08/2016	Stage equipment and carbon-steel casings.
12/05/2016 - 12/08/2016	Prepare sites before pouring concrete.
12/06/2016 - 12/14/2016	Pour concrete (pads and filling casings).
12/15/2016 - 12/21/2016	Demobilize from site.
July 2017	Place UR signs.

3.0 Waste Disposition

This section addresses the characterization and management of remediation wastes generated at CAU 568. Waste management activities were conducted as specified in the CAP (NNSA/NFO, 2016a), except as discussed in Section 2.2.

3.1 Generated Wastes

The wastes listed in Table 3-1 were generated during closure activities at CAU 568. Wastes were segregated to the greatest extent possible, and waste minimization techniques were integrated into the field activities to reduce the amount of waste generated. Controls were in place to minimize the use of hazardous materials and to avoid the unnecessary generation of hazardous and/or mixed waste.

The amount, type, and source of waste placed into each container were recorded in waste management records that are maintained in the CAU 568 file and submitted to a Records System that is compliant with DOE Order 243.1B, Administrative Change 1 (DOE, 2013). The executed waste shipping and disposal documentation for CAU 568 are included in Appendix E.

Wastes generated during the corrective action activities were segregated into the following waste types:

- Mixed low-level waste (MLLW) debris consisting of lead bricks, lead plates, and broken lead-acid batteries. These debris items were collected and treated on site via macroencapsulation before disposal at the Area 5 RWMC.
- MLLW consisting of radiologically contaminated soil with lead shot. This waste was removed, packaged, and transferred to the management and operating (M&O) contractor for offsite treatment and disposal.
- Low-level radioactive waste (LLW), consisting of remediated soil and debris that was packaged and disposed of by direct burial.
- LLW investigation-derived waste (IDW), which included debris consisting of plastic sheeting, glass/plastic sample jars, personal protective equipment (PPE), sampling scoops, and disposable aluminum pans generated during the investigation and remediation of the site.
- LLW debris, consisting of metal debris and a small volume of remediated soil generated at several well sites. The metal debris items included carbon-steel casing, piping, winch

Table 3-1
Waste Summary Table

CAS	Waste Items	Waste Characterization				Waste Disposition			
		Hazardous	Hydrocarbon	PCBs	Radioactive	Disposal Facility	Waste Volume	Disposal Date	Disposal Doc[a]
03-23-23	MLLW (Soil with Lead Shot)	Yes	No	No	Yes	Offsite Treatment	50 ft^3	TBD	TBD
03-23-23	LLW (Soil & Debris)	No	No	No	Yes	Area 5 RWMC	8,910 ft^3	08/29/2016 through 09/14/2016	CD
Multiple CASs	LLW (SCO Debris)	No	No	No	Yes	Area 5 RWMC	2,025 ft^3	01/31/2017 & 02/01/2017	CD

[a]Copies of waste disposal documents are located in Appendix E of this document.

CD = Certificate of Disposal
ft^3 = Cubic foot
PCB = Polychlorinated biphenyl
SCO = Surface contaminated object
TBD = To be determined

assembly, well head casings, caps, and collars. The debris also included stainless-steel metal cables and carbon-steel cables.

3.2 Waste Characterization and Disposal

Waste characterization was based on process knowledge, radiological survey results, and analytical results of direct and/or associated samples. All LLW-generated wastes were characterized as containing low-level radioactivity attributed to residual radioactive soil adhering to the PPE and disposable sampling equipment. The radiological characterizations for each of the waste streams were based on the results of radiological surveys and/or analytical data that identified elevated levels of radionuclides on each of the waste streams. These data were used to calculate the overall activity and activity concentration in each waste container. A brief description of the characterization information for each waste stream is provided below:

- The lead and associated soil waste was characterized as MLLW because the soil directly below the lead shot failed Toxicity Characteristic Leaching Procedure (TCLP) analysis for lead and was assigned the U.S. Environmental Protection Agency (EPA) hazardous waste code D008 (CFR, 2017b). The only detected results of the TCLP analysis for sample number C512 were arsenic at 1.1 milligrams per liter (mg/L) and lead at 1,000 mg/L. The radiochemical analysis results also indicated the soil exceeded the Performance Objective Criteria (POC) for the unrestricted release of radiological material (BN, 1995). Therefore, the waste was characterized and managed as MLLW. The treatment standard for remediated MLLW that consists of mainly soil requires stabilization to meet land disposal restrictions requirements. The Area 5 RWMC currently does not have a permit that allows this kind of treatment method. Therefore, the waste was removed, packaged, and transferred to the M&O contractor for offsite treatment and disposition.

- The PPE and disposable sampling equipment that were used inside of radiologically posted areas were characterized as LLW based on the required assumption that any waste generated in a radiologically controlled area is radiologically contaminated. The process knowledge included a visual inspection of the PPE and sampling equipment conducted before packaging. The visual inspection verified that the PPE and sampling equipment did not contain any discoloration or staining that might indicate the items may have become contaminated with hazardous and/or chemical contamination. The visual inspection also verified that the PPE and sampling equipment did not contain any significant amounts of residual material (i.e., soil) adhering to the PPE, further assuring that the waste did not contain any significant amounts of potentially contaminated soil. Therefore, the PPE and disposable sampling equipment waste was characterized as LLW.

- The bulk soil and debris waste generated at the CAU 568 locations were characterized using direct soil samples collected from the waste piles. The analytical results from these samples

did not indicate any hydrocarbons, PCBs, or RCRA-regulated hazardous constituents above regulatory limits. The results indicated several radioisotopes exceeding the Table 4-2 limits of the NNSS Radiological Control Manual (NNSA/NSO, 2012a). Therefore, the waste was characterized as LLW.

A total of 8 drums of PPE/debris wastes and 25 bulk containers of soil and debris were generated and shipped for disposal during the corrective action activities. All LLW generated was shipped to the Area 5 RWMC in accordance with requirements in the *Nevada National Security Site Waste Acceptance Criteria* (NNSA/NFO, 2016b). One B-25 container of MLLW was generated, and is pending offsite treatment and disposal. A detailed list is provided below:

- One bulk container (B-25 box) containing MLLW remediated soil contaminated with lead shot and other lead items was transferred to the M&O contractor for offsite treatment at an approved treatment, storage, and disposal facility before disposal.
- Eight drums of LLW PPE were generated during remedial activities. These drums were shipped as LLW for disposal at the Area 5 RWMC.
- Twenty-five IP-1 rated soft-sided bulk containers (each containing approximately 15 cubic yards [yd^3] of soil/debris waste) were transported in 25-yd^3 intermodal roll-off containers for disposal at the Area 5 RWMC.

4.0 Closure Verification Results

All corrective actions were implemented as specified in the CAP (NNSA/NFO, 2016a) and ROTC-1 (NNSA/NFO, 2016c) except as discussed in Section 2.2. For the closure in place sites, the corrective action was implemented by establishing an FFACO UR. No verification samples were required or collected at these sites. For the clean closure sites, the corrective action of the removal of contaminated material was implemented, and verification as prescribed in the CAP was completed. Composite soil confirmation samples were collected at the broken lead-acid battery site, the lead shot site, soil pile with metallic debris, and the three surface debris/soil piles after completion of corrective action activities to verify that site closure objectives had been achieved.

Analytical results for the radionuclide and RCRA metals analysis are presented in Appendix D. The verification activities prescribed in the CAP were achieved as indicated below:

- Verification sampling was conducted at the lead locations to verify lead contamination is less than FALs. The analytical results of samples collected from the verification soil plots did not exceed the FAL for lead.
- Verification sampling at the Soil and Debris Piles was conducted to verify that contamination is less than FALs. The analytical results of samples collected from the verification soil plots did not exceed the FAL for metals or radiological dose.
- Removable contamination surveys were completed at the HCA Soil Pile after removal of the debris and associated soil. As HCA conditions are no longer present at the HCA Soil Pile, it is no longer necessary to assume that removable contamination would cause a dose exceeding the radiological FAL.
- The well head covers associated with Otero and Valencia were removed, and visual surveys were conducted. Visual surveys verified that the well head covers had been removed.

4.1 Data Quality Assessment

This DQA section addresses the data quality and decision specifications stipulated for verification sampling in the CAU 568 CAP (NNSA/NFO, 2016a). The DQA process is the scientific evaluation of the actual investigation results to determine whether the DQO criteria established in the CAP were met and whether DQO decisions can be resolved at the desired level of confidence. The DQO process ensures that the right type, quality, and quantity of data will be available to support the resolution of

those decisions at an appropriate level of confidence. Using both the DQO and DQA processes helps to ensure that DQO decisions are sound and defensible.

The DQA involves five steps that begin with a review of the DQOs and end with an answer to the DQO decisions. These steps are briefly summarized as follows:

1. *Review DQOs and Sampling Design*. Review the DQO process to provide context for analyzing the data. State the primary statistical hypotheses; confirm the limits on decision errors for committing false-negative (Type I) or false-positive (Type II) decision errors; and review any special features, potential problems, or any deviations to the sampling design.

2. *Conduct a Preliminary Data Review.* A preliminary data review should be performed by reviewing QA reports and inspecting the data both numerically and graphically, validating and verifying the data to ensure that the measurement systems performed in accordance with the criteria specified, and using the validated dataset to determine whether the quality of the data is satisfactory.

3. *Select the Test*. Select the test based on the population of interest, population parameter, and hypotheses. Identify the key underlying assumptions that could cause a change in one of the DQO decisions.

4. *Verify the Assumptions*. Perform tests of assumptions. If data are missing or censored, determine the impact on DQO decision error.

5. *Draw Conclusions from the Data*. Perform the calculations required for the test.

4.1.1 Review DQOs and Sampling Design

This section contains a review of the DQO process presented in Appendix A. The DQO decisions are presented with the DQO provisions to limit false-negative or false-positive decision errors. Special features, potential problems, or any deviations to the sampling design are also presented.

The FAL for radioactivity established in Appendix D of the CADD (NNSA/NFO, 2015) was based on an annual dose limit of 25 mrem/yr over an annual exposure time of 80 hours (i.e., the Occasional Use Area exposure scenario defines that a site worker would be exposed to site contamination 8 hours per day for 10 days per year). To be comparable to these action levels, the CAU 568 investigation results are presented in terms of the dose a receptor would receive from site contamination under the Occasional Use Area (mrem/OU-yr) exposure scenario.

The chemical preliminary action levels (PALs) are based on the EPA Region 9 Regional Screening Levels (RSLs) for chemical contaminants in industrial soils (EPA, 2016). The chemical FALs were established in Appendix D of the CADD (NNSA/NFO, 2015). The chemical FALs are also provided in Appendix D of this CR for comparison to analytical results.

4.1.1.1 DQO Decision Statement

The DQO decision statement as presented in the CAP (NNSA/NFO, 2016a) is as follows: "Do COCs remain following completion of the clean closure corrective actions?" Any contaminant that is present (or is assumed to be present) at levels that would cause it to exceed its corresponding FAL will be defined as a COC. If COCs are not present, further corrective action is not required. If COCs are present, additional contamination will be removed.

4.1.1.1.1 DQO Provisions To Limit False-Negative Decision Error

A false-negative decision error (when it is concluded that contamination exceeding FALs is not present when it actually is) was controlled by meeting the following criteria:

1a) For the DQO decision statement, having a high degree of confidence that sample locations selected will identify COCs if present anywhere within the study group (judgmental sampling).

1b) Maintaining a false-negative decision error rate of 0.05 (probabilistic sampling).

2) Having a high degree of confidence that analyses conducted will be sufficient to detect any COCs present in the samples.

3) Having a high degree of confidence that the dataset is of sufficient quality and completeness.

Criteria 1b, 2, and 3, were assessed based on the entire dataset. Therefore, these assessments apply to the DQO decision statement.

Criterion 1a (Confidence Judgmental Sample Locations Identify COCs)

To resolve the DQO decision statement (determine whether a COC is present at a release), samples were collected and analyzed following these two criteria:

- Samples must be collected in areas most likely to contain a COC.
- The analytical suite selected must be sufficient to identify any COCs present in the samples.

To satisfy the criteria that the sample must be collected in areas most likely to contain a COC, the judgmental sample locations were selected at the highest radiological readings as detected during the FIDLER terrestrial radiological survey.

The analytical methods were chosen during the DQO process as the analyses required to detect any of the contaminants of potential concern (COPCs) that were defined as the contaminants that could reasonably be expected at the site that could contribute to a dose or risk exceeding FALs. The analyses were identified based on the contaminants detected in corrective action investigation (CAI) samples as reported in the CADD (NNSA/NFO, 2015). This provides assurance that the analyses conducted for each sample has the capability of identifying any COPC present in the sample.

All radiological samples were analyzed for isotopic Am isotopic plutonium (Pu), isotopic uranium (U), and gamma spectrometry. Samples collected at lead sites were analyzed for RCRA metals.

Criterion 1b (Confidence in Probabilistic False-Negative Decision Error Rate)

Control of the false-negative decision error for the probabilistic samples was accomplished by ensuring the following:

- That the samples are collected from unbiased locations.

Selection of the sample aliquot locations within a sample plot was accomplished using a random start, systematic triangular grid pattern for sample placement. This permitted that all given locations within the boundaries of the sample plot would have an equal probability of being chosen.

Criterion 2 (Confidence in Detecting COCs Present in Samples)

Sample results were assessed against the acceptance criterion for the data quality indicator (DQI) of sensitivity as defined in the Soils QAP (NNSA/NSO, 2012b). The sensitivity acceptance criterion is that analytical detection limits will be less than the corresponding FAL (NNSA/NFO, 2014b). All of the chemical analyses met this criterion. For radionuclides, the criterion is that all detection limits are less than their corresponding Occasional Use Area residual radioactive material guideline (RRMGs). All of the analytical result detection limits for every radionuclide were less than their corresponding RRMGs. Therefore, the DQI for sensitivity has been met for all contaminants, and no data were rejected due to sensitivity.

Criterion 3 (Confidence that Dataset is of Sufficient Quality and Complete)

To satisfy the third criterion, the dataset was assessed against the acceptance criteria for the DQIs of precision, accuracy, comparability, completeness, and representativeness, as defined in the Soils QAP (NNSA/NSO, 2012b). The individual DQI results are presented in the following subsections.

Precision

Precision was evaluated as described in the CAIP (NNSA/NFO, 2014a) and Section 4.2 of the Soils QAP (NNSA/NSO, 2012b). No data quality issues were identified for the analytical results that resulted in them being qualified for precision. Therefore, the criterion for precision was met for all contaminants. The potential for a false-negative DQO decision error is negligible, and the results can be confidently used for decision making.

Accuracy

Accuracy was evaluated as described in the CAIP (NNSA/NFO, 2014a) and Section 4.2 of the Soils QAP (NNSA/NSO, 2012b). No data quality issues were identified for the analytical results that resulted in them being qualified for accuracy. Therefore, the criterion for accuracy was met for all contaminants. The potential for a false-negative DQO decision error is negligible, and the results can be confidently used for decision making.

Representativeness

The DQO process as identified in the CAP (NNSA/NFO, 2016a) was used to address sampling and analytical requirements for the verification samples. During this process, the locations were selected that enabled the samples collected to be representative of the population parameters identified in the DQO (the most likely locations to contain contamination [judgmental sampling] or that represent contamination of the sample plot [probabilistic sampling]).

Special consideration is needed for americium and plutonium isotope concentrations related to representativeness. This is due to the nature of these contaminants in soil. These isotopes may be present in soil in the form of small particles that may or may not be captured in a small soil sample of 1 to 2 grams. As individual particles of these radionuclides can make a significant impact on analytical results, small soil samples taken from the same site can produce analytical results that are very different (i.e., poor accuracy). However, the americium and plutonium isotopes are co-located (e.g., Am-241 is a daughter product of Pu-241), and the relative concentrations between different samples from the same site (i.e., the ratio of americium to plutonium isotope concentrations) should be equal. Based on process knowledge and demonstrated by analytical results from previously sampled Soils Activity sites, the ratios between americium and plutonium isotopes in soil contamination from any given source is expected to be the same throughout the contaminant plume at any given time. Therefore, if the ratios are known and one of these isotopic concentrations is known, the concentrations of the other isotopes can be estimated.

Am-241 is reported by the gamma spectrometry method as well as the isotopic americium method. As the gamma spectrometry measurement is based on a much larger soil sample (usually 1 liter), the particle distribution problem discussed above is greatly diminished and the probability of the result being representative of the sampled site is much improved. Therefore, the ratios between the americium and plutonium isotopes will be established using the isotopic analytical results and these ratios were used to infer concentrations of plutonium isotopes using the gamma spectrometry results for Am-241. These inferred plutonium values are more representative of the sampled area than the isotopic results.

Based on the selection of the sample locations and the use of americium and plutonium concentrations that are more representative of the sampled area, the analytical data acquired during the CAU 568 CAI are considered to adequately represent contaminant concentrations of the sampled population.

Comparability

Field sampling, as described in the CAP (NNSA/NFO, 2016a), was performed and documented in accordance with approved procedures that are comparable to standard industry practices. Approved analytical methods and procedures per DOE were used to analyze, report, and validate the data. These are comparable to other methods used not only in industry and government practices, but most importantly are comparable to other investigations conducted for the NNSS. Therefore, CAU 568 datasets are considered comparable to other datasets generated using these same standardized DOE procedures, thereby meeting DQO requirements.

Also, standard, approved field and analytical methods ensured that data were appropriate for comparison to the investigation action levels specified in the CAP.

Completeness

The CAIP (NNSA/NFO, 2014a) defines acceptable criteria for completeness to be that the dataset is sufficiently complete to be able to make the DQO decisions. This is initially evaluated as 80 percent of release-specific analytes identified in the CAP having valid results. Rejected data (either qualified as rejected or data that failed the criterion of sensitivity) were not used in the resolution of DQO decisions and are not counted toward meeting the completeness acceptance criterion. all of the results from the verification samples were valid and usable for decision-making. Therefore, the completeness criteria was met.

4.1.1.1.2 DQO Provisions To Limit False-Positive Decision Error

The false-positive decision error was controlled by assessing the potential for false-positive analytical results. QA/quality control (QC) samples such as method blanks were used to determine whether a false-positive analytical result may have occurred. This provision is evaluated during the data validation process and appropriate qualifications are applied to the data when applicable. There were no data qualifications that would indicate a potential false-positive analytical result.

Proper decontamination of sampling equipment also minimized the potential for cross contamination that could lead to a false-positive analytical result.

4.1.1.2 Alternative Actions to the Decision

If COCs are not detected in verification samples from the area of the removed soil and debris, further corrective action is not required. If COCs are detected, additional removal will be completed.

4.1.1.3 Sampling Design

The CAP (NNSA/NFO, 2016a) stipulated that the following sampling processes would be implemented:

- Sampling of sample plots will be conducted by a combination of judgmental and probabilistic sampling approaches.

  Result. The location of the plots were selected judgmentally, and sample aliquots were collected within each plot probabilistically as described in the CAP.

4.1.2 Conduct a Preliminary Data Review

A preliminary data review was conducted by reviewing QA reports and inspecting the data. The contract analytical laboratories generate a QA nonconformance report when data quality does not meet contractual requirements. All data received from the analytical laboratories met contractual requirements, and a QA nonconformance report was not generated. Data were validated and verified to ensure that the measurement systems performed in accordance with the criteria specified in the Soils QAP (NNSA/NSO, 2012b). The validated dataset quality was found to be satisfactory.

4.1.3 Select the Test, and Identify Key Assumptions

The test for making DQO decisions for radiological contamination was the comparison of the total effective dose (TED) to the FAL of 25 mrem/OU-yr. For other types of contamination, the test for making DQO decisions was the comparison of the maximum analyte result from each release to the corresponding FAL.

The analytical and computational results for external and internal doses for the soil samples are presented in Appendix D.

4.1.4 Verify the Assumptions

The key assumptions that could impact the DQO decision are listed in Table 4-1.

Table 4-1
Key Assumptions

Exposure Scenario	Occasional Use Area
Affected Media	Surface soil within the footprint of the excavated soil and debris piles
Location of Contamination/Release points	Surface soil within the footprint of the excavated soil and debris piles
Transport Mechanism	None, as recently exposed soil below the soil and debris pile has not been previously subject to migration forces.
Preferential Pathways	None, as recently exposed soil below the soil and debris pile has not been previously subject to migration forces.
Lateral and Vertical Extent of Contamination	Contamination, if present, is expected to be contiguous to the former soil and debris piles, and decrease with distance and depth from this source.
Groundwater Impacts	None
Future Land Use	Nuclear and High Explosives Test Zone as defined in Table 4-1 of the Final Site-Wide Environmental Impact Statement (NNSA/NSO 2013)
Other DQO Assumptions	None

The results of the investigation support the key assumptions identified in the CAU 568 CAP DQOs (NNSA/NFO, 2016a) and Table 4-1. All data collected during the closure verification activities supported the CSM, and no revisions to the CSM were necessary.

4.1.4.1 Other DQO Commitments

HCA Soil Pile

Characterize and remove the HCA Soil Pile; perform a radiological survey of the area; and collect verification soil samples.

Well Head Covers

Characterize and remove three carbon-steel well head covers; confirm with visual verification; and conduct a radiological survey of the area immediately underneath each.

Soil and Debris Piles

Remove contaminated soil and debris; confirm through visual verification; and conduct a radiological survey. Verification composite soil samples will be collected from the locations with the highest radiological survey levels. A minimum of one composite plot sample will be established at each debris pile location.

Lead Releases

Remove soil and lead; confirm by visual verification; collect a composite soil sample from each location; and analyze for RCRA metals.

4.1.5 Draw Conclusions from the Data

The DQO decision on the presence of COCs at the corrective action sites was resolved based on the analytical results of samples collected at the soil plot locations. These results demonstrate that no COCs are present at the clean closure corrective action sites in concentrations greater than the FALs, and no further corrective actions are necessary.

4.1.6 Data Quality for Decision-Supporting Data

The CAP (NNSA/NFO, 2016a) identified FIDLER radiological survey data as decision-supporting data. The FIDLER data meet the data quality requirements listed in Section 2.6.1 of the Soils QAP (NNSA/NSO, 2012b) through the verification of acceptable instrument performance. This was accomplished through the use of control charts and daily operational tests (performing daily background and response checks). This assures that the instrument responds appropriately to higher levels of radiation with correspondingly higher readings. The FIDLER readings are used qualitatively to represent radiation levels relative to the nearby background radiation level. These are expressed in terms of multiples of background (MOB) radiation level. The qualitative MOB values are used to distinguish a spatial pattern of where radioactivity is relatively higher and lower. FIDLER data were

used qualitatively to guide the biasing of sampling locations. As used for these purposes, the quality of FIDLER survey data is sufficient to meet the requirements of decision-supporting data.

4.2 Use Restrictions

Corrective actions completed at the clean closure sites listed in Table 2-1 resulted in no remaining contamination that require a UR.

Contamination is present at the closure in place sites listed in Table 2-1 at levels assumed to exceed the FALs and require URs. FFACO URs were implemented based on the assumed potential to receive a dose exceeding 25 mrem/yr. This is based on the current land use, which is an assumed maximum exposure period of 80 hours per year. Activities that would cause a site worker to be exposed to site radiological contamination within the FFACO UR are restricted within the area defined by the coordinates listed in the administrative UR and depicted in the figure attached to each UR without prior notification to and acknowledgement from NDEP unless the activities are conducted under the provisions of 10 *Code of Federal Regulations* (CFR) Part 835 (CFR, 2017a). The FFACO UR is recorded in the FFACO database, M&O contractor Geographic Information Systems (GIS), and the Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO URs are posted around the areas or on the casings isolating the well head assemblies.

Administrative URs have also been established to prevent inadvertent exposure of workers to radioactivity if a more intensive use of the sites were to be considered in the future. As defined in Section 4.0 of the CADD, best management practice (BMP) administrative URs were established based on the assumed potential to receive a dose exceeding 25 mrem/yr in areas identified as exhibiting removable contamination at levels exceeding the criterion for a CA. New activities that would cause a site worker to be exposed to site radiological contamination for a period of more than that of current land use (80 hours per year) are restricted within the areas defined by the coordinates listed in the administrative UR and depicted in the figure attached to each UR without prior notification and approval of NDEP unless the activities are conducted under provisions of 10 CFR Part 835 (CFR, 2017a). These administrative URs are recorded in the FFACO database, M&O contractor GIS, and the EM Nevada Program CAU/CAS files. As stated on the individual UR forms in Attachment G-1, no physical site controls are required for the administrative URs.

The Use Restriction Information form and figures showing the UR boundary for each CAS are included in Attachment G-1. Post-closure requirements are summarized in Section 5.2.

The corrective actions for CAU 568 are based on the assumption that activities on the NNSS will be limited to those that are industrial in nature and that the NNSS will maintain controlled access (i.e., restrict public access and residential use). Should the future land use of the NNSS change such that these assumptions are no longer valid, additional evaluation may be necessary.

5.0 Conclusions and Recommendations

5.1 Conclusions

The CAU 568 CAAs, as determined by the stakeholders, were implemented as follows:

- The Otero, San Juan, Pascal-A, Pascal-B, Pascal-C, Luna, Colfax, Valencia, and Chipmunk shaft safety experiments were closed in place by covering all exposed sections of the well head assembly components with concrete; and then along with the Pascal-A, Boomer, and Chavez surface releases, posted with UR signs. The sites were appropriately recorded, and long-term inspection and maintenance will be conducted.

- The Otero and Valencia well head covers were clean closed by removal and disposal of the covers. The soil/debris and lead locations were clean closed by excavation, containerization, and disposal of the debris, lead, and affected soils.

Following implementation of the corrective actions at CAU 568, the final FFACO closures for each CAS (including the CASs with no further action) are listed in Table 5-1.

Table 5-1
CAU 568 CASs and Corrective Actions

CAS Number	CAS Description	Corrective Action
03-08-04	Soil and Debris Piles	Clean Closure
03-23-17	S-3I Contamination Area	No Further Action
03-23-19	T-3U Contamination Area	Closure in Place
03-23-20	Otero Contamination Area	Closure in Place
03-23-22	Platypus Contamination Area	No Further Action
03-23-23	San Juan Contamination Area	Closure in Place
03-23-26	Shrew/Wolverine Contamination Area	No Further Action
03-23-30	HCA Soil Pile	Clean Closure
03-23-31	U-3d Contamination Area	Closure in Place
03-23-32	U-3j Test Release	Closure in Place
03-23-33	U-3r Contamination Area	Closure in Place
03-23-34	U-3ay Contamination Area	Closure in Place
03-26-04	Test-Related Debris	Clean Closure
03-45-01	Test Surface Releases	Closure in Place

5.2 Post-Closure Requirements

The FFACO URs implemented at the closure in place release sites will protect site workers from inadvertent exposure. The FFACO URs are defined and shown in Appendix G. These FFACO URs require annual inspections to certify that postings are in place, intact, and readable.

All URs are recorded in the FFACO database, the M&O contractor GIS, and the EM Nevada Program CAU/CAS files. The development of URs for CAU 568 is based on current land use. All new activities are reviewed under the Real Estate/Operations Permit process. When a new activity impacts a use restricted site, it is identified and an evaluation of the potential for the new activity to expose workers to contamination is made by EM Nevada Program personnel. If the exposure based on the new exposure scenario is higher than that used to establish the FFACO action level, NDEP will be notified.

5.3 Recommendations

The EM Nevada Program requests that NDEP issue a Notice of Completion for CAU 568 and approve transferring the CAU from Appendix III to Appendix IV of the FFACO. The DOE, under its regulatory authority for management of radioactive waste materials associated with environmental remediation activities, approves this request (USC, 2012).

6.0 References

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EPA, see U.S. Environmental Protection Agency.

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U.S. Environmental Protection Agency. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process,* EPA QA/G-4, EPA/240/B-06/001. Washington, DC: Office of Environmental Information.

U.S. Environmental Protection Agency. 2016. *Pacific Southwest, Region 9: Regional Screening Levels (Formerly PRGs), Screening Levels for Chemical Contaminants*. As accessed at http://www.epa.gov/region9/superfund/prg on 20 December. Prepared by EPA Office of Superfund and Oak Ridge National Laboratory.

Appendix A

DQOs as Developed in the CAP

Note: This appendix contains the DQOs as presented in Appendix B of the CAP. Therefore, cross references, acronyms, section headings, references, page numbers, header information, and other data in this appendix refer to the original document.

B.1.0 Sampling and Analysis Plan

The DQOs described in this appendix supplement the DQO process presented in the CAU 568 CAIP (NNSA/NFO, 2014) by adding decisions needed to confirm the completion of required corrective actions listed in the CAU 568 CADD (NNSA/NFO, 2015) and the quality criteria specific to those decisions. These DQOs are designed to ensure that the data collected will provide sufficient and reliable information to technically defend the DQO decisions that confirm that no further corrective actions are necessary after the implementation of clean closure of the three well head covers, HCA soil pile, three soil and debris piles, lead-acid battery soil, and lead shot. The seven steps of the DQO process presented in Sections B.2.0 through B.8.0 were developed in accordance with *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006).

In general, the procedures used in the DQO process provide a method to establish performance or acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of a study.

B.2.0 Step 1 - State the Problem

Step 1 of the DQO process defines the problem that requires study and develops a conceptual model of the environmental hazard to be investigated.

B.2.1 Problem Statement

The problem statement for CAU 568 is as follows: "Existing sample information is insufficient to determine whether COCs are present following completion of the clean closure corrective actions."

B.2.2 Conceptual Site Model

The CSM is used to organize and communicate information about site characteristics. It reflects the best interpretation of available information at a point in time. The CSM is a primary vehicle for communicating assumptions about release mechanisms, potential migration pathways, or specific constraints. The CSM describes the most probable scenario for current conditions at each site, and defines the assumptions that are the basis for identifying appropriate sampling strategy and data collection methods. An accurate CSM is important as it serves as the basis for all subsequent inputs and decisions throughout the DQO process.

The CSM was developed for CAU 568 using information from the physical setting, contaminant sources, release information, historical background information, knowledge from similar sites, and physical and chemical properties of the potentially affected media and contaminants of potential concern (COPCs). The CSM presented in the CAU 568 CAIP (NNSA/NFO, 2014) for each of the sites addressed by this appendix was supported by the results of the CAI. No changes were made to the CSM in the CADD (NNSA/NFO, 2015). Therefore, the DQOs presented in this appendix are based on the CSM presented in the CAIP.

B.3.0 Step 2 - Identify the Goal of the Study

Step 2 of the DQO process states how environmental data will be used in meeting objectives and solving the problem, identifies study questions or decision statements, and considers alternative outcomes or actions that can occur upon answering the questions.

B.3.1 Decision Statements

The decision statement is as follows: "Do COCs remain following completion of the clean closure corrective actions?"

For the purposes of these DQOs, a COC is defined as the presence of contamination exceeding the FALs established in the CADD or the presence of removable contamination exceeding the threshold for establishing an HCA.

B.3.2 Alternative Actions to the Decision

After removal actions, if COCs are not present, further corrective action is not required. If COCs are present, additional contamination will be removed.

B.4.0 Step 3 - Identify Information Inputs

Step 3 of the DQO process identifies the information needed, determines sources for information, and identifies methods that will allow reliable comparisons with corrective action criteria.

B.4.1 Information Needs

To resolve the DQO decision (determine whether COCs remain), surveys will be conducted and soil samples will be collected and analyzed following these two criteria:

- Surveys and soil samples must be collected in areas most likely to contain a COC (judgmental sampling).
- The method must be sufficient to identify any COCs present.

B.4.2 Sources of Information

Information to satisfy the DQO decision will be generated by performing visual and radiological surveys, and collecting and analyzing soil samples from the areas of greatest bias (locations of greatest accumulations of PSM) or the areas of highest radiological readings in the general area of the releases.

B.5.0 Step 4 - Define the Boundaries of the Study

Step 4 of the DQO process defines the target population of interest and its relevant spatial boundaries, specifies temporal and other practical constraints associated with survey/data collection, and defines the sampling units on which decisions or estimates will be made.

B.5.1 Target Populations of Interest

The population of interest to resolve the DQO decision (determine whether COCs from the HCA soil pile, three soil and debris piles, well head covers, lead shot, or lead-acid battery are present) is the soil with the highest levels of remaining contamination.

B.5.2 Spatial Boundaries

Spatial boundaries are the maximum lateral and vertical extent of expected contamination that can be supported by the CSM. The DQO decision spatial boundaries are presented in Section A.5.2 of the CAIP (NNSA/NFO, 2014). Contamination found beyond these boundaries may indicate a flaw in the CSM and may require reevaluation of the CSM before the investigation can continue.

B.5.3 Practical Constraints

Practical constraints may be activities by other organizations at the NNSS, utilities, threatened or endangered animals and plants, unstable or steep terrain, and/or access restrictions that may affect the ability to investigate this site. No practical constraints have been identified specific to CAU 568 clean closure confirmation activities.

B.5.4 Define the Sampling Units

The scale of decision making refers to the smallest, most appropriate area or volume for which decisions will be made. The scale of decision making for the CAU 568 confirmation decisions is each of the sites defined as requiring a corrective action of clean closure in the CADD (NNSA/NFO, 2015).

B.6.0 Step 5 - Develop the Analytic Approach

Step 5 of the DQO process specifies appropriate population parameters for making decisions, defines action levels, and generates a decision rule.

B.6.1 Population Parameters

Population parameters are the parameters compared to action levels. The population parameters are COCs identified for each of the clean closure sites in the CADD (NNSA/NFO, 2015).

B.6.2 Action Levels

The FALs for chemicals and radionuclides are established in Appendix D of the CADD (NNSA/NFO, 2015).

B.6.3 Decision Rules

The decision rules applicable to the DQO decision are as follows:

- If contamination levels are inconsistent with the CSM or extend beyond the spatial boundaries identified in Section B.5.2, then work will be suspended and the corrective action strategy will be reconsidered, else the decision will be to continue the corrective action.
- If the population parameter of any COC in the population of interest (defined in Step 4) exceeds the corresponding action level, then additional corrective action will be implemented, else no further corrective action is needed.

B.7.0 Step 6 - Specify Performance or Acceptance Criteria

Step 6 of the DQO process defines the decision hypotheses, specifies controls against false rejection and false acceptance decision errors, examines consequences of making incorrect decisions from the test, and places acceptable limits on the likelihood of making decision errors. This process is unchanged from the CAIP. Refer to Section A.7.0 of the CAIP (NNSA/NFO, 2014) for additional detail on performance or acceptance criteria.

B.8.0 Step 7 - Develop the Plan for Obtaining Data

Step 7 of the DQO process selects and documents a design that will produce data that will best achieve performance or acceptance criteria. A judgmental scheme will be implemented to select survey and sample locations at the HCA soil pile, three soil and debris piles, lead-acid battery soil, and lead shot. A probabilistic sampling scheme will be implemented to select composite sample locations within the sample plots at the HCA soil pile, three soil and debris piles, lead-acid battery soil, and lead-shot area.

As discussed in Section 2.4, a visual inspection will be conducted to confirm whether the PSM/debris/contaminated soil has been removed from the following release areas: HCA soil pile, three soil and debris piles, lead-acid battery location, and lead-shot area. A visual inspection will also be conducted at the locations of the three well head covers to confirm whether the PSM has been removed.

Once the PSM/debris/contaminated soil has been removed from the areas of the three removed soil and debris piles and HCA soil pile, radiological surveys will be conducted to determine whether any elevated radiological readings remain. A soil sample plot will be established at each removed pile location, biased to the area containing the highest radiological readings. One composite confirmation sample consisting of nine subsamples will be collected from unbiased locations within each sample plot. These samples will be analyzed for gamma spectroscopy and RCRA metals (Table 2-1).

For the lead-acid battery location, one composite confirmation sample consisting of nine subsamples will be collected from unbiased locations within an approximate 2-by-2-m sample plot. For the lead-shot area, one composite confirmation sample consisting of nine subsamples will be collected from unbiased locations within an approximate 2-by-2-m sample plot from each of the two areas of greatest bias (areas with greatest accumulation of lead shot). These samples will be analyzed for RCRA metals.

Within the HCA soil pile area, completion of the corrective action will be confirmed by evaluating removable contamination levels in the area of the removed HCA soil pile to determine whether levels

remain that exceed the removable contamination limits for HCA conditions per the *Nevada National Security Site Radiological Control Manual* (NNSA/NSO, 2012).

B.9.0 References

EPA, see U.S. Environmental Protection Agency.

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

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Appendix B

Closure Certification

B.1.0 Closure Certification

Certification of closure is required for permitted or interim status hazardous waste facilities, and is not applicable to CAU 568.

Appendix C

As-Built Documentation

C.1.0 As-Built Documentation

The as-built drawing for the closure for isolating the safety experiment well head assemblies is in Figure C.1-1. Because all of the well head assemblies use the same method, a single drawing was used to display the closures. The dimensions of each closure are referenced in the as-built drawing and listed in Table C.1-1.

Table C.1-1
CAU 568 Cemented Casing Detail

Site	(A) Diameter (ft)	(B) Height (ft)	Volume (ft^3)	Volume (yd^3)
Valencia	5.5	3	72	2.7
Pascal-C	5.5	3	72	2.7
Pascal-C	5.5	6	143	5.3
Otero	5.5	3	72	2.7
Luna	5.5	4	95	3.6
Luna	5.5	6	143	5.3
Pascal-B	5.5	4	95	3.6
Colfax	5.5	4	95	3.6
Chipmunk	10	5	393	14.6
Pascal-A	5.5	3	72	2.7
San Juan	10	7	550	20.4

ft = Foot

Concrete cylinder compression testing was performed as specified in the CAU 568 CAP (NNSA/NFO, 2016). Measuring the compressive strength of concrete is achieved by taking a sample of concrete at the time of placement. Cylinders, measuring approximately 12 inches high by 6 inches in diameter, are compressed by a break machine that exerts increasing force upon the cylinder until it structurally fractures. When a failure occurs (commonly referred to as “the break”), the compressive strength is measured by dividing the force (pounds) measured at the time the cylinder fails by the load-bearing surface area (square inches) of the concrete sample. At the time of the break, the sample’s age is generally noted for QA purposes. Therefore, to meet the concrete compressive strength specification, the break results should calculate to at least 4,000 pounds per square inch (psi) at 28 days.

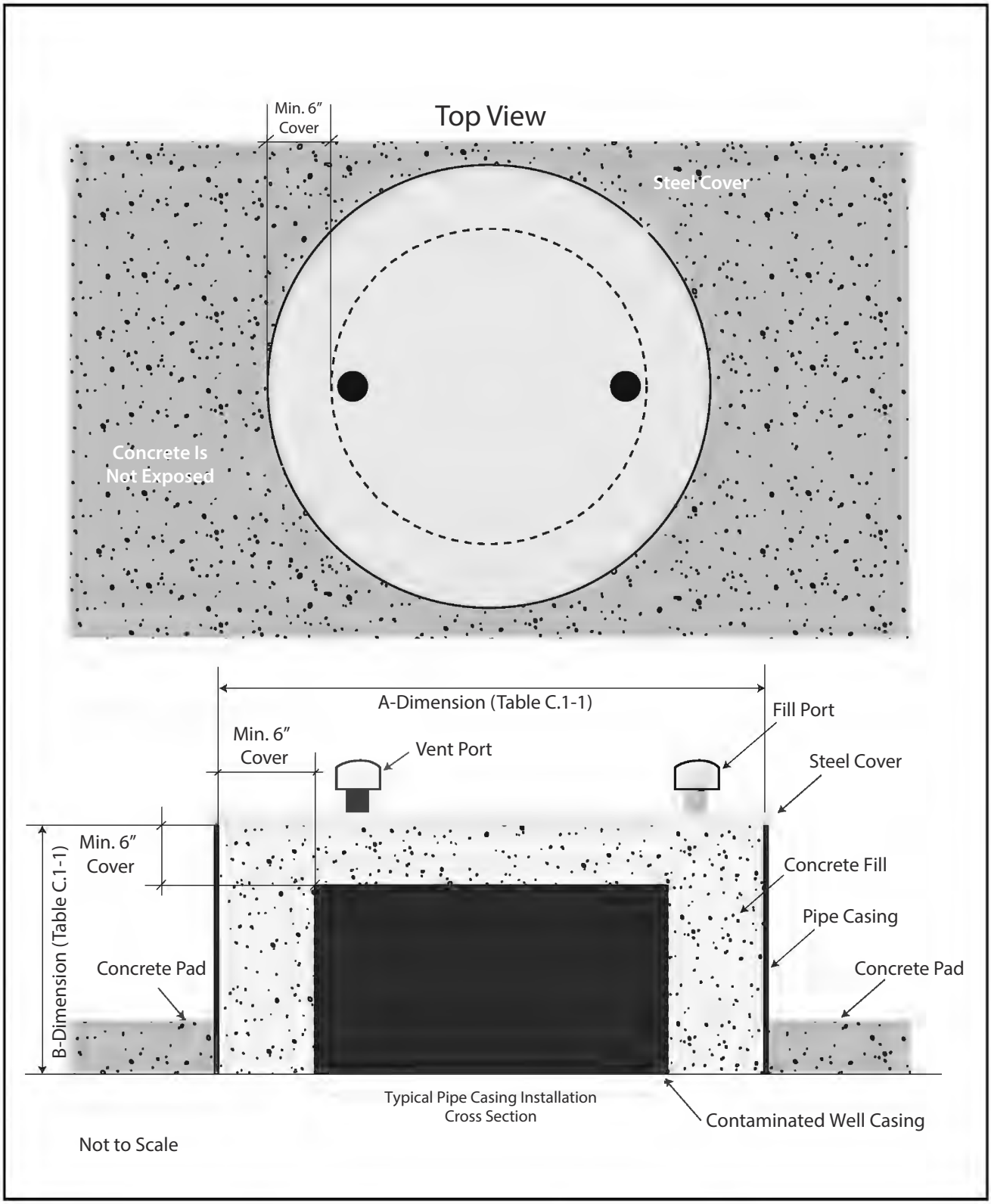

Figure C.1-1
CAU 568 Closure in Place As-Built Drawing for Safety Experiment Well Head Assemblies, Carbon-Steel Pipe Casing

A set of three concrete cylinders was collected for each day of placing concrete at CAU 568. Results are provided in Table C.1-2. All test cylinders exceeded the criterion of 4,000 psi for the 28-day compressive strength, except for two of the test cylinders from January 5, 2017. These test cylinders reached more than 96 percent of the criterion. Compressive strength (e.g., crush resistance) is important in the construction of footings and supports for bridges or other load-bearing structures, but not inside the steel casings. However, the concrete placed inside the carbon-steel casings at CAU 568 is not subject to any load, and compressive strength of the concrete inside the carbon-steel casings is not considered a critical parameter. Additionally, while it estimated that concrete reaches 75 percent of its 28-day compressive strength in seven days, its strength will remain stable or even increase over time (Kosmatka et al., 2002). Therefore, it is concluded that the concrete placed inside the steel casings at CAU 568 are sufficient for encapsulating the radioactive materials.

Table C.1-2
CAU 568 Concrete Cylinder Compression Test Results

Date of Placement	Well Casing	28-Day Compression Test Strength	Average Compression Test Strength
12/14/2016	Pascal-A, Pascal-B, Pascal-C, Otero, Luna, San Juan, Chipmunk, Colfax	5,430 5,300 5,280	5,335
12/15/2016	Chipmunk, Valencia	4,080 4,120 4,060	4,085
01/05/2017	Luna, Pascal-B, Colfax	3,970 3,840 4,080	**3,965**
01/09/2017	Pascal-A, Pascal-C, Otero	4,440 4,470 4,380	4,430
01/10/2017	San Juan	5,340 5,210 5,220	5,255

Note: Bolded value did not achieve the minimum average compressive strength of 4,000 psi.

C.2.0 References

Kosmatka, S.H., B. Kerkhoff, W.C. Panarese, and K.S. Elliott. 2002. *Design and Control of Concrete Mixtures,* 14th edition. Skokie, IL: Portland Cement Association.

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Appendix D

Confirmation Sampling Test Results

D.1.0 Introduction

All corrective actions were implemented as specified in the CAP (NNSA/NFO, 2016a) and ROTC-1 (NNSA/NFO, 2016c) except as discussed in Section 2.2. For the closure in place sites, the corrective action was implemented by establishing an FFACO UR. No verification samples were required or collected at these sites. This appendix presents the analytical results for the verification soil samples collected at each clean closure release site to demonstrate completion of clean closure activities at the CAU 568 CASs. To determine the potential contamination levels remaining at the clean closure sites after closure activities were completed, the soil samples listed in Table D.1-1 were collected from sample plots in the areas with the highest FIDLER survey reading beneath where the soil/debris piles had been and from the locations where the greatest concentration of lead was removed at the lead locations.

Table D.1-1
Verification Samples

Release	Location	Sample Number
Soil and Debris Piles 03-08-04	C21	AA6C602
	C22	AA6C603
	C23	AA6C604
Lead-Acid Battery 03-26-04	C17	AA6C040
	C91	AA6C041
	C92	AA6C042

A probabilistic sampling approach was implemented for collecting nine aliquots from each 2-by-2-m sample plot. Each 2-by-2-m sample plot composite sample consisted of soil collected from nine randomly located subsample locations within a 3-by-3 grid. All samples were collected from the surface to a depth of 5 centimeters (cm). At the HCA Soil Pile (CAS 03-23-30), results of removable contamination surveys at six locations were all less than HCA criteria. The maximum readings from the removable surveys were 890 dpm/100 cm^2 removable alpha and 400 dpm/100 cm^2 beta/gamma. As HCA conditions are no longer present, it is no longer necessary to assume that removable contamination would cause a dose exceeding the radiological FAL. Therefore, the remaining soil pile material was not removed. Because HCA conditions are no longer present and soil sample results

from this site demonstrated that soil contamination did not have the potential to cause a dose exceeding the FAL, the verification soil sample was not necessary.

This appendix presents the analytical results for the verification samples collected at each release at completion of closure activities at the CAU 568 CASs. The verification sample locations are displayed in Figure D.1-1. All results greater than minimum detectable concentrations (MDCs)/minimum detectable levels (MDLs) from the gamma spectroscopy analyses are reported in Table D.1-2. Also reported in Table D.1-2 are the inferred plutonium isotope activities that were calculated by multiplying the Am-241 activity from the gamma spectroscopy analysis with the ratios of the plutonium isotope activities to the isotopic activities of Am-241 shown in Table D.1-3.
The inference of plutonium isotope activities using americium is related to the nature of these contaminants in soil. These isotopes may be present in soil in the form of small particles that may or may not be captured in a 1- to 2-gram portion of a soil sample as used for isotopic analyses.
As individual particles of these radionuclides have high specific activities, they can make a significant impact on analytical results. This may result in analytical results from the same soil sample that are significantly different (i.e., poor accuracy). However, the americium and plutonium isotopes are co-located (e.g., Am-241 is a daughter product of Pu-241) and the relative concentrations between different samples from the same site (i.e., the ratio of americium to plutonium isotope concentrations) should be equal. Based on process knowledge and demonstrated by analytical results from previously sampled Soils Activity sites, the ratios between americium and plutonium isotopes in soil contamination from any given source is expected to be the same throughout the contaminant plume at any given time. Therefore, if the Am-241 to Pu isotope ratios are known and the activity of Am-241 is known, the activities of the Pu isotopes can be inferred.

Am-241 is reported by the gamma spectrometry method as well as the isotopic americium method. As the gamma spectrometry measurement is based on a much larger soil sample (usually 1 liter), the particle distribution problem discussed above is greatly diminished, and the probability of the result being representative of the sampled site is much improved. Therefore, the isotopic analytical results will be used to establish ratios between the americium and plutonium isotopes and the gamma spectrometry results for Am-241 will be used to infer concentrations of plutonium isotopes using the ratios. These inferred Pu values will be more representative of the sampled area than the isotopic results.

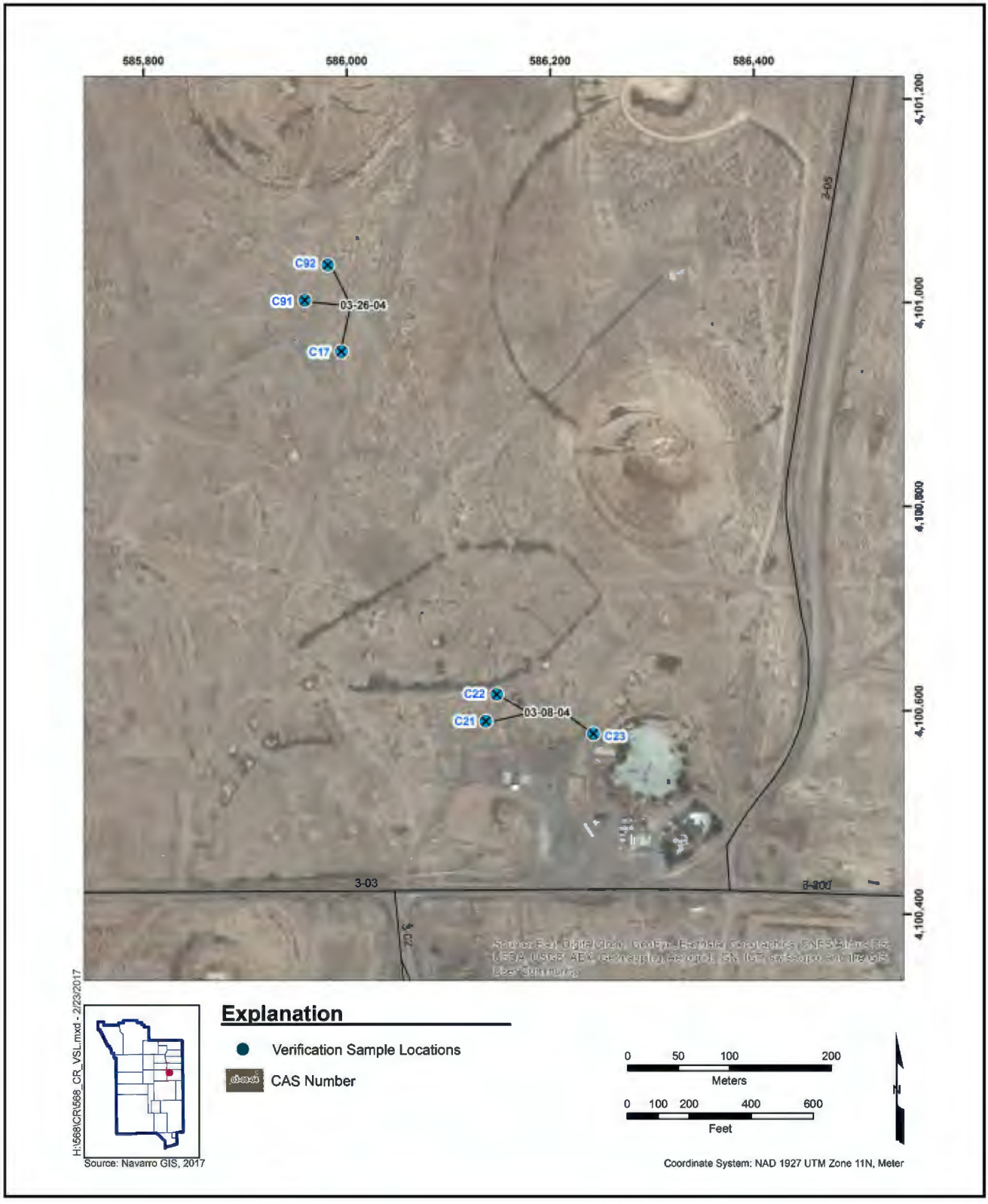


Figure D.1-1
CAU 568 Verification Samples Location Map

Table D.1-2
Verification Sample Results for Radionuclides [a, b]

Release	Location	Analytical Results from Soil Samples (pCi/g)			Inferred Activities from Ratios (pCi/g)		
		Th-232	Am-241	Cs-137	Pu-238	Pu-239/240	Pu-241
Soil and Debris Piles 03-08-04	C21	1.6	17.8	1.4	1.3	99.8	37.3
	C22	1.6	47.6	2.1	3.4	267	99.8
	C23	1.6	7.3	0.6	0.5	40.9	15.3

[a] Results shown are rounded to three significant digits with a limit of one decimal place.
[b] Doses presented here are a conservative estimate of maximum potential dose for decision-making purposes only and are not intended to represent actual doses to a receptor.

Cs = Cesium
pCi/g = Picocuries per gram
Th = Thorium

Table D.1-3
Plutonium Isotope to Am-241 Ratios [a]

Pu-238	Pu-239/240	Pu-241
0.07	5.6	2.1

[a] Although results shown are rounded, all values calculated with these ratios are based on the unrounded numbers.

The ratios of the plutonium isotope activities to the isotopic activities of Am-241 shown in Table D.1-3 were determined by correlating the isotopic plutonium sample results to the corresponding isotopic Am-241 result from CAI analyses. The slopes of the linear regressions resulting from these correlations as shown in Figure D.1-2 are used as the ratios. All results in this appendix are reported using the following protocol:

1. All numbers were rounded to three significant digits for reporting purposes to avoid inferring more confidence in the numbers than is justified; however, the entire (unrounded) numbers were used in calculations.

2. Radionuclide activities are limited to one decimal place (i.e., there is no confidence in, or significance to, hundredths of a pCi/g).

3. Dose results are limited to whole digits (i.e., there is no confidence in, or significance to, tenths of a mrem/yr).

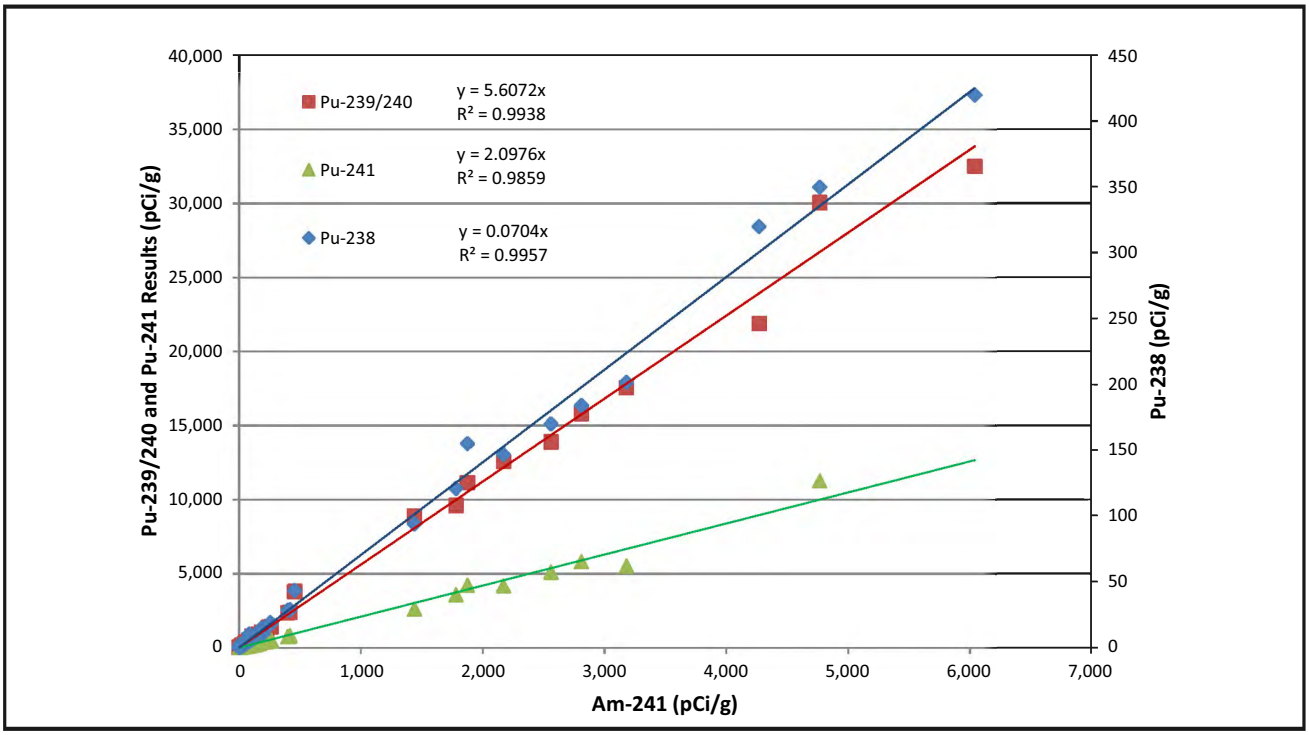


Figure D.1-2
Plutonium Isotope to Am-241 Ratio Correlations

D.1.1 Radiological Dose Calculations

All radiological dose calculations are based on conversion factors that relate isotope activity to radiological dose. These conversion factors represent the radionuclide activity in soil that would result in a 25-mrem/yr dose to a receptor for a specific exposure scenario independent of the presence of any other source of radioactivity. The resulting soil activities are radionuclide-specific conversion factors referred to as residual radioactive material guidelines (RRMGs) that are expressed in units of picocuries per gram (pCi/g).

Because the RRMGs are dependent upon exposure time and exposure pathway, separate sets of RRMGs were developed for the industrial area, remote work area, and occasional use area exposure scenarios defined in the RBCA document and for internal dose (inhalation and soil ingestion pathways) and TED (inhalation, soil ingestion, and external gamma pathways). This was accomplished by converting the 25-mrem/yr dose constraint into soil concentrations using version 6.5 of the RESRAD material code (Yu et al., 2001) with the input parameters presented in the RBCA document. The resulting sets of RRMGs are presented in Table D.1-4.

Table D.1-4
RRMGs (pCi/g)

Scenario - Pathways	Ac-228	Am-241	Cs-137	Pu-238	Pu-239/240	Pu-241
Industrial Area - Internal Dose	3,910	5,190	94,800	4,520	4,140	214,000
Industrial Area - Total Dose	611	2,110	81	4,500	4,120	200,000
Remote Work Area - Internal Dose	23,200	30,800	563,000	26,900	24,600	1,270,000
Remote Work Area - Total Dose	3,630	12,500	484	26,800	24,500	1,190,000
Occasional Use Area - Internal Dose	65,000	86,200	1,580,000	75,200	68,900	3,550,000
Occasional Use Area - Total Dose	11,800	39,000	1,630	74,900	68,600	3,360,000

Ac = Actinium

The TED was calculated as the sum of the internal and external doses at each location. The calculation of TED is not intended to represent the actual dose a receptor might receive from the release site. Due to the many conservative assumptions and the use of conservative input parameter values used in RESRAD for the calculation of RRMGs, the resulting calculated TED values are intentionally inflated. This overestimation of dose provides protection from making false-negative decision errors and compensates for uncertainties.

Internal doses and RRMG-derived TEDs were calculated based on radionuclide analytical results from soil samples and the corresponding RRMGs as presented in Table D.1-4. External dose was calculated as the difference between the internal and RRMG-derived TED values. The internal or total dose associated with any specific radionuclide in a single soil sample was established by dividing the radionuclide activity by the corresponding internal or TED RRMG and then multiplying the result by 25. The internal or total dose (depending upon the RRMG used) for each sampled location was then calculated as the sum of the doses associated with each radionuclide reported as present in the sample. The doses calculated from analytical results are conservatively assumed to be entirely from nuclear testing activities (i.e., no background radioactivity is subtracted from the results).

D.1.2 Internal Radiological Dose

Estimates for the internal dose that a receptor would receive at the contaminated site were determined as described in Section D.1.1 and the Soils RBCA document (NNSA/NFO, 2014). The internal doses for each exposure scenario are presented in Table D.1-5.

Table D.1-5
Internal Dose for Each Exposure Scenario (mrem/yr)[a]

Release	Location	Ac-228	Am-241	Cs-137	Pu-238	Pu-239/240	Pu-241	Total
Soil and Debris Piles CAS 03-08-04	**Industrial Area Exposure Scenario**							
	C21	0	0	0	0	1	0	1
	C22	0	0	0	0	2	0	2
	C23	0	0	0	0	0	0	0
	Remote Work Area Exposure Scenario							
	C21	0	0	0	0	0	0	0
	C22	0	0	0	0	0	0	0
	C23	0	0	0	0	0	0	0
	Occasional Use Area Exposure Scenario							
	C21	0	0	0	0	0	0	0
	C22	0	0	0	0	0	0	0
	C23	0	0	0	0	0	0	0

[a] Although results shown are rounded, all calculated results are based on unrounded numbers.

D.1.3 External Radiological Dose

In accordance with the DQOs presented in the CAP (NNSA/NFO, 2016), verification soil samples were collected and dose was estimated from the verification sample analytical results. As thermoluminescent dosimeters (TLDs) were not used to estimate external doses, the external doses estimated using soil sample results were increased using a correction factor so that they would be more equivalent to the expected external doses that could have been generated by TLDs. This correction factor was developed to more consistently report external dose between sites where TLDs or soil samples were used to estimate external dose based on the observed differences when external dose was estimated using both methods at common locations. Figure D.1-3 plots the external doses

from Soils Activity locations at 15 CAUs where external doses were estimated using both the TLD and soil sample methods. The data in this figure show that the TLD external dose estimates are generally somewhat higher than the external dose estimates from soil samples. Use of the TLD-equivalent external dose is conservative as the regression from these data show that the TLD estimated external doses are generally 1.58 times the estimated external doses calculated from soil sample results. Table D.1-6 presents the RRMG-derived external dose data (the difference between RRMG-derived TED and RRMG-derived internal dose) as well as TLD-equivalent external doses that have been increased using the 1.58 correction factor.

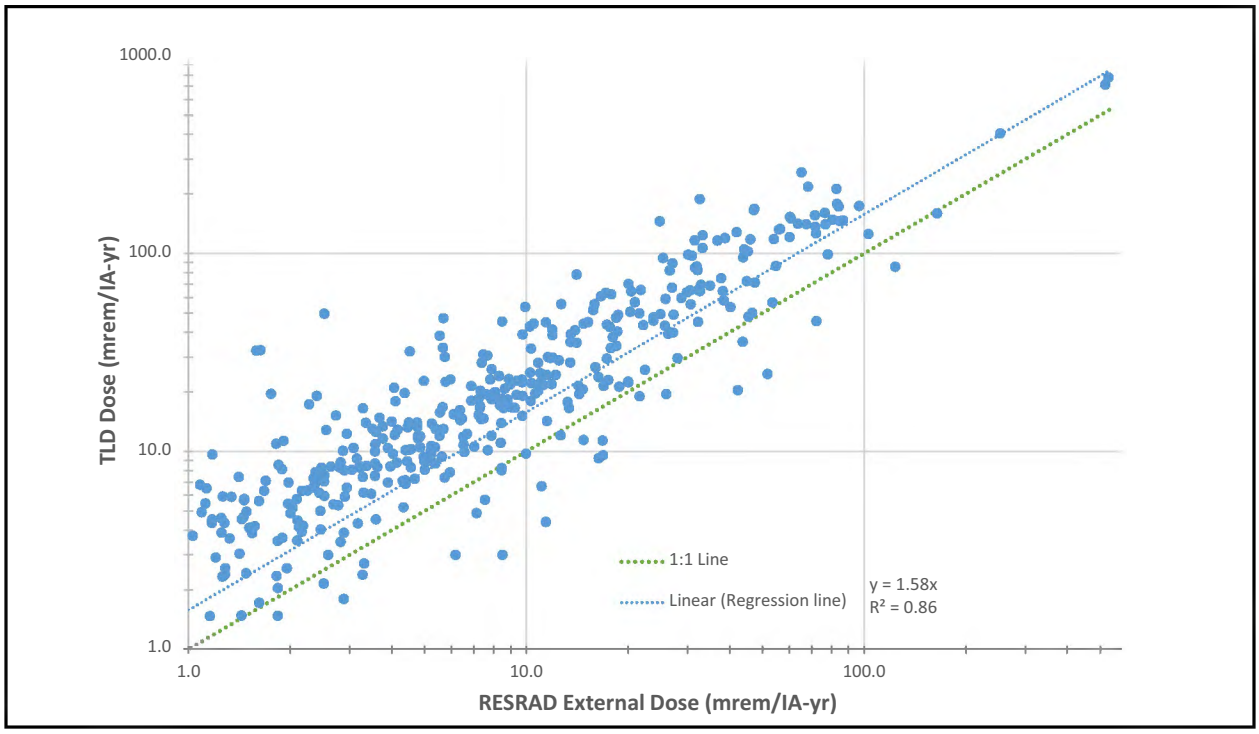


Figure D.1-3
Correlation of TLD External Dose Estimates to RRMG-Derived External Dose Estimates

D.1.4 Total Effective Dose

The TED was calculated by adding the internal dose values listed in Table D.1-5 and the TLD-equivalent external dose values listed in Table D.1-6. Values of the TED for the Industrial Area, Remote Work Area, and Occasional Use Area exposure scenarios are presented in Table D.1-7.

Table D.1-6
External Dose for Each Exposure Scenario (mrem/yr) [a]

Release	Location	Ac-228	Am-241	Cs-137	Pu-238	Pu-239/240	Pu-241	Total	Total (with correction factor of 1.58)
Soil and Debris Piles CAS 03-08-04	**Industrial Area Exposure Scenario**								
	C21	0	0	0	0	0	0	1	1
	C22	0	0	1	0	0	0	1	2
	C23	0	0	0	0	0	0	0	0
	Remote Work Area Exposure Scenario								
	C21	0	0	0	0	0	0	0	0
	C22	0	0	0	0	0	0	0	0
	C23	0	0	0	0	0	0	0	0
	Occasional Use Area Exposure Scenario								
	C21	0	0	0	0	0	0	0	0
	C22	0	0	0	0	0	0	0	0
	C23	0	0	0	0	0	0	0	0

[a] Although results shown are rounded, all calculated results are based on unrounded numbers.

D.1.5 Chemical Contaminants

The analytical results for RCRA metals in samples that exceeded the MDCs are shown in Table D.1-8. No results exceeded a FAL.

Table D.1-7
TED for Each Exposure Scenario (mrem/yr) [a]

Release	Location	Ac-228	Am-241	Cs-137	Pu-238	Pu-239/240	Pu-241	Total	Total (with correction factor of 1.58)
Soil and Debris Piles CAS 03-08-04	**Industrial Area Exposure Scenario**								
	C21	0	0	0	0	1	0	1	2
	C22	0	1	1	0	2	0	3	4
	C23	0	0	0	0	0	0	1	1
	Remote Work Area Exposure Scenario								
	C21	0	0	0	0	0	0	0	0
	C22	0	0	0	0	0	0	0	1
	C23	0	0	0	0	0	0	0	0
	Occasional Use Area Exposure Scenario								
	C21	0	0	0	0	0	0	0	0
	C22	0	0	0	0	0	0	0	0
	C23	0	0	0	0	0	0	0	0

[a] Although results shown are rounded, all calculated results are based on unrounded numbers.

Table D.1-8
Sample Results for Metals

Release	Location	RCRA Metals (mg/kg)					
		Arsenic	Barium	Cadmium	Chromium	Lead	Mercury
FALs		**23**	**190,000**	**9,300**	**33.6**	**5,739**	**43**
Soil and Debris Piles 03-08-04	C21	3.8	200	0.22 (J)	6 (J)	14 (J)	0.018 (J-)
	C22	3.3	220	0.18 (J)	5.3 (J)	14 (J)	0.011 (J-)
	C23	4	430	0.35 (J)	7.5 (J)	17 (J)	0.014 (J-)
Lead-Acid Battery 03-26-04	C17	22 (J)	160	0.37 (J)	4.9	2,000 (J)	0.012 (J)
	C91	7.9 (J)	180	0.11 (J)	5.9	34 (J)	0.012 (J)
	C92	3.4 (J)	140	0.12 (J)	4.8	13 (J)	0.011 (J)

mg/kg = Milligrams per kilogram

J = Estimated value.
J- = The result is an estimated quantity, but the result may be biased low.

D.2.0 References

Navarro GIS, see Navarro Geographic Information Systems.

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

Navarro Geographic Information Systems. 2017. ESRI ArcGIS Software.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2014. *Soils Risk-Based Corrective Action Evaluation Process*, Rev. 1, DOE/NV--1475-Rev. 1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2016. *Corrective Action Plan for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada*, Rev. 0, DOE/NV--1546. Las Vegas, NV.

Yu, C., A.J. Zielen, J.-J. Cheng, D.J. LePoire, E. Gnanapragasam, S. Kamboj, J. Arnish, A. Wallo, III, W.A. Williams, and H. Peterson. 2001. *User's Manual for RESRAD Version 6,* ANL/EAD-4. Argonne, IL: Argonne National Laboratory, Environmental Assessment Division. (Version 7.0 released in April 2014.)

Appendix E

Waste Disposition Documentation

(14 Pages)

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16016** with container numbers **568K01 and 568K04** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		8/29/16
Signature		Date
Robert H Zion	H130	Waste Specialist
Received by	Organization	Title
/s/ Robert H. Zion		08/29/2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16017** with container numbers **568K02 and 568K03** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		8/30/16
Signature		Date
James B. Frick	NNSS	Waste Specialist
Received by	Organization	Title
/s/ James B. Frick		08/30/2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16018** with container numbers **568K07 and 568K08** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		8/30/16
Signature		Date
James B. Frick	NNSS	Waste Specialist
Received by	Organization	Title
/s/ James B. Frick		08/30/2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16019** with container numbers **568K05 and 568K06** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		8/31/16
Signature		Date
James B. Frick	NNSS	Waste Specialist
Received by	Organization	Title
/s/ James B. Frick		08/31/2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16020** with container numbers **568K09 and 568K10** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		8/31/16
Signature		Date
E. TAKAHASHI	NSTec	Sr Scientist
Received by	Organization	Title
/s/ E. Takahashi		31-AUG-2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16021** with container numbers **568K11 and 568K12** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		9/1/16
Signature		Date
Stephen E Wolf	NSTec	Waste Specialist
Received by	Organization	Title
/s/ Stephen E. Wolf		09/01/16
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16023** with container numbers **568K13 and 568K14** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		9-7-16
Signature		Date
James B. Frick	NNSS, Area 5	Waste Specialist
Received by	Organization	Title
/s/ James B. Frick		09/07/2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16024** with container numbers **568K15 and 568K16** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		9-7-16
Signature		Date
E. TAKAHASHI	NSTec	SR SCIENTIST
Received by	Organization	Title
/s/ E. Takahashi		09/08/2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16025** with container numbers **568K17 and 568K18** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		9/13/16
Signature		Date
E. Takahashi	NSTec	Sr Scientist
Received by	Organization	Title
/s/ E. Takahashi		09/13/16
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16026** with container numbers **568K19 and 568K20** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		9-14-16
Signature		Date
JON TANAKA	NSTEC	SUPERVISOR
Received by	Organization	Title
/s/ Jon Tanaka		09-14-2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number ITL16027 with container numbers 568K21 and 568K22 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		9-14-16
Signature		Date
Stephen Wolf	NSTec	Waste Specialist
Received by	Organization	Title
/s/ Stephen E. Wolf		9/14/16
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL16001** with container numbers **550A13; 550A17; 550A18; 550A21; 568A02; 568A03; 568A04; 568A05; 568A06; 568A07; 568A08; 568A10; 571A01; 571A02; 571A03; 571A04; 571A05; 571A06; 571A07; and 571A08** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/17/16
Signature		Date
Ed Takahashi	NSTec	Sr Scientist
Received by	Organization	Title
/s/ E. Takahashi		03/17/2016
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL17001** with container numbers: **568S01 and 568S02** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1-31-17
Signature		Date
Stephen Wolf	NSfoc	Waste Specialist
Received by	Organization	Title
/s/ Stephen E. Wolf		01/31/2017
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000006, Revision 16, shipment number **ITL17002** with container number: **568S03** was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LL Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		2/1/17
Signature		**Date**
James B. Frick	NNSS/Area 5 RWMS	Waste Specialist
Received by	**Organization**	**Title**
/s/ James B. Frick		02/01/2017
Signature		**Date**

Appendix F

Modifications to the Post-Closure Plan

F.1.0 Modifications to the Post-Closure Plan

This appendix does not apply to CAU 568 because the original Post-Closure Plan as presented in the CAU 568 CAP was sufficient.

Appendix G

Use Restrictions

G.1.0 Use Restrictions

Attachment G-1 of this appendix provides details of the URs and figures of the UR boundaries. The UR forms provide information derived from CAI results to assist in the future evaluation of human health and safety risks to potential users of the use restricted areas. Where available, maximum estimated dose and maximum activities of significant dose-producing radionuclides are provided for those locations where samples were collected. Doses and activities may be present at higher levels at locations where samples were not collected.

Attachment G-1

Use Restrictions

(33 Pages)

Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-19, T-3U Contamination Area

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,192	586,251
	4,100,175	586,218
	4,100,236	586,170
	4,100,260	586,199

Depth: Surface to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

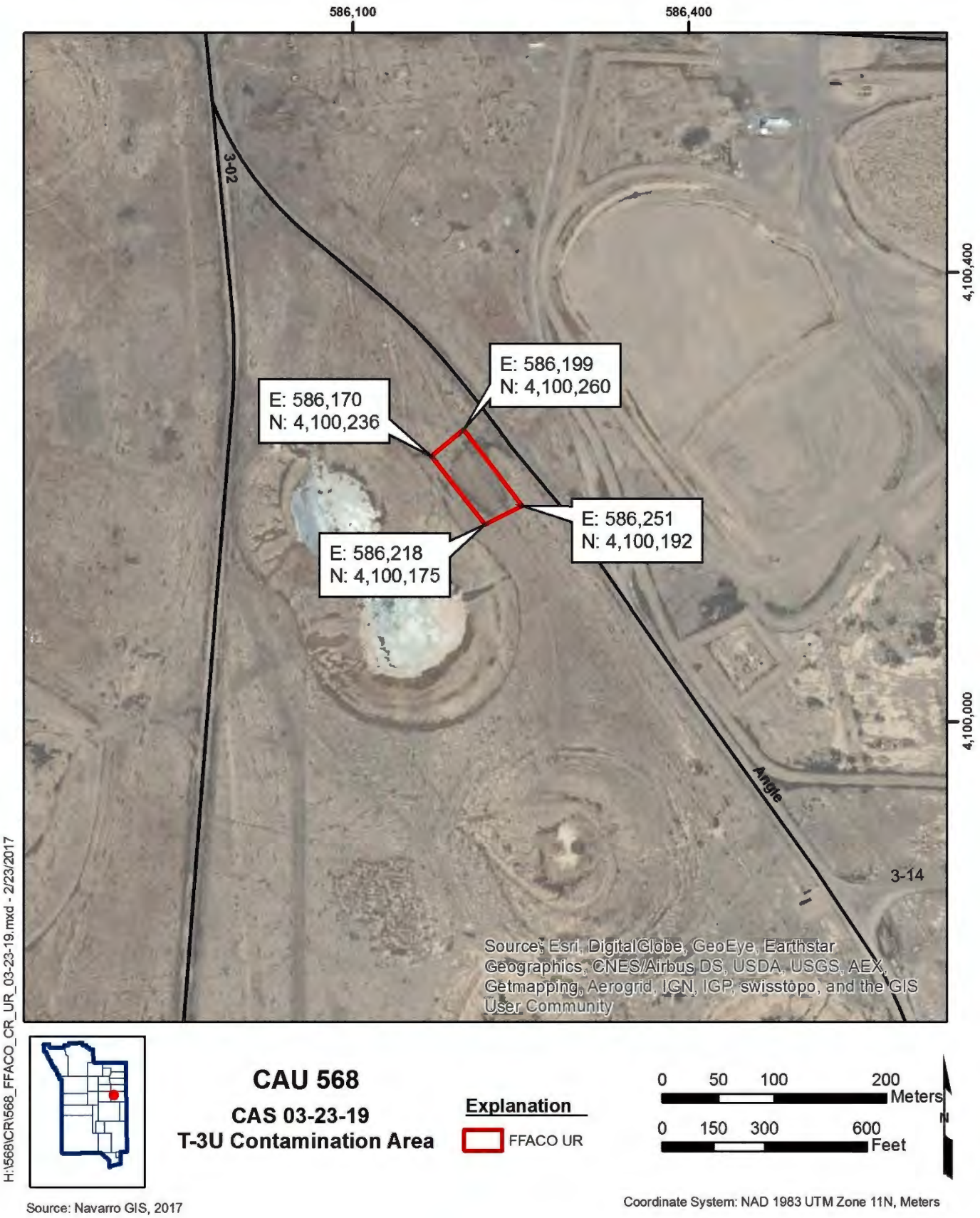
Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. Based on the current land use which is an assumed maximum exposure period of 80 hours per year, the maximum calculated dose rate within this UR was 17.6 mrem/yr. However, contamination is assumed to be present in excess of 25 mrem/yr from the areas identified as exhibiting removable contamination at levels exceeding the posting criterion for a high contamination area. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CADD for CAU 568.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-19, T-3U Contamination Area			
Constituent	**Maximum Concentration**	**Occasional Use Action Level**	**Units**
Americium 243	95	4,410	pCi/g
Plutonium 239/240	32,634	68,600	pCi/g
Americium 241	5,820	39,000	pCi/g

Site Controls: Activities that would cause a site worker to be exposed to radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information



Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,130	586,313
	4,100,091	586,248
	4,100,119	586,254
	4,100,202	586,180
	4,100,231	586,158
	4,100,258	586,131
	4,100,274	586,064
	4,100,257	586,022
	4,100,219	586,003
	4,100,226	585,993
	4,100,250	585,999
	4,100,335	585,999
	4,100,395	585,997
	4,100,468	585,989
	4,100,477	586,008
	4,100,407	586,086
	4,100,321	586,179
	4,100,262	586,228
	4,100,197	586,275

Depth: Surface to 15 cm bgs

Survey Source (GPS, GIS, etc): GIS

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: This administrative use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr in the area identified as exhibiting removable contamination at levels exceeding the posting criterion for a contamination area. Based on a future potential industrial land use which is an assumed maximum exposure period of 2000 hours per year, the maximum calculated dose rate within this UR was 306 mrem/yr. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CAU 568 CADD.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-19, T-3U Contamination Area			
Constituent	**Maximum Concentration**	**Industrial Area Action Level**	**Units**
Americium 243	95	223	pCi/g
Plutonium 239/240	32,634	4,120	pCi/g
Americium 241	5,820	2,110	pCi/g

Use Restriction Information

Site Controls: New activities that would cause a site worker to be exposed to site radiological contamination for a period of more than that of current land use (80 hours per year) are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. This administrative UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. No physical site controls are required for this administrative UR.

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

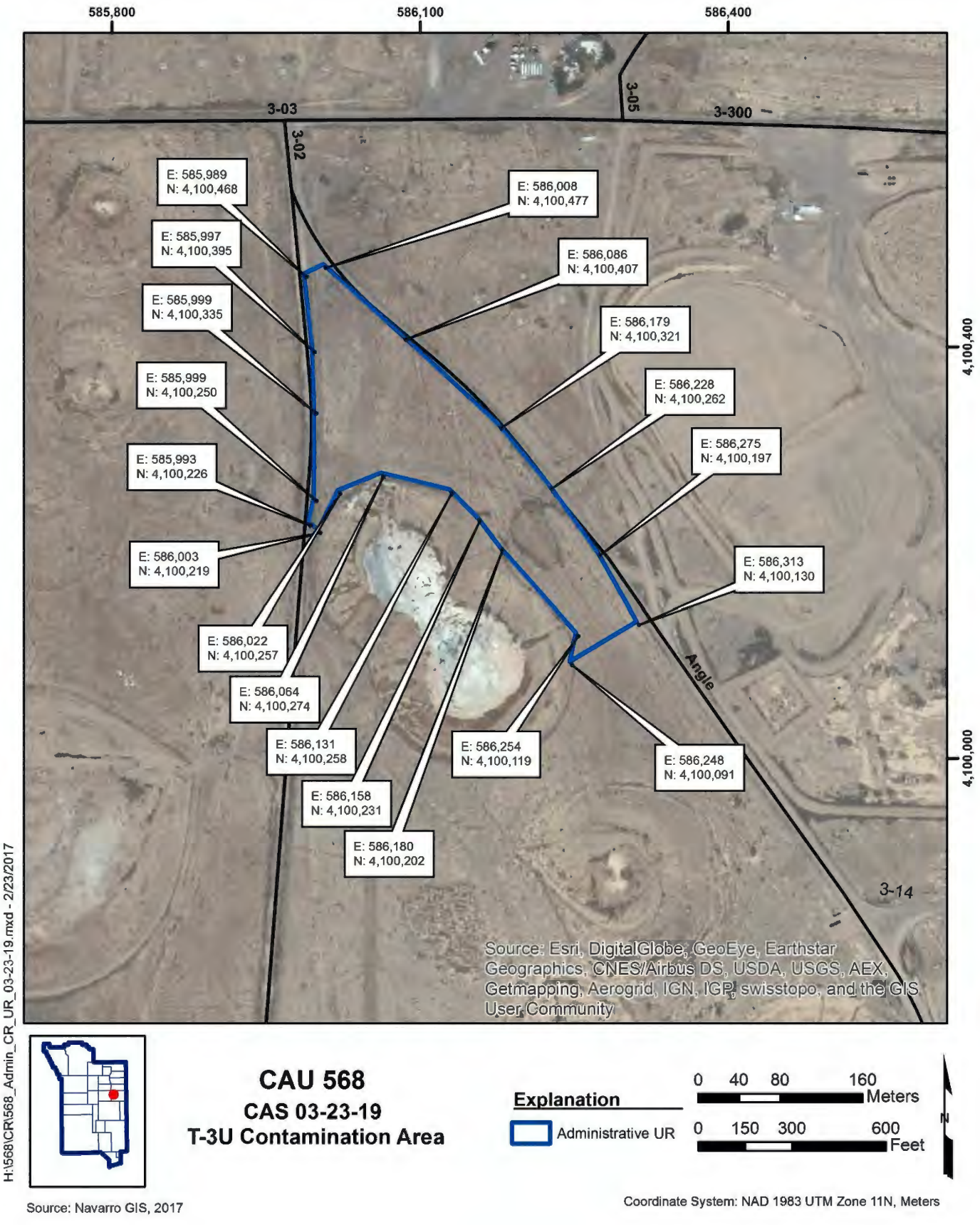
Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information



Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-20, Otero Contamination Area

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,823	586,026
	4,100,822	586,004
	4,100,844	586,003
	4,100,845	586,024

Depth: From 30 cm bgs to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. Based on the current land use which is an assumed maximum exposure period of 80 hours per year, the maximum calculated dose rate within this UR was 8.1 mrem/yr. However, the UR area is assumed to contain subsurface radioactive contamination from safety experiments and is assumed to provide a dose exceeding the action level of 25 mrem/yr if a receptor were exposed to subsurface material. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CADD for CAU 568.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-20, Otero Contamination Area			
Constituent	**Maximum Concentration**	**Occasional Use Action Level**	**Units**
Cesium-137	55.6	1,630	pCi/g
Plutonium 239/240	18,616	68,600	pCi/g
Americium 241	3,320	39,000	pCi/g
Americium 243	114	4,410	pCi/g

Site Controls: Activities that would cause a site worker to be exposed to subsurface radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information

Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
N/A		

Depth: N/A

Survey Source (GPS, GIS, etc): N/A

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: N/A

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-20, Otero Contamination Area			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
N/A			

Site Controls: N/A

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-23, San Juan Contamination Area

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

Pascal-C

UR Points	Northing	Easting
Southeast Corner	4,100,849	586,114
	4,100,836	586,096
	4,100,851	586,088
	4,100,857	586,101

San Juan

UR Points	Northing	Easting
Southeast Corner	4,100,820	585,962
	4,100,819	585,936
	4,100,838	585,941
	4,100,838	585,960

Depth: From 30 cm bgs to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

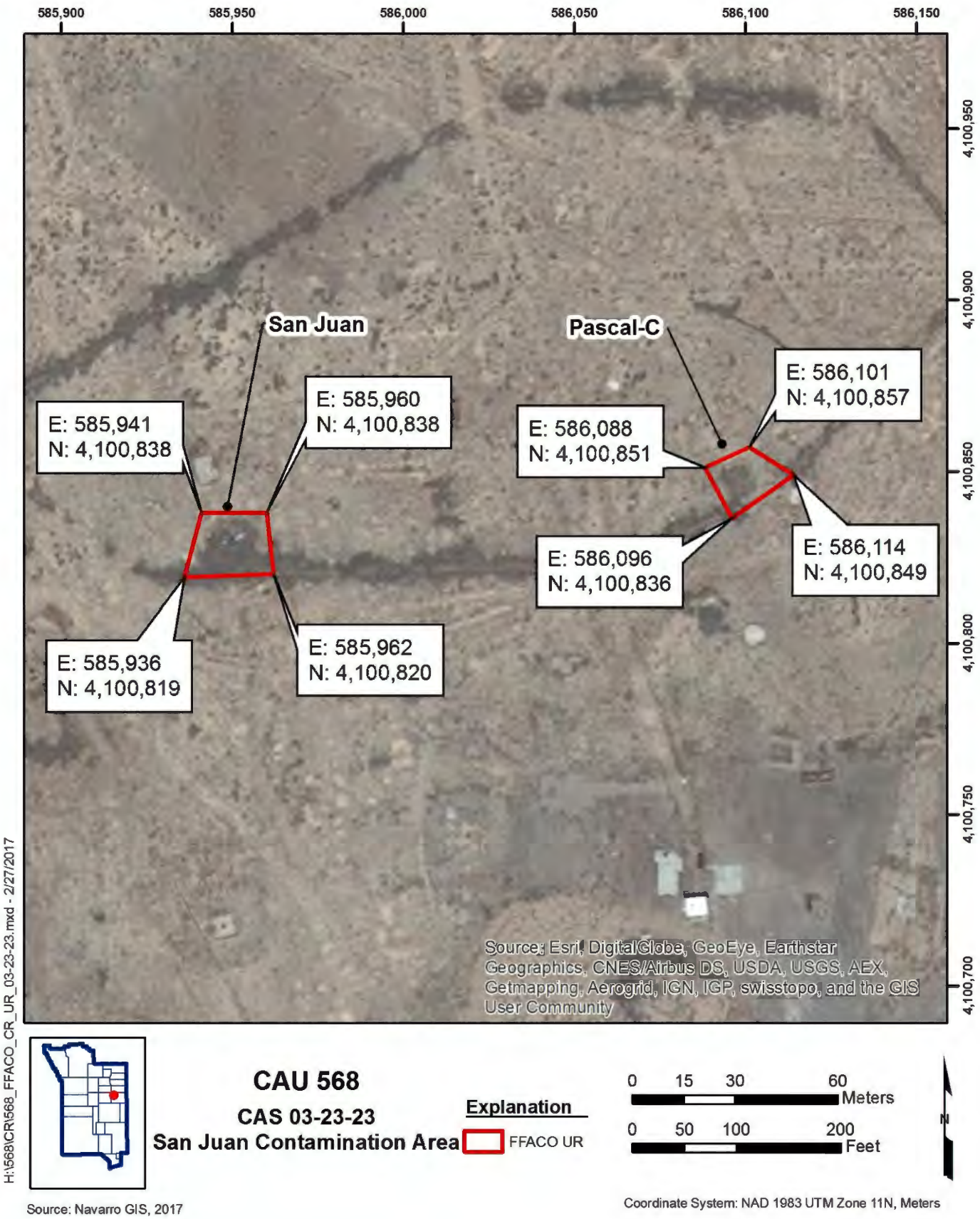
Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. Based on the current land use which is an assumed maximum exposure period of 80 hours per year, the maximum calculated dose rate within this UR was 8.1 mrem/yr. However, the UR area is assumed to contain subsurface radioactive contamination from safety experiments and is assumed to provide a dose exceeding the action level of 25 mrem/yr if a receptor were exposed to subsurface material. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CADD for CAU 568.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-23, San Juan Contamination Area			
Constituent	**Maximum Concentration**	**Occasional Use Action Level**	**Units**
Cesium-137	55.6	1,630	pCi/g
Plutonium 239/240	18,616	68,600	pCi/g
Americium 241	3,320	39,000	pCi/g
Americium 243	114	4,410	pCi/g

Site Controls: Activities that would cause a site worker to be exposed to subsurface radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information



Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,836	586,119
	4,100,816	586,057
	4,100,812	585,996
	4,100,816	585,917
	4,100,863	585,864
	4,100,964	586,031
	4,100,964	586,125
	4,100,906	586,174

Depth: Surface to 15 cm bgs

Survey Source (GPS, GIS, etc): GIS

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: This administrative use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr in the area identified as exhibiting removable contamination at levels exceeding the posting criterion for a contamination area. Based on a future potential industrial land use which is an assumed maximum exposure period of 2000 hours per year, the maximum calculated dose rate within this UR was 145 mrem/yr. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CAU 568 CADD.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-23, San Juan Contamination Area			
Constituent	**Maximum Concentration**	**Industrial Area Action Level**	**Units**
Cesium-137	55.6	81	pCi/g
Plutonium 239/240	18,616	4,120	pCi/g
Americium 241	3,320	2,110	pCi/g
Americium 243	114	223	pCi/g

Site Controls: New activities that would cause a site worker to be exposed to site radiological contamination for a period of more than that of current land use (80 hours per year) are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. This administrative UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. No physical site controls are required for this administrative UR.

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

Use Restriction Information

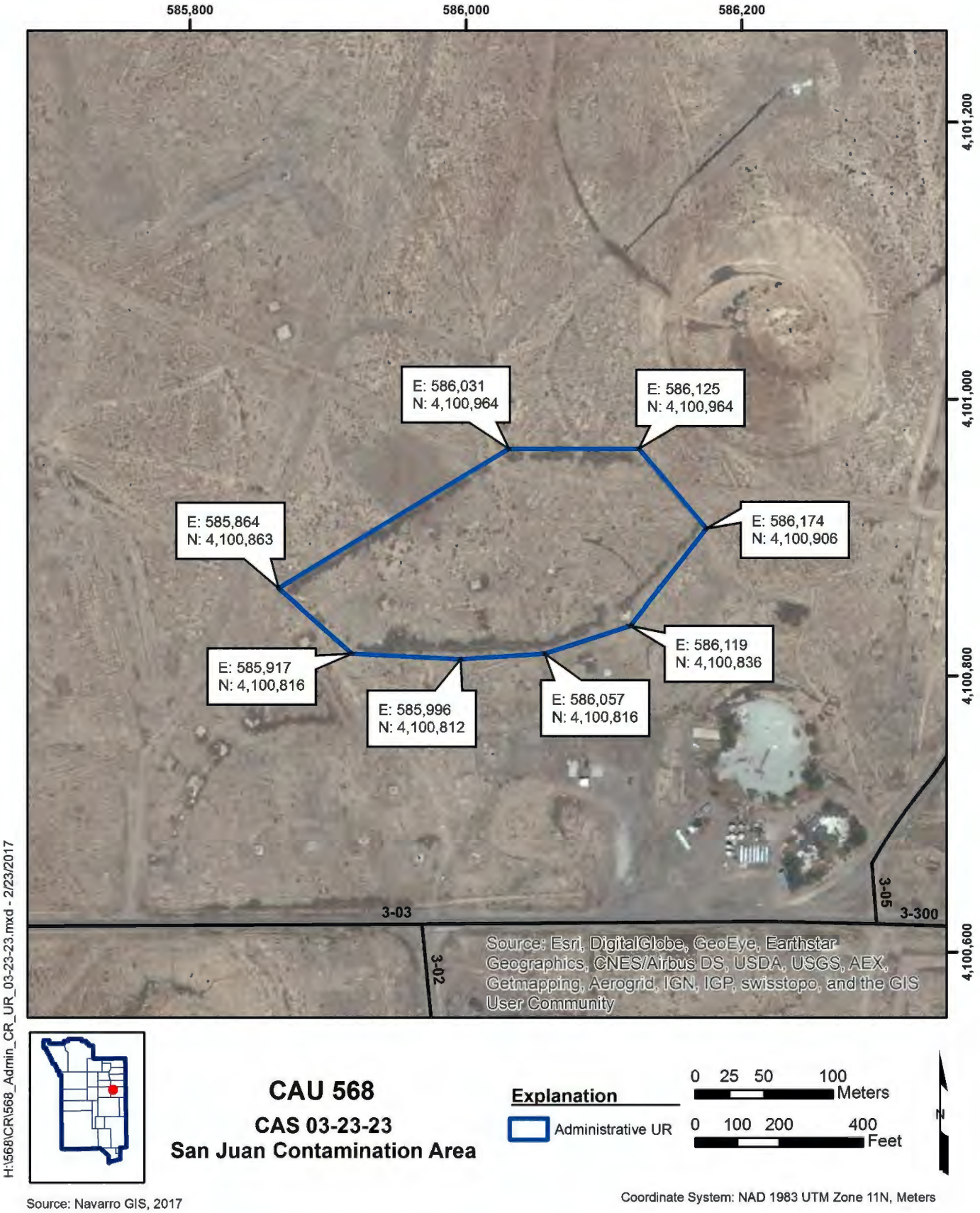
Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information



Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-30, HCA Soil Pile

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
N/A		

Depth: N/A

Survey Source (GPS, GIS, etc): N/A

Basis for FFACO UR(s):

Summary Statement: N/A

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-30, HCA Soil Pile			
Constituent	**Maximum Concentration**	**Occasional Use Action Level**	**Units**
N/A			

Site Controls: N/A

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,862	586,231
	4,100,864	586,225
	4,100,877	586,229
	4,100,875	586,236

Depth: Surface to 15 cm bgs

Survey Source (GPS, GIS, etc): GIS

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: This administrative use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr in the area identified as exhibiting removable contamination at levels exceeding the posting criterion for a contamination area. Based on a future potential industrial land use which is an assumed maximum exposure period of 2000 hours per year, the maximum calculated dose rate within this UR was 144 mrem/yr. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CAU 568 CADD.

Use Restriction Information

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-30, HCA Soil Pile			
Constituent	**Maximum Concentration**	**Industrial Area Action Level**	**Units**
Cesium-137	9.5	81	pCi/g
Plutonium 239/240	13,906	4,120	pCi/g
Americium 241	2,480	2,110	pCi/g

Site Controls: New activities that would cause a site worker to be exposed to site radiological contamination for a period of more than that of current land use (80 hours per year) are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. This administrative UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. No physical site controls are required for this administrative UR.

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: N/A

Inspection/Maintenance Frequency: N/A

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information

Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-31, U-3d Contamination Area

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,712	585,806
	4,100,723	585,792
	4,100,743	585,801
	4,100,766	585,825
	4,100,782	585,850
	4,100,768	585,859
	4,100,743	585,827

Depth: Surface to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

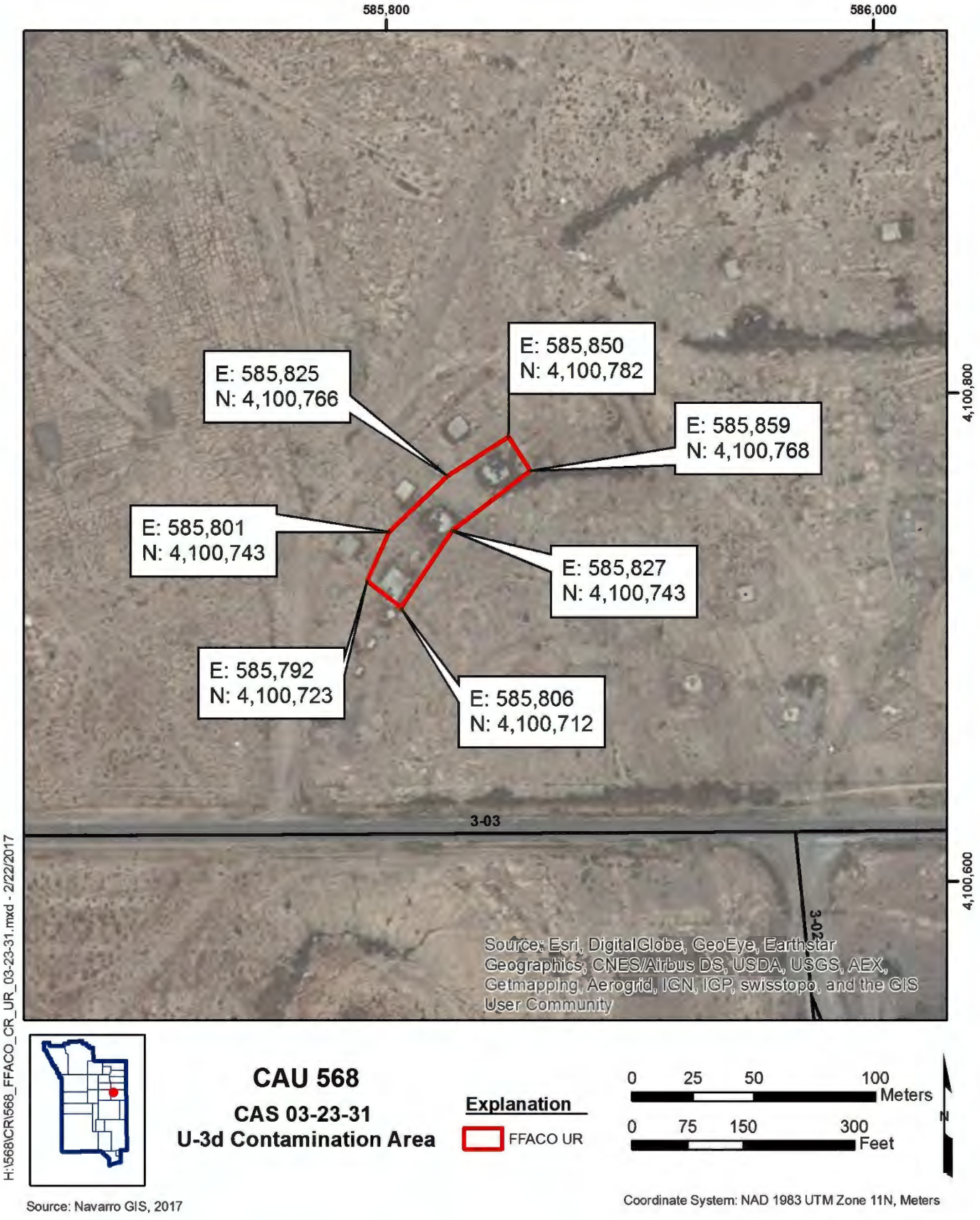
Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. Based on the current land use which is an assumed maximum exposure period of 80 hours per year, the maximum calculated dose rate within this UR was 0.4 mrem/yr. However, the UR area is assumed to contain subsurface radioactive contamination from safety experiments and is assumed to provide a dose exceeding the action level of 25 mrem/yr if a receptor were exposed to subsurface material. Contamination is also assumed to be present in excess of the action level from the areas identified as exhibiting removable contamination at levels exceeding the posting criterion for a high contamination area. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CADD for CAU 568.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-31, U-3d Contamination Area			
Constituent	**Maximum Concentration**	**Occasional Use Action Level**	**Units**
Plutonium 239/240	424	68,600	pCi/g

Site Controls: Activities that would cause a site worker to be exposed to radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information



Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,628	585,969
	4,100,624	585,944
	4,100,624	585,893
	4,100,627	585,806
	4,100,653	585,796
	4,100,676	585,793
	4,100,711	585,800
	4,100,730	585,778
	4,100,734	585,767
	4,100,755	585,775
	4,100,778	585,795
	4,100,809	585,832
	4,100,793	585,849
	4,100,768	585,863
	4,100,770	585,882
	4,100,768	585,902
	4,100,791	585,890
	4,100,802	585,883
	4,100,810	585,887
	4,100,811	585,900
	4,100,804	585,904
	4,100,797	585,905
	4,100,764	585,922
	4,100,748	585,947
	4,100,725	585,967
	4,100,696	585,980
	4,100,674	585,984
	4,100,652	585,979

Depth: Surface to 15 cm bgs

Survey Source (GPS, GIS, etc): GIS

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: This administrative use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr in the area identified as exhibiting removable contamination at levels exceeding the posting criterion for a contamination area. Based on a future potential industrial land use which is an assumed maximum exposure period of 2000 hours per year, the maximum calculated dose rate within this UR was 51.5 mrem/yr. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CAU 568 CADD.

Use Restriction Information

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-31, U-3d Contamination Area			
Constituent	**Maximum Concentration**	**Industrial Area Action Level**	**Units**
Plutonium 239/240	7,345	4,120	pCi/g
Americium 241	1,310	2,110	pCi/g

Site Controls: New activities that would cause a site worker to be exposed to site radiological contamination for a period of more than that of current land use (80 hours per year) are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. This administrative UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. No physical site controls are required for this administrative UR.

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

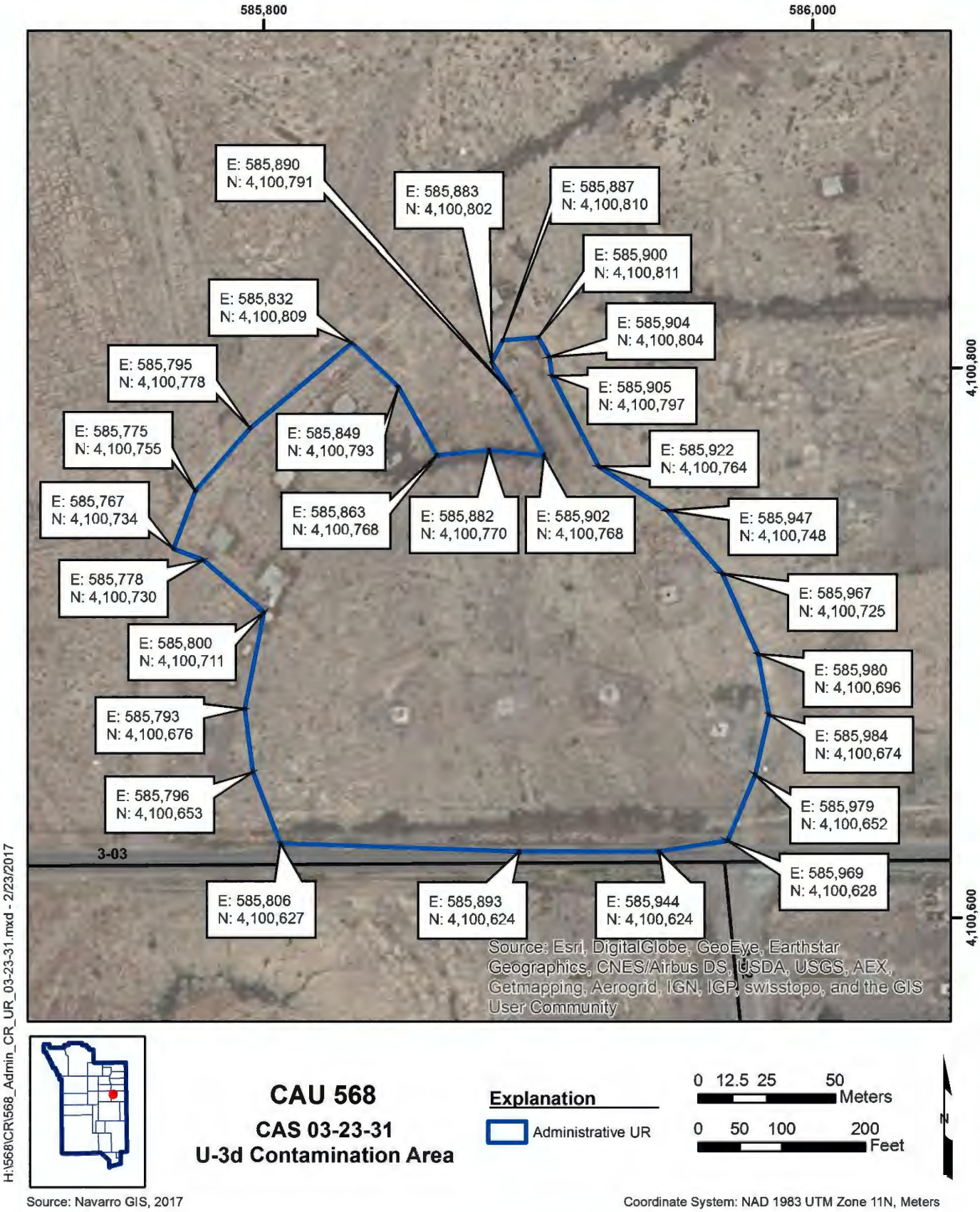
Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information



Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-32, U-3j Test Release

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,101,043	585,878
	4,101,038	585,861
	4,101,053	585,857
	4,101,057	585,874

Depth: Starting from 15 cm bgs to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

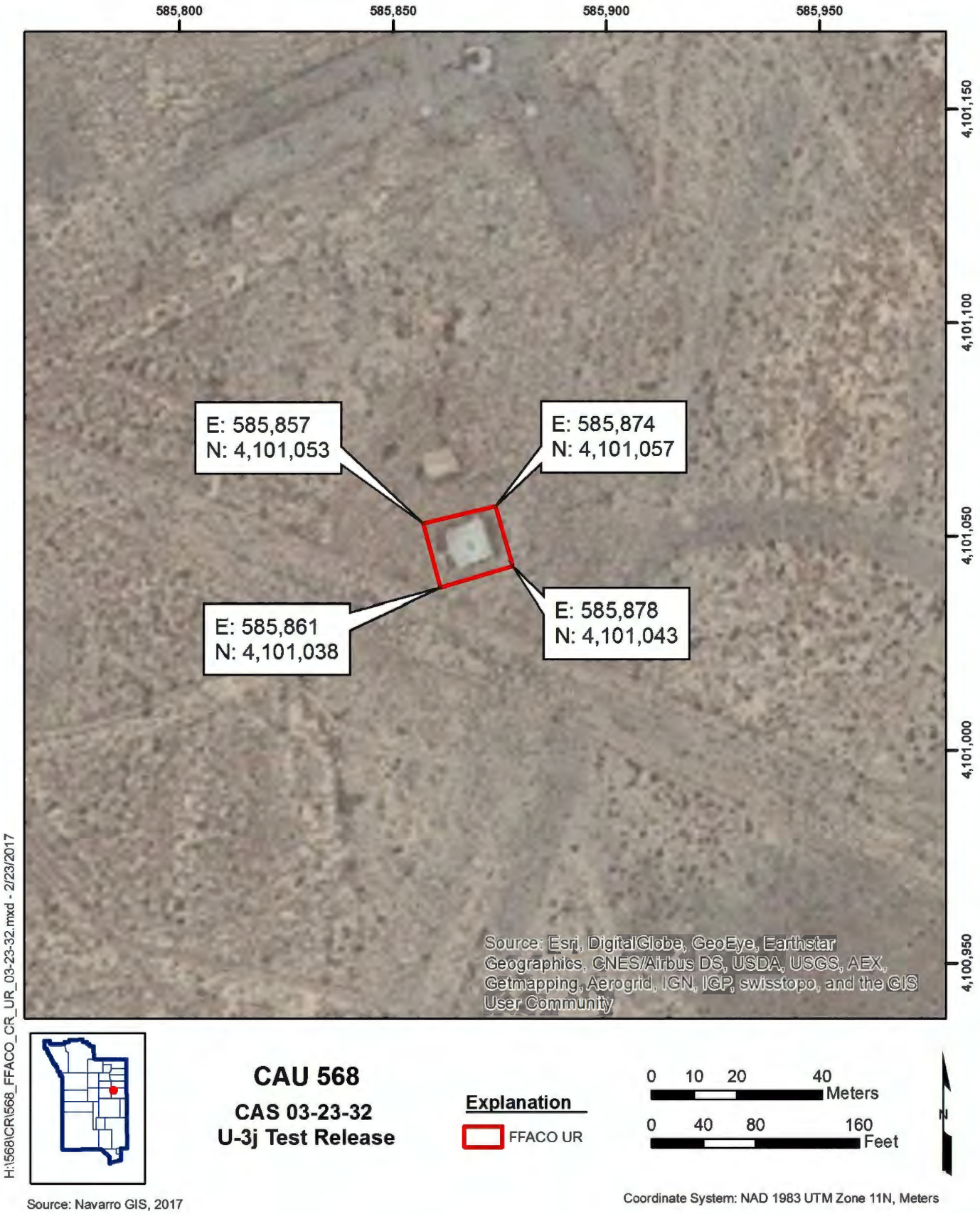
Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. Based on the current land use which is an assumed maximum exposure period of 80 hours per year, the maximum calculated dose rate within this UR was 0.4 mrem/yr. However, the UR area is assumed to contain subsurface radioactive contamination from a safety experiment and is assumed to provide a dose exceeding the action level of 25 mrem/yr if a receptor were exposed to subsurface material. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CADD for CAU 568. This use restriction also protects workers from inadvertent exposure to subsurface radioactive contamination.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-32, U-3j Test Release			
Constituent	**Maximum Concentration**	**Occasional Use Action Level**	**Units**
Plutonium 239/240	836	68,600	pCi/g

Site Controls: Activities that would cause a site worker to be exposed to the subsurface radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information



Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
N/A		

Depth: N/A

Survey Source (GPS, GIS, etc): N/A

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: N/A

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-32, U-3j Test Release			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
N/A			

Site Controls: N/A

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-33, U-3r Contamination Area

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,797	586,193
	4,100,802	586,179
	4,100,818	586,188
	4,100,812	586,200

Depth: From 30 cm bgs to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. Based on the current land use which is an assumed maximum exposure period of 80 hours per year, the maximum calculated dose rate within this UR was 0.9 mrem/yr. However, the UR area is assumed to contain subsurface radioactive contamination from safety experiments and is assumed to provide a dose exceeding the action level of 25 mrem/yr if a receptor were exposed to subsurface material. The maximum concentration of any radionuclide detected in soil samples that could contribute more than 10 percent of the Industrial Area action level is presented in the contaminants table below. The analytical results and locations of all samples are presented in the CADD for CAU 568.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-33, U-3r Contamination Area			
Constituent	**Maximum Concentration**	**Occasional Use Action Level**	**Units**
Americium 243	77.4	4,410	pCi/g
Plutonium 239/240	7,049	68,600	pCi/g
Americium 241	1,257	39,000	pCi/g

Site Controls: Activities that would cause a site worker to be exposed to radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information

Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
N/A		

Depth: N/A

Survey Source (GPS, GIS, etc): N/A

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: N/A

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-33, U-3r Contamination Area			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
N/A			

Site Controls: N/A

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-23-34, U-3ay Contamination Area

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,738	586,021
	4,100,739	586,015
	4,100,745	586,016
	4,100,744	586,023

Depth: From 30 cm bgs to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. Based on the current land use which is an assumed maximum exposure period of 80 hours per year, the maximum calculated dose rate within this UR was less than 0.1 mrem/yr. However, the UR area is assumed to contain subsurface radioactive contamination from safety experiments and is assumed to provide a dose exceeding the action level of 25 mrem/yr if a receptor were exposed to subsurface material. No radionuclide was detected in soil samples that could contribute more than 10 percent of the action level. The analytical results and locations of all samples are presented in the CADD for CAU 568.

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-34, U-3ay Contamination Area			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
N/A			

Site Controls: Activities that would cause a site worker to be exposed to subsurface radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information

Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
N/A		

Depth: N/A

Survey Source (GPS, GIS, etc): N/A

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: N/A

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-23-34, U-3ay Contamination Area			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
N/A			

Site Controls: N/A

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Use Restriction Information

CAU Number/Description: CAU 568, Area 3 Plutonium Dispersion Sites
Applicable CAS Number/Description: CAS 03-45-01, Test Surface Releases

Contact (DOE AL/Activity): EM Soils Federal Activity Lead

FFACO Use Restriction Physical Description:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
Southeast Corner	4,100,662	585,778
	4,100,663	585,766
	4,100,672	585,769
	4,100,672	585,778

Depth: Surface to an undetermined depth

Survey Source (GPS, GIS, etc): GIS

Basis for FFACO UR(s):

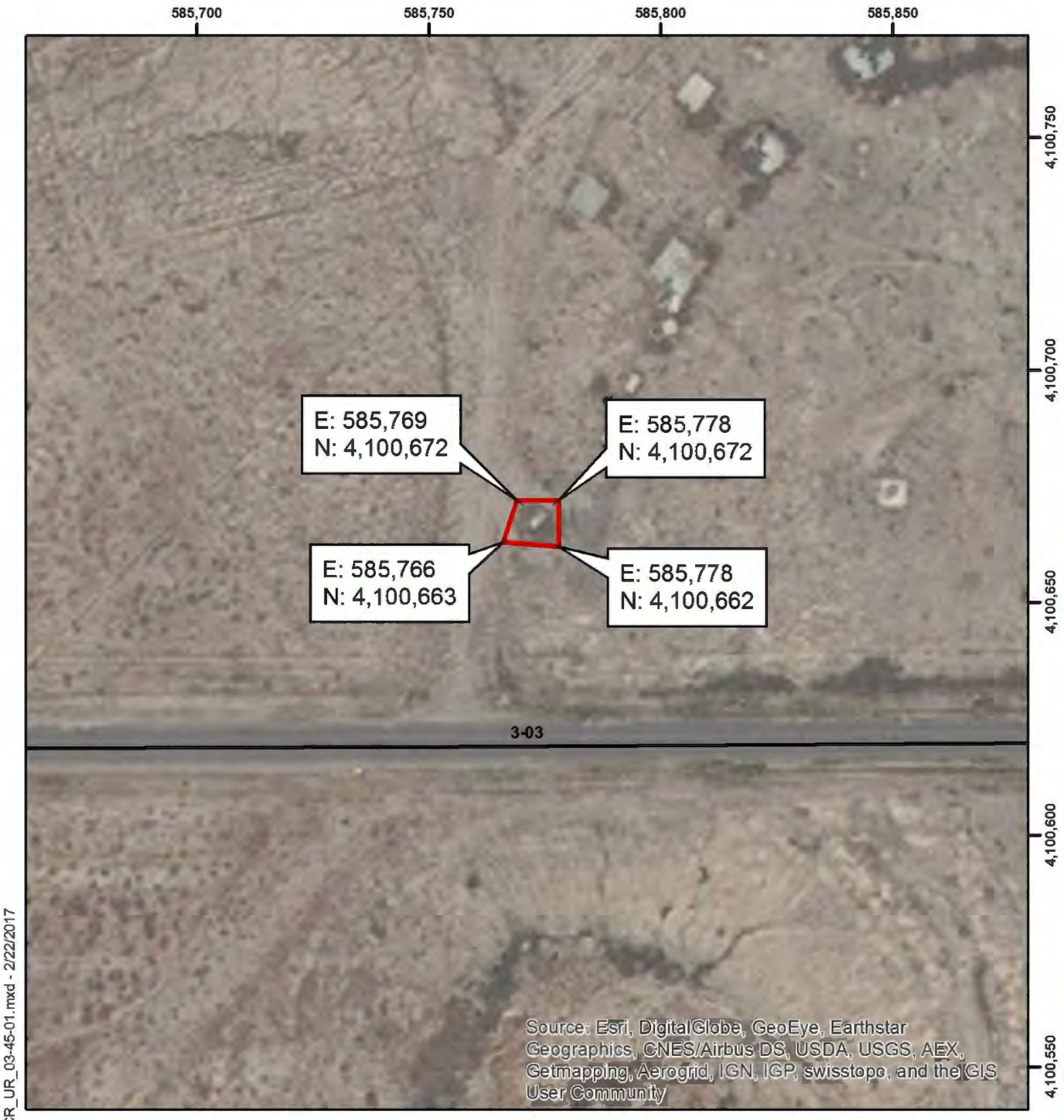
Summary Statement: This FFACO use restriction (UR) is established based on the assumed potential to receive a dose exceeding 25 mrem/yr from contamination that is present at this site. The maximum calculated dose rate was not determined within this UR as soil samples could not be safely collected. However, the UR area is assumed to contain radioactive contamination in excess of the action level.

Contaminants Table:

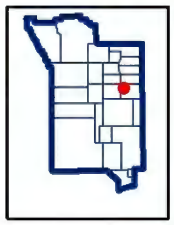
Maximum Concentration of Contaminants for CAU 568 CAS 03-45-01, Test Surface Releases			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
Unknown			

Site Controls: Activities that would cause a site worker to be exposed to radiological contamination are restricted within the area defined by the coordinates listed above and depicted in the attached figure without prior notification and acknowledgment of NDEP unless the activities are conducted under the provisions of 10 CFR Part 835. The FFACO UR is recorded in the FFACO database, M&O Contractor GIS, and the Office of Environmental Management (EM) Nevada Program CAU/CAS files. Warning signs for the FFACO UR are posted outside the boundary of the UR area.

Use Restriction Information



H:\568\CR\568_FFACO_CR_UR_03-45-01.mxd - 2/22/2017



CAU 568

CAS 03-45-01

Test Surface Releases

Explanation

FFACO UR

0 10 20 40 Meters

0 40 80 160 Feet

N

Source: Navarro GIS, 2017

Coordinate System: NAD 1983 UTM Zone 11N, Meters

Use Restriction Information

Administrative Use Restriction Physical Description*:

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Points	Northing	Easting
N/A		

Depth: N/A

Survey Source (GPS, GIS, etc): N/A

*Coordinates for the Administrative Use Restriction exclude the area defined by the FFACO Use Restriction coordinates.

Basis for Administrative UR(s):

Summary Statement: N/A

Contaminants Table:

Maximum Concentration of Contaminants for CAU 568 CAS 03-45-01, Test Surface Releases			
Constituent	**Maximum Concentration**	**Action Level**	**Units**
N/A			

Site Controls: N/A

UR Maintenance Requirements (applies to both FFACO and Administrative UR(s) if Administrative UR exists):

Description: Warning signs for the FFACO UR will be inspected to ensure postings are in place, intact, and legible. Signs will be repaired or replaced as needed.

Inspection/Maintenance Frequency: Inspections will be conducted annually.

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 CR or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: None

Submitted By: /s/ Tiffany A. Lantow **Date:** 06/20/2017

Appendix H

Sample Location Coordinates

H.1.0 Sample Location Coordinates

The center of each verification sample plot at the CAU 568 site was surveyed using a Global Positioning System (GPS) instrument. Survey coordinates for these locations are listed in Table H.1-1.

Table H.1-1
Coordinates for CAU 568 2-by-2-m Sample Plots[a]

Sample Plot/Location	Easting[b]	Northing[b]
C21	586,137	4,100,590
C22	586,148	4,100,616
C23	586,243	4,100,577
C17	585,995	4,100,952
C91	585,959	4,101,002
C92	585,981	4,101,037

[a]All coordinates listed are for the center of the sample plot.
[b]UTM Zone 11, NAD 1927 (U.S. Western) in meters.

NAD = North American Datum
UTM = Universal Transverse Mercator

Appendix I

Nevada Division of Environmental Protection Comments

(17 Pages)

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 568: Area 3 Plutonium Dispersion Sites, Nevada National Security Site, Nevada				2. Document Date: February 20, 2017
3. Revision Number: 0				4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead: Tiffany Lantow				6. Date Comments Due: March 20, 2017
7. Review Criteria: Full				
8. Reviewer/Organization Phone No.: Chris Andres, NDEP, (702) 486-2850, ext. 232 and Scott Page, NDEP, (702) 486-2850, ext. 237				9. Reviewer's Signature:
10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
1.	Section ES, Pages ES-1, 2, 1st Paragraph		Last sentence: this sentence is a bit misleading as there are 23 releases listed in Table ES-1. While it is explained in the paragraph under the table that the corrective action for three releases was "no further action," the three are, nevertheless, releases that were initially identified. Suggest changing "20" to "23."	The CAP only addresses the releases that require corrective action. For clarity, changed "identified corrective action alternatives for 20 releases associated with the 14 corrective action sites" to "present the plan for conducting corrective actions for 20 releases associated with the 11 corrective action sites (CASs)" in this sentence and in the last sentence of the second paragraph in Section 1.0. Deleted CASs 03-23-17, 03-23-22, and 03-23-26 from Table ES-1 and Table 1-1.
2.	Section ES, Page ES-2, 2nd Paragraph		In light of the recent, ongoing discussions regarding the *Soils Activity Quality Assurance Plan* and the changes being discussed, should the second half of this sentence be reworded?	Following "Plan", replaced "which establishes" with "and approved quality assurance programs that establish".
3.	Section 1.0, Page 1, 2nd Paragraph		Last Sentence: see Comment #1	See response to Comment #1
4.	Section 1.0, Page 2, 1st Paragraph		3rd Sentence: the "exception" statement that begins this sentence does not appear in the first sentence of the first full paragraph on Page ES-3. Some reference to the exceptions should be made in the ES.	Added the clarifying text "(with minor deviations as described in this document)" to the sentence on Page ES-3.
5.	Section 1.0, Page 3, Figure 1-1		Suggest adding all three classes of CASs (CC, NFA and CP) to figure, color code by class with a reference to the previous FFACO docs where certain CAS were designated for further disposition. Then add explanation to the revised figure which would clarify and add continuity to decision making process among FFACO documents and process.	For clarification, the CC and CIP sites were identified on the figure. The CAP and CR do not address NFA sites. The following was added to the end of the section: "The Corrective Action Decision Document (CADD) for CAU 568 (NNSA/NFO, 2015) identifies the release sites that require additional corrective action and presents information supporting the selection of corrective action alternatives (CAAs)."
6.	Section 1.2, Page 4, 1st Paragraph		1st sentence: the concrete was covered by a steel case (referred to as "barrier" in Table 2-1) and appropriately signed.	The steel case is not referred to as a barrier in the CAP or the CR. The concrete is the barrier, and the steel was only used as a casing for forming the concrete. Signage other than the use restriction signs are for site informational purposes only and are not part of the FFACO closure.
7.	Section 1.2, Page 4, 2nd Paragraph		1st sentence: see Comments #4 and 2.	This sentence already addresses the deviations and references Section 2.2, Deviations. Replaced "which establishes" with "and approved quality assurance (QA) programs that establish".

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7. Review Criteria: Full				
8. Reviewer/Organization Phone No.: Chris Andres, NDEP, (702) 486-2850, ext. 232 and Scott Page, NDEP, (702) 486-2850, ext. 237				9. Reviewer's Signature:
10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
8.	Section 2.0, Page 8, Table 2-1		a) The "Closure Method" column for CAS 03-23-23, San Juan Well Head Cover states "Closure in Place," as do Tables ES-1 and 1-1. The CADD, Section 4.0, Second Paragraph states clean closure was selected for the well head cover for CAS 03-23-23. Section 2.2 of the CR, as do references to CAS 03-23-23 in the CAP, states the Luna deviation was the same as that implemented for the San Juan well head cover. When, and why, was the recommended correction action for the well head cover for CAS 03-23-23 changed from Clean Closure in the approved CADD to Closure in Place in the CR (and the CAP)? b) The "COCs[a]" column for CASs 03-23-19, 03-23-23, 03-23-30, and 03-23-31 states the following: "Radiological dose based on HCA conditions." This statement infers that the HCA conditions correspond to a radiological dose that exceeds the FAL. This is inconsistent with the CAU 568 CADD and the Decision statement in B.3.1 of the CR. Suggest the following replacement text: "HCA conditions assumed to exceed FALs."	a) All corrective actions were completed as specified in the CAP (as modified by the approved ROTC to the CAP) except as discussed in the Deviations section. See letter to Christine Andres from Robert Boehlecke dated 10/04/2016, "SUBMITTAL OF THE RECORD OF TECHNICAL CHANGE NUMBER DOE/NV--1546-ROTC-I FOR THE FINAL CORRECTIVE ACTION PLAN (CAP) FOR CORRECTIVE ACTION UNIT (CAU) 568: AREA 3 PLUTONIUM DISPERSION SITES, NEVADA NATIONAL SECURITY SITE, NEVADA, REVISION 0, MAY 2016," Approved by Christine Andres on 10/05/2016. For clarity, references to the ROTC were inserted at each CAP reference that related to the ROTC. b) To prevent inference by the reader that HCA conditions correspond to dose, replaced all instances of "radiological dose based on HCA conditions" with "Assumed radiological dose based on HCA conditions".
9.	Section 2.1.1.1, Page 7, 1st Paragraph		1st sentence: restate what constitutes HCA conditions and restate the FAL level.	For additional clarity, replaced the first sentence with: "The Chavez Surface Release (Figure 2-1) is composed of CAS 03-23-17 (contamination area [CA] conditions from a tower shot surface release) and CAS 03-23-19 (a DCB defined by the HCA boundary). This site exhibits HCA conditions (more than 2,000 disintegrations per minute per 100 square centimeters [dpm/100 cm^2] removable alpha contamination) and is assumed to exceed the FAL of 25 millirem per Occasional Use Area year (mrem/OU-yr)."
10.	Section 2.1.1.2, Page 7, 2nd Paragraph		1st sentence: describe the steel casing solution for containing radioactive material; does the "Entombed Radioactive Material Sign" shown in Fig. 2-1 constitute a UR sign or are there additional signs placed?	Inserted following the first sentence: "Steel casings were used as forms for containing and forming the concrete barriers." The "Entombed Radioactive Material" sign shown in Figure 2-1 is for site informational purposes only and is not part of the FFACO closure. Based on the inserted figures from Comments #14 and #18, this figure was renumbered to Figure 2-3.

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11.	Section 2.1.1.2, Page 8, Table 2-1		Column 'COC' and associated footnote: suggest clarifying by CAS when COCs for radiological dose are based on measurements and when they are inferred from HCA conditions and/or buried subsurface contamination.	As stated in the CADD, dose was not detected above 25 mrem/OU-yr in any soil samples collected from CAU 568. Therefore, all COCs were assumed. Added "Assumed" to all radiological COCs in table. Document was revised per response to Comment #8b.
12.	Section 2.1.1.2, Page 7, 2nd Paragraph		a) 2nd sentence: discuss how the well head covers came to be "adjacent" to the emplacement holes instead of placed over them. b) 3rd sentence: this sentence is broken up by 13 pages of tables and figures. Suggest this sentence and section be consolidated, with the tables and figures following, to improve document flow and readability.	a) This section describes the corrective action activities that were conducted. Inserted the following before the last sentence of the second paragraph in Section 1.0: "The steel well head covers were originally welded onto the emplacement holes, and were removed and placed near the emplacement holes after testing activities ended." b) Technical editors address these types of editorial issues in the final document production process.
13.	Section 2.1.1.2, Page 20, 1st Paragraph		Last sentence: cite the exact location in the document where the UR is specified.	Moved the previous sentence: "The FFACO URs for these CASs are included in Attachment G-1." to the end of the paragraph.
14.	Section 2.1.1.3, Page 20, 1st Paragraph		Could a picture of the posted UR warning signs be included in the CR?	Figure has been added as new Figure 2-2.
15.	Section 2.1.1.4, Page 20, 1st Paragraph		Could a picture of the posted UR warning signs be included in the CR?	See response to Comment #14.
16.	Section 2.1.2.1, Page 20, 1st Paragraph		Last Sentence: Section *2.4.1.2, Well Head Covers,* of the CAP also states that "A radiological survey of the area immediately underneath each well head cover will be performed. Results will be reported in the CAU 568 CR." Was a radiological survey of the area performed?	Radiological surveys were performed underneath each well head cover as specified in the CAP. Inserted before the last sentence of this paragraph: "For the Otero site, the field instrument for the detection of low-energy radiation (FIDLER) survey conducted after removal of the well head cover showed that radiological conditions beneath the well head cover were consistent with conditions in the surrounding areas (Figure 2-12). For the Valencia well head cover site, the removable contamination survey conducted after removal of the well head cover showed maximum readings of 1,050 dpm/100 cm^2 removable alpha. As this area was previously identified as a CA, this demonstrates no significant differences in conditions after removal of the well head cover."

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17.	Section 2.1.2.2, Page 20, 1st Paragraph		1st paragraph, 3rd sentence beginning with, "As prescribed in the CAP (NNSA/NFO, 2016a}, verification of the completion of this corrective action was accomplished by conducting a visual inspection, conducting a radiological survey, and collecting a verification soil sample as needed." Section 2.1.2.2 Soil and Debris Piles (CAU 568 CAP RTC 1) states that: "Completion of the correction action for CAS 03-23-30, will be confirmed by evaluating removable contamination levels in the area of the removed soil pile to determine whether levels remain that exceed the removable contamination limits for HCA conditions per the *Nevada National Security Site Radiological Control Manual* (NNSA/NSO 2012a}." This section does not address the removable contamination survey. The removable contamination survey is discussed in Section 2.2 Deviations from CAP as Approved. Move the removable survey discussion from the deviation section to this one.	To clarify the use of HCA conditions as an indicator of when to assume corrective action is necessary and clarify why a sample was not collected at the HCA soil pile, replaced Section 2.1.2.2 with the following: "2.1.2.2 Soil and Debris Piles Soil and debris associated with CAS 03-08-04 (Figure 2-1) were removed as part of the corrective action activities. Soil and debris were excavated and disposed of as low-level waste (LLW) at the Area 5 RWMC. As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by conducting a visual inspection, conducting a radiological survey, and collecting a verification soil sample if needed. Waste disposal documentation is located in Appendix E. Figures 2-13 through 2-15 show the three soil/debris piles associated with CAS 03-08-04 before, during, and after the removal of the soil and debris piles. A FIDLER radiation survey was conducted over the excavated areas after the removal activities were complete. The results of the FIDLER survey are presented in Figure 2-12. A verification sample was collected from each of the three soil piles (AA6C602 at location C21, AA6C603 at location C22, and AA6C604 at location C23). Each sample was collected from a 2-by-2-meter (m) sample plot using the methodology defined in the Soils RBCA document for sample plots (NNSA/NFO, 2014b). The locations of these sample plots were selected as the areas with the highest radiological readings within the footprint of each removed pile. Each verification sample was composed of nine aliquots (i.e., subsamples that were blended together and from which the verification sample was collected). The locations within the sample plots (from which the nine aliquots were collected) were selected using an unbiased random start, triangular grid technique. Sample results are located in Appendix D. 2.1.2.3 HCA Soil Pile Soil and debris associated with CAS 03-23-30 (Figure 2-1) were removed as part of the corrective action activities. Soil and debris were excavated and disposed of as LLW at the Area 5 RWMC. As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by conducting a visual inspection, conducting a radiological survey, and collecting a verification soil sample if needed. Waste disposal documentation is located in Appendix E. A FIDLER radiation survey was conducted over the excavated areas after the removal activities were complete. The results of the FIDLER survey are presented in Figure 2-12. Note that although relative levels of radioactivity are elevated at the HCA pile, dose is still well below the FAL, and the area is controlled as a CA. As documented in the CADD (NNSA/NFO, 2015) and the CAP (NNSA/NFO, 2016a), only the metallic debris exhibited HCA conditions and was the subject of the corrective action. After the metallic debris was removed using FIDLER screening as specified in the CAP, additional FIDLER screening did not indicate the presence of additional debris items. The removal of all radioactivity exceeding the HCA criteria was confirmed by removable contamination surveys. Results of removable contamination surveys at six locations were all less than HCA criteria. The maximum readings from the removable surveys were 890 dpm/100 cm^2 removable alpha and 400 dpm/100 cm^2 beta/gamma. Because metallic debris was completely removed (along with some associated soil), the planned verification soil sample was not necessary, as soil in the area was already characterized in the CADD and shown to be below the radiological FAL. This deviation does not affect the DQO decision criteria, as all material that exceeded HCA criteria was removed during the corrective action. Therefore, it is no longer necessary to assume that dose is present at levels exceeding the FAL."
18.	Sections 2.1.1.3 through 2.1.2.2,		Ensure that figure references are given for the cited sections.	Inserted Figure 2-1 from the CAP in Section 2.1.1, and inserted a reference to that figure in each of these sections.

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7. Review Criteria: Full				
8. Reviewer/Organization Phone No.: Chris Andres, NDEP, (702) 486-2850, ext. 232 and Scott Page, NDEP, (702) 486-2850, ext. 237				9. Reviewer's Signature:
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	Page 20			
19.	Section 2.1.2.2 and Figures 2-11 through 2-15, Pages 20, 22-26, Figures 2-11 through 2-13		To be consistent with earlier figures, label: a) All figures with CAS 03-08-04 b) Figures 2-11 through 2-13 as "Before" c) Figures 2-14 and 2-15 as North, Northwest or Area as was used for Figures 2-11 through 2-13	a) Added CAS 03-08-04 to figure titles b) Added before and after pictures to the soil pile figures, and labeled them as Piles #1, #2, and #3. New figures for each soil pile are Figures 2-13, 2-14, and 2-15. c) To be consistent with all figures, removed North, Northwest, and Area designators from the figure titles, as all sites are North and West of the mud plant and in the area of the mud plant.
20.	Section 2.1.2.2, Page 21, 1st Paragraph		Second last sentence: Section 2.4.1.3, Soil and Debris Piles, of the CAP states "Removal of contaminated soil and debris at CAS 03-08-04 will be confirmed through visual inspection, and by conducting a radiological survey and collecting confirmation composite samples in the areas of highest radiological survey levels detected during the survey (Section 2.1.2.2). Samples will be analyzed for gamma spectroscopy and RCRA metals, and any other biasing factors identified within the piles. A minimum of one composite plot sample will be established in the location of highest radiological readings at each soil and debris pile." These sentences from the CAP are contradictory to this sentence in the CR, which states, "Composite verification samples consisting of nine aliquots from 2-by-2 meter (m) sample plots were collected from unbiased locations at the former location of each pile, and were analyzed using gamma spectroscopy and for Resource Conservation and Recovery Act (RCRA) metals." (bold added) Explain the difference between the work outlined in the approved CAP and that reported in the CR.	There is no difference between the work outlined in the approved CAP and that reported in the CR. Sampling was implemented as specified in the CAP. For added clarity, the sentence was reworded as shown in the response to Comment #17.

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21.	Figure 2-16, Page 27		Visually, it appears significant radioactive contamination is still present at CAS 03-23-20 even after post corrective action based, on the current MOB scale. The reader cannot draw conclusions based on the scale and figure as to what the color values represent in relation to background (i.e., what is contaminated and what is not). Additionally, there is no description of the meaning/purpose of the figure. Suggest including the mean background count rate, the location of the background reference areas, and provide a textual discussion explaining Figure 2-16 and how it supports the closure activity verification.	See response to Comment #17, which contains the following note: "Note that although relative levels of radioactivity are elevated at the HCA pile, dose is still well below the FAL, and the area is controlled as a CA." Added background count rates, the location of the background reference, and CAS names to the figure. Also, the color values were changed to be the same as the pre-corrective action HCA soil pile figure in the CADD. Based on figure changes resulting from these comments, this figure was renumbered to Figure 2-12.

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22.	Section 2.1.2.3, Page 28, 1st, 2nd, and 3rd Paragraphs		a) 1st Paragraph, 1st Sentence: should the phrase "associated soil" be replaced with "lead- contaminated soil"? b) 1st Paragraph, Last sentence: reference and identify the sample numbers. c) 2nd Paragraph: explain how sample plots collected from "unbiased locations" could have been taken from locations with "the greatest amount" of lead shot present? d) 3rd Paragraph: insert reference to Table 3-1. e) 3rd paragraph: explain why this waste was classified as mixed low-level waste (MLLW) instead of RCRA hazardous waste, by including a discussion of the following: did this waste stream meet the definition of 0008 hazardous waste, meaning it failed (or was presumed it would fail by process knowledge) the TCLP test for RCRA metals? Why was it necessary to ship this waste stream offsite "for treatment and disposition" instead of disposing it in Area 5 NNSS (Sec. 3.2)?	a) Changed the first sentence to: "Lead and lead-contaminated soil..." b) Added sample and location numbers for all of the soil pile and lead samples described under Section 2.1.2. c) The CAP and CR are consistent in stating that all sample plots will be biased to locations of features or the highest radioactivity. They are also consistent in stating that all subsamples within sample plots are from unbiased locations. Throughout all past Soils Activity CAUs, sample plots have never been selected from unbiased locations. The protocol for sample plots is defined in the Soils RBCA document that sample plots locations are selected judgmentally and the subsample locations are selected probabilistically. For additional clarity, the third and fourth sentences of this paragraph were replaced with the following: "As prescribed in the CAP (NNSA/NFO, 2016a), completion of this corrective action was verified by collecting two verification soil samples (AA6C041 and AA6C042). Each sample was collected from a 2-by-2-m sample plot (locations C91 and C92) using the methodology defined in the Soils RBCA document for sample plots (NNSA/NFO, 2014b). The locations of these sample plots were selected as the areas with the greatest accumulation of lead shot (biased locations determined judgmentally from a visual survey). Each verification sample was comprised of nine aliquots (i.e., subsamples that were blended together and from which the verification sample was collected). The locations within the sample plots (from which the nine aliquots were collected) were selected using an unbiased random start, triangular grid technique." d) This paragraph was replaced with: "The characterization, management, and disposal of the wastes generated by this corrective action are described in Section 3.2." This is consistent with the FFACO outline. e) See response to Comment #22d.

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23.	Section 2.2, Page 28, 1st Paragraph		2nd sentence: provide a summary of quantitative data on the "high levels of removable contamination" and the radionuclides comprising removable contamination.	The deviation was based on safety concerns from experienced radiological technicians. As expected from a safety shot test, over 96% of the activity in the grab sample from the Luna site was composed of Am-241 and Pu isotopes. To make this more clear, the second sentence was changed to: "While preparing to remove this well head cover, safety concerns were raised during a scoping survey regarding the potential to expose workers to airborne radioactivity due to the disturbance of high levels of removable contamination (mainly composed of americium [Am]-241 and plutonium isotopes)."
24.	Section 2.2, Page 31, 1st Paragraph		4th sentence beginning with, "After the Metallic debris was removed....": should conditions change (future land use) additional surveys may be required. Can this FIDLER data be included in the Closure Report for future reference? Including post-closure FIDLER survey data in the report may be appropriate because material was removed based on the FIDLER survey(s).	Yes, Figure 2-12 was revised to better display the post removal FIDLER data. To clarify the deviation to the CAP, replaced this paragraph with the following: "The CAP specified that a confirmation composite sample would be collected in the area of highest radiological survey levels at the HCA soil pile associated with CAS 03-23-30. As explained in the CADD (NNSA/NFO, 2015) and the CAP (NNSA/NFO, 2016a), the contamination that required corrective action at this site was the presence of high levels of removable contamination associated with metal debris on the pile. As was shown in the CADD, radiological dose from soil at the HCA soil pile is well below the FAL. The maximum of the 95 percent upper confidence limit results from composite soil samples taken from this site (samples C507 and C685 to C688) was 9 mrem/OU-yr. As documented in the CADD and the CAP, only the metallic debris exhibited HCA conditions and was the subject of the corrective action. After the metallic debris was removed using FIDLER screening as specified in the CAP, additional FIDLER screening did not indicate the presence of additional debris items. The removal of all radioactivity exceeding the HCA criteria was confirmed by removable contamination surveys. Because metallic debris was completely removed (along with some associated soil), the planned verification soil sample was not necessary, as soil in the area was already characterized in the CADD and shown to be below the radiological FAL. This deviation does not affect the DQO decision criteria, as all material that exceeded HCA criteria was removed during the corrective action. Therefore, it is no longer necessary to assume that dose is present at levels exceeding the FAL."
25.	Section 3.1, Page 33, 2nd Paragraph		2nd paragraph, 1st sentence: DOE programmatic question: describe in the CR, disposition of CAU 568 files and how they will be made available for future reference to waste disposed and site characterization.	Replaced first sentence with: "The amount, type, and source of waste placed into each container were recorded in waste management records that are maintained in the CAU 568 file and submitted to a Records System that is compliant with DOE Order 243.1B, Administrative Change 1 (DOE, 2013)."

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26.	Section 3.1, Page 33, 3rd Paragraph		1st bullet: insert after "elemental" and before "lead debris" the phrase "hazardous waste".	Replaced first bullet with the following two bullets: "• Mixed low-level waste (MLLW) debris consisting of lead bricks, lead plates, and broken lead acid batteries. These debris items were collected and treated on site via macroencapsulation before disposal at the Area 5 RWMC." "• MLLW consisting of radiologically contaminated soil with lead shot. This waste was removed, packaged, and transferred to the management and operating (M&O) contractor for offsite treatment and disposal."
27.	Section 3.1, Page 34, Table 3-1		a) 1st row: this waste stream was previously described as including "associated soil." Does this mean "lead-contaminated" soil? If so, suggest revising Waste Item description accordingly. b) 1st row, last two columns: MLLW stream appears to have been generated around Sept 2016 (Table 2-2), but this table suggests at the time this document was drafted, the waste had not been transported for offsite disposal. Explain.	a) Changed "(Lead Shot)" to "(Soil with Lead Shot)". b) This waste is pending disposal. Final disposal information will be provided in an ROTC after final disposition of the waste.

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28.	Section 3.2, Page 35, 1st Paragraph		a) 1st sentence: briefly describe how "process knowledge" was used to characterize this waste, i.e., what is known about the waste's origin and properties, how it was released to the ground, and what inferences were made to classify it as RCRA hazardous waste for the toxicity characteristic of lead. b) 1st bullet, 2nd sentence: after "debris items," add "broken lead battery, lead shot, and lead- contaminated soil" c) 2nd bullet: briefly describe the use of "process knowledge" in this case; clarify that the lack of visual inspection "staining" was the only method used to rule out hazardous or chemical contamination.	a) The detailed information about how each waste type was characterized is contained later in this section. See responses to Comment #28b and 28c. b) Replaced first bullet with the following: "• The lead and associated soil waste was characterized as MLLW because the soil directly below the lead shot failed Toxicity Characteristic Leaching Procedure (TCLP) analysis for lead and was assigned the U.S. Environmental Protection Agency (EPA) hazardous waste code D008 (CFR, 2017b). The only detected results of the TCLP analysis for sample number C512 were arsenic at 1.1 milligrams per liter (mg/L) and lead at 1,000 mg/L. The radiochemical analysis results also indicated the soil exceeded the Performance Objective Criteria (POC) for the unrestricted release of radiological material (BN, 1995). Therefore, the waste was characterized and managed as MLLW. The treatment standard for remediated MLLW that consists of mainly soil requires stabilization to meet land disposal restrictions requirements. The Area 5 RWMC currently does not have a permit that allows this kind of treatment method. Therefore, the waste was removed, packaged, and transferred to the M&O contractor for offsite treatment and disposition." c) For additional clarity, the second bullet was replaced with the following: "• The PPE and disposable sampling equipment that were used inside of radiologically posted areas were characterized as LLW based on the required assumption that any waste generated in a radiologically controlled area is radiologically contaminated. The process knowledge included a visual inspection of the PPE and sampling equipment conducted before packaging. The visual inspection verified that the PPE and sampling equipment did not contain any discoloration or staining, that might indicate the items may have become contaminated with hazardous and/or chemical contamination. The visual inspection also verified that the PPE and sampling equipment did not contain any significant amounts of residual material (i.e., soil) adhering to the PPE further assuring that the waste did not contain any significant amounts of potentially contaminated soil. Therefore, the PPE and disposable sampling equipment waste was characterized as LLW."

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10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
29.	Section 4.0, Page 37, 1st and 2nd Paragraphs		a) 1st paragraph: A phrase should be added at the end of the first sentence stating that were two (or whatever the number is after comments above have been addressed) deviations to the corrective actions specified in the CAP, with a reference to the applicable Section in the CR. b) 2nd paragraph: The bullets made need to be changed or added based on resolution of some comments made above. c) 3rd bullet: To be consistent with the first two bullets, include the results of the visual surveys.	a) Added to the end of the first sentence: "except as discussed in Section 2.2." b) Replaced the first sentence of the second bullet with: "Verification sampling at the Soil and Debris Piles was conducted to verify that contamination is less than FALs." The following new bullet was inserted after the second bullet: "Removable contamination surveys were completed at the HCA Soil Pile after removal of the debris and associated soil. As HCA conditions are no longer present at the HCA Soil Pile, it is no longer necessary to assume that removable contamination would cause a dose exceeding the radiological FAL. " c) Added to the end of the last bullet: "Visual surveys verified that the well head covers had been removed."
30.	Section 4.1.1, Page 39, 3rd Paragraph		Last sentence: "The chemical FALs...." Appendix D of the CAP is the NDEP resolution of comments. Chemical FALs are discussed in Appendix D of the CADD. The only location the Chemical FALs could be found was in Appendix D of this CR. Suggest adding a note here to indicate that Chemical FALs are found in Appendix D of this CR for comparison to verification sample results - providing the reader confirmation that after PSM removal the verification sample results were below the FALs.	All FALs were established in Appendix D of the CADD. Changed "CAP (NNSA/NFO, 2016a)" to "CADD (NNSA/NFO, 2015)". Added the following to the end of this paragraph: "The chemical FALs are also provided in Appendix D of this CR for comparison to analytical results."
31.	Section 4.1.1.1, Page 39, 1st Paragraph		There is no "Decision I" statement in the CAP. The statement, "Do COCs remain following completion of the clean closure corrective actions?" is called a decision statement in Section B.3.1 of the CAP. It would also follow that if there is a Decision I there would be a Decision II. There is no such description in the CR.	Changed "Decision I" to "DQO decision statement" throughout document.
32.	Section 4.1.1.1.1, Page 41, 2nd and 3rd Paragraphs		Reword the second sentences in *Precision* and *Accuracy* as was done for the CADD/CAP for CAU 413.	The text "No results from the verification samples were" was replaced with "No data quality issues were identified for the analytical results that resulted in them being" in the precision and accuracy subsections.

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33.	Section 4.1.4, Page 45, Table 4-1		Under "Future Land Use": explain what is meant by "Nuclear Test Zone" clearly given the past, present and future missions at the site by referencing the most recently approved EIS for the NNSS.	Added the following to the table entry: "as defined in Table 4-1 of the Final Site-Wide Environmental Impact Statement (NNSA/NSO 2013)"
34.	Section 4.1.6, Page 46, 1st Paragraph		It is stated towards the end of the paragraph the FIDLER data was used to guide the biasing of sample locations. Earlier in the document, as commented on above, unbiased samples were taken. Explain the discrepancy.	There is no discrepancy. See response to Comment 22c.
35.	Section 4.2, Page 47, 1st and 2nd Paragraphs		a) What is the assumption that there is a potential to receive a dose exceeding 25 mrem/yr. when there was no sample location that demonstrated a dose exceeding this FAL? The second sentence in this paragraph appears contradictory. b) 2nd paragraph, 2nd sentence beginning with: "As a best management practice (BMP), the administrative URs are established based on the assumed potential to receive a dose exceeding 25 mrem/yr in the area identified as exhibiting removable contamination at levels exceeding the criterion for a contamination area." A review of the CR, CAP, and CADD did not identify another discussion with respect to the stated best management practice. Please provide more detail for the best management practice and how the administrative UR boundary was established (i.e., removable contamination surveys, or GIS based contour, etc.).	a) Because collecting representative samples of these sites was not practical, it was assumed that contamination was present at levels exceeding the FAL. To avoid confusion the following text was removed from the second sentence: "Although no sample location demonstrated a dose exceeding a FAL,". b) In Section 4.0 of the CADD, it states: "An administrative UR may also be established based on the presence of removable contamination that meets CA criteria (see Section A.2.6). There are two areas in CAU 568 that meet CA criteria (San Juan CA and Chavez CA). The recommended administrative boundaries are presented Figure A.3-4 and will be implemented in the closure report. Administrative URs will be recorded and controlled in the same manner as the FFACO URs, but will not require posting or inspections." The contamination boundaries were pre-defined by Radiation Control. The sentence was modified as follows: "As defined in Section 4.0 of the CADD, best management practice (BMP) administrative URs were established based on the assumed potential to receive a dose exceeding 25 mrem/yr in areas identified as exhibiting removable contamination at levels exceeding the criterion for a CA."
36.	Section 4.2, Page 47, 2nd Paragraph		2nd paragraph, last sentence beginning with "No physical site controls....": it would be beneficial to state here for transparency that no physical controls are required for Administrative URs in accordance with the FFACO handbook. Since concentration values on the UR forms for Administrative URs are over the IA action level, but no controls are required - the explanation makes it clear that no controls are required because the FFACO handbook does not require controls.	Consistent with past practice, we do not reference the FFACO handbook because it is an internal guide and not a binding agreement. Reworded sentence to: "As stated on the individual UR forms in Attachment G-1, no physical site controls are required for the administrative URs."

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37.	Section 5.2, Page 48, 2nd Paragraph		Last Sentence: as opposed to only requiring approval from NDEP, NDEP is of the opinion that any proposed activity within a use restricted area that would result in a more intensive use of the site would also require approval from DOE/EM personnel. Clarify what "a more intensive use of the site" actually means.	Replaced last sentence with: "All new activities are reviewed under the Real Estate/Operations Permit process. When a new activity impacts a use restricted site, it is identified and an evaluation of the potential for the new activity to expose workers to contamination is made by EM Nevada Program personnel. If the exposure based on the new exposure scenario is higher than that used to establish the FFACO action level, NDEP will be notified."
38.	Section 5.3, Page 48, 1st Paragraph		Last Sentence: define "approves these actions".	Replaced "these actions" with "this request".
39.	Section C.1.0, Page C-3, 1st Paragraph		There should be at least an acknowledgment that one of the Average Compression Test Strengths is slightly below the 4,000 psi and then continue with the description of why this is not thought to pose a problem for the longer term integrity of waste containment. Document transparency would also be improved by specifying the organization conducting this work.	Replaced the second sentence with: "All test cylinders exceeded the criterion of 4,000 psi for the 28-day compressive strength except for two of the test cylinders from January 5, 2017. These test cylinders reached more than 96 percent of the criterion." Consistent with past practices, the individual contractors performing the work are not called out in the document because all work is performed on behalf of DOE.
40.	Section D.1.0, Page D-1, 1st Paragraph		A phrase should be added at the end of the first sentence stating that were two (final number TBD) deviations to the corrective actions specified in the CAP, with a reference to the applicable Section in the CR.	Added to the end of the first sentence: "except as discussed in Section 2.2"
41.	Section D.1.0, Page D-1, 1st Paragraph		Last sentence: CR lacks the necessary support data for NDEP to confirm the effectiveness of the corrective action. Include summary data for the removable contamination survey. The summary data at a minimum should include the total number of measurements, the min, max, median, and standard deviation of the data set.	Replaced sentence with: "At the HCA Soil Pile (CAS 03-23-30), results of removable contamination surveys at six locations were all less than HCA criteria. The maximum readings from the removable surveys were 890 dpm/100 cm^2 removable alpha and 400 dpm/100 cm^2 beta/gamma. As HCA conditions are no longer present, it is no longer necessary to assume that removable contamination would cause a dose exceeding the radiological FAL. Therefore, the remaining soil pile material was not removed. Because HCA conditions are no longer present and soil sample results from this site demonstrated that soil contamination did not have the potential to cause a dose exceeding the FAL, the verification soil sample was not necessary."
42.	Section D.1.1, Page D-1, 1st Paragraph		First Sentence: the statement "In accordance with the verification sampling DQOs and the CAP" may not be true in light previous comments.	It is still true.

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43.	Section D.1.1, Page D-1, 1st Paragraph		Section D.1.1 is hard to understand. There is no explanation of the why the relationship between the TLD external dose and the RESRAD-calculated external dose is not reliable when dose is low, or why is it more reliable to use the central tendency of the data set. There are no calculations presented or explained for the derivation of 1.58 correction factor. Suggest that this section be re-written so it is more easily understood.	Appendix D was rewritten for clarity.
44.	Figure D.1.1, Page D-2		Are the CAS annotations correct on the figure since Table D.1-1 shows CAS shows 03-23-30 as the release for samples C21, C22, and C23? Review CAS annotations and correct as necessary.	CAS number was corrected in the tables.
45.	Figure D.1-2, Page D-3		Figure D.1-2 does not show the central tendency or the regression equation. Add regression line to Figure D.1-2.	Figure was replaced, and regression equation was inserted.
46.	Section D.1.2, Page D-3, 1st Paragraph		The referenced Soils RBCA does not provide the methodology for calculating internal dose as it is presented in Table D.1-2. Please state that the internal dose as presented in Table D.1-2 was calculated by taking the verification sample results and multiplying by the internal dose RRMGs as stated in the RBCA.	Internal dose as presented in Table D.1-2 was calculated according to the methodology in Section 4.3.2 of the Soils RBCA document. The internal dose is not calculated by multiplying the sample results by the internal dose RRMGs but rather dividing the sample results by their corresponding internal dose RRMGs, multiplying the result by 25, and then summing the doses for all detected radionuclides. Appendix D was rewritten to show all calculations.
47.	Table D.1-1, Page D-4		In verifying the calculations for the estimated external dose for C21, C22, and C23, the results were divided by the correction factor of 1.58 and not multiplied by the correction factor, as stated in Section D.1.1. Also, the use of significant digits is not consistent. To ensure transparency and methodology preservation, please include the data and describe how these values were calculated. It is suggested that this be shown in a calculation table that shows the sample result, corresponding RRMG, and correction factor.	The RRMG-calculated external dose was increased by multiplying by the correction factor as stated in Section D.1.1. Dividing by the correction factor would have decreased the estimated external dose. This was not a calculation error. Appendix D was rewritten to clarify all dose calculations. The use of significant digits was revised based on the following protocol, which was added to the end of Section D.1.0: "All results in this appendix are reported using the following protocol: 1. All numbers were rounded to three significant digits for reporting purposes to avoid inferring more confidence in the numbers than is justified; however, the entire (unrounded) numbers were used in calculations. 2. Radionuclide activities are limited to one decimal place (i.e., there is no confidence in, or significance to, hundredths of a pCi/g). 3. Dose results are limited to whole digits (i.e., there is no confidence in, or significance to, tenths of a mrem/yr)."

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48.	Table D.1-2, Page D-4		In verifying the calculations, the estimated internal doses for C21, C22, and C23 under the RW and OU scenarios are not zero. They are as follows: C21- RW = 0.12, OU= 0.04 C22 - RW = 0.32, OU = 0.11 C23 - RW = 0.05, OU = 0.02 Explain why these were presented as zero (significant figures). These were calculated by taking the isotope specific sample result and dividing by the isotope specific internal dose RRMG. To ensure transparency and methodology preservation, include the data and describe how these values were calculated.	The differences are due to rounding. The rounding of numbers was inconsistent in the tables and was corrected using the protocol described in the response to Comment #47. Appendix D was rewritten to clarify all dose calculations and reported to the protocol described in the response to Comment #47.
49.	Table D.1-3, Page D-4		In verifying the calculations, the estimated TED cannot be verified due to the identified issues with the estimated values shown in Tables D.1-1 and D.1-2. Correct the table values.	Appendix D was rewritten to clarify all dose calculations and reported to the protocol described in the response to Comment #47.
50.	Table D.1-5, Page D-6		The table does not show the FAL for each radionuclide.	The radionuclide FAL established in the CAU 568 CADD and used in all dose reporting is 25 mrem/OU-yr. No FALs were established for individual radionuclides. The RRMGs for each radionuclide are in the revised Appendix D tables. Units were added to each table.
51.	Table G-1		Each "Use Restriction Information" section contains summary statements. Nearly all of these summary statements provide a maximum calculated dose and table of maximum radionuclide concentrations. However, the CR does not discuss where these values came from. These values cannot be verified since the CR lacks the necessary support data so NDEP or other users could confirm the Use Restrictions are appropriate. Please include the data in the CR so the verification can be made.	The inclusion of this information in the URs is consistent with all URs established in past Soils CAUs. These data came from the CAI analytical data. The CADD analytical results were not published in the CADD. Added the following text to Appendix G: "The UR forms provide information derived from CAI results to assist in the future evaluation of human health and safety risks to potential users of the use restricted areas. Where available, maximum estimated dose and maximum activities of significant dose-producing radionuclides are provided for those locations where samples were collected. Doses and activities may be present at higher levels at locations where samples were not collected."

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52.	Section 5.1		Additional need identified by DOE to clarify the final FFACO corrective action of each CAS.	The FFACO assigns a corrective action to the CAS and not the individual release. CASs that have any component that is closed in place is assigned a corrective action of closure in place. Added to the end of Section 5.1: "Following implementation of the corrective actions at CAU 568, the final FFACO closures for each CAS (including the CASs with no further action) are listed in Table 5-1." Inserted the following table in this section:
53.	3. Page 7, Section 2.1.1.1	M	This section needed clarification that there are two CASs related to the Chavez Surface Release. The FFACO UR includes both CASs.	This section was replaced with the following text: "The Chavez Surface Release (Figure 2-1) is composed of CAS 03-23-17 (contamination area [CA] conditions from a tower shot surface release) and CAS 03-23-19 (a DCB defined by the HCA boundary). This site exhibits HCA conditions (more than 2,000 disintegrations per minute per 100 square centimeters [dpm/100 cm^2] removable alpha contamination) and is assumed to exceed the FAL of 25 millirem per Occasional Use Area year (mrem/OU-yr). An FFACO UR was established at the corrective action boundary, and UR warning signs were posted. The FFACO UR for these CASs is included in Attachment G-1."

Table 5-1
CAU 568 CASs and Corrective Actions

CAS Number	CAS Description	Corrective Action
03-08-04	Soil and Debris Piles	Clean Closure
03-23-17	S-3I Contamination Area	No Further Action
03-23-19	T-3U Contamination Area	Closure in Place
03-23-20	Otero Contamination Area	Closure in Place
03-23-22	Platypus Contamination Area	No Further Action
03-23-23	San Juan Contamination Area	Closure in Place
03-23-26	Shrew/Wolverine Contamination Area	No Further Action
03-23-30	HCA Soil Pile	Clean Closure
03-23-31	U-3d Contamination Area	Closure in Place
03-23-32	U-3j Test Release	Closure in Place
03-23-33	U-3r Contamination Area	Closure in Place
03-23-34	U-3ay Contamination Area	Closure in Place
03-26-04	Test-Related Debris	Clean Closure
03-45-01	Test Surface Releases	Closure in Place

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54.	Throughout document			Several other editorial corrections were made.

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