# Nevada Site Specific Advisory Board
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**Full Board Meeting Handouts for**
**Wednesday, November 20, 2013**

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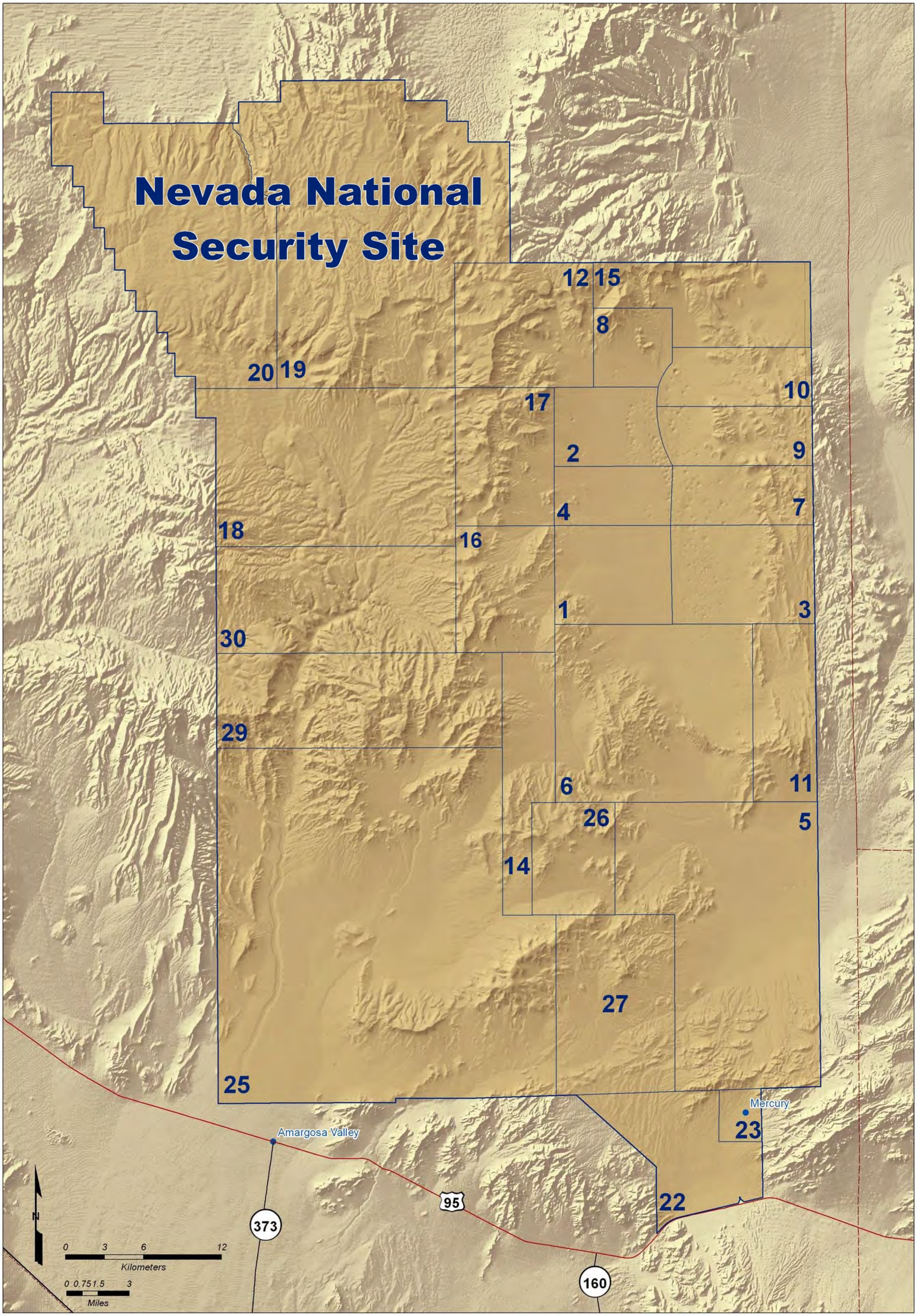
**If you just want to print certain pages, the directions are: file, print, Pages to Print, choose the radio button-Pages and enter just the pages that you want printed, then choose print**



Nevada National
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# U.S. Department of Energy Environmental Management Site-Specific Advisory Boards

# AGENDA

# NSSAB FULL BOARD MEETING

National Atomic Testing Museum (Frank Rogers Auditorium)
755 East Flamingo Road, Las Vegas, Nevada

**November 20, 2013 at 5 p.m.**

| | |
|---|---|
| **Open Meeting / Announcements** | **Barb Ulmer**, Facilitator |
| **Chair's Opening Remarks** | **Kathleen Bienenstein,** Chair |
| ▪ Agenda approval | |
| **Public Comment** | **Barb Ulmer**, Facilitator |
| **U.S. Department of Energy Update** | **Scott Wade,** DOE |
| **Corrective Action Alternatives for Corrective Action Unit (CAU 550), Smoky Contamination Area (Work Plan Item #1)** | |
| ▪ DOE Presentation | **Tiffany Lantow,** DOE |
| ▪ NSSAB Recommendation Development | **Kathleen Bienenstein,** Chair |
| **Groundwater Open House (Work Plan Item #4)** | |
| ▪ DOE Presentation | **Kelly Snyder,** DOE |
| ▪ NSSAB Discussion | **Kathleen Bienenstein,** Chair |
| **Break** | **Barb Ulmer**, Facilitator |
| **Radionuclide Decay at Use-Restricted Soil Sites (Work Plan Item #3)** | |
| ▪ DOE Presentation | **Lynn Kidman,** Navarro-Intera |
| ▪ NSSAB Discussion and Determine Path Forward | **Kathleen Bienenstein,** Chair |
| **External Peer Review for Yucca Flat (Work Plan Item #2)** | |
| ▪ DOE Presentation | **Bill Wilborn,** DOE |
| ▪ NSSAB Recommendation Development | **Kathleen Bienenstein,** Chair |
| **Liaison Updates** | |
| ▪ Clark County | Phil Klevorick |
| ▪ Consolidated Group of Tribes and Organizations | Richard Arnold |
| ▪ Elko County Commission | Charlie Myers |
| ▪ Esmeralda County Commission | Ralph Keyes |
| ▪ Lincoln County Commission | Kevin Phillips |
| ▪ Meadows School Student Liaison | Matt Hodapp |
| ▪ Nye County Commission | Dan Schinhofen |
| ▪ Nye County Nuclear Waste Repository Project Office | John Klenke |
| ▪ State of Nevada Division of Environmental Protection | Tim Murphy |
| ▪ U.S. National Park Service | Genne Nelson |
| ▪ White Pine County Commission | Mike Lemich |

**Liaison Discussion  Wrapup** — **Scott Wade,** DOE

**Other NSSAB Business:** — **Kathleen Bienenstein,** Chair

- NNSS Tour Update
- NSSAB Discussion Regarding Sec./Gov.'s Working Group
- EM SSAB Chairs Meeting  Synopsis (Nov. 4-7, 2013)
- EM SSAB Draft Recommendations
- NSSAB FY 2013 Evaluations — **Kelly Snyder,** DDFO
- Meeting Locations for FY 2014

**Meeting Wrap-up/Assessment/Adjournment** — **Barb Ulmer**, Facilitator

- NSSAB Tour of the NNSS
  - Full Day, Wednesday, January 22, 2014
- Next Full Board Meeting
  - 5 p.m., Wednesday, February 19, 2014

# NSSAB MEETING ATTENDANCE

**Full Board Meetings**

**October 2013 through September 2014 (FY 2014)**

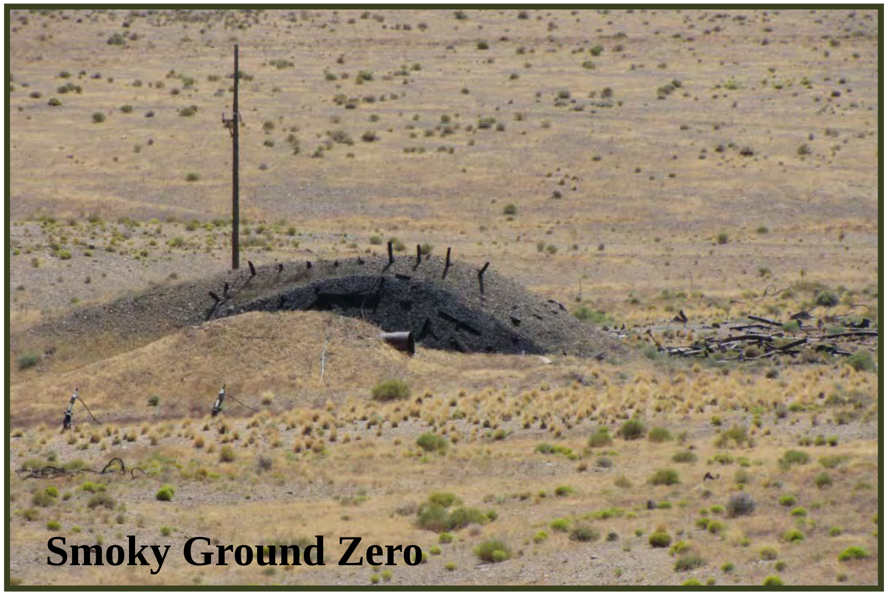
| Name | 11/20/13 | 2/19/14 | 3/19/14 | 5/21/14 | 7/16/14 | 9/17/14 | Max Terms Limit |
|---|---|---|---|---|---|---|---|
| **MEMBERS** | | | | | | | |
| Kathleen Bienenstein | √ | | | | | | 2014 |
| Thomas Fisher | E | | | | | | 2017 |
| Arthur Goldsmith | √ | | | | | | 2017 |
| Donna Hruska | √ | | | | | | 2016 |
| Cheryl Kastelic | U | | | | | | 2018 |
| Janice Keiserman | √ | | | | | | 2018 |
| Michael Moore | √ | | | | | | 2016 |
| Edward Rosemark | √ | | | | | | 2018 |
| William Sears | √ | | | | | | 2018 |
| Jack Sypolt | √ | | | | | | 2017 |
| **LIAISONS** | | | | | | | |
| Clark County | √ | | | | E | | |
| Consolidated Group of Tribes and Organizations | √ | | | | | | |
| Elko County Commission | U | | | | | | |
| Esmeralda County Commission | √ | | | | | | |
| Lincoln County Commission | E | | | | | | |
| Meadows School | √ | | | | | | |
| Nye County Commission | √ | | | | | | |
| Nye Co. Nuclear Waste Repository Project Office | √ | | | | | | |
| State of NV Division of Env Protection | √ | | | | | | |
| U.S. Natl Park Service | E | | | | | | |
| White Pine Co. Commission | E | | | | | | |

KEY: √ = Present | Term Limit | E = Excused U = Unexcused | RM = Remove RS = Resign

Corrective Action Alternatives Recommendation for Corrective Action Unit 550
ENVIRONMENTAL MANAGEMENT
Nevada Field Office
Tiffany Lantow
Soils Activity Lead
Nevada Site Specific Advisory Board (NSSAB)
November 20, 2013
Environmental Management
safety ❖ performance ❖ cleanup ❖ closure
www.em.doe.gov

# NSSAB Work Plan Item 1

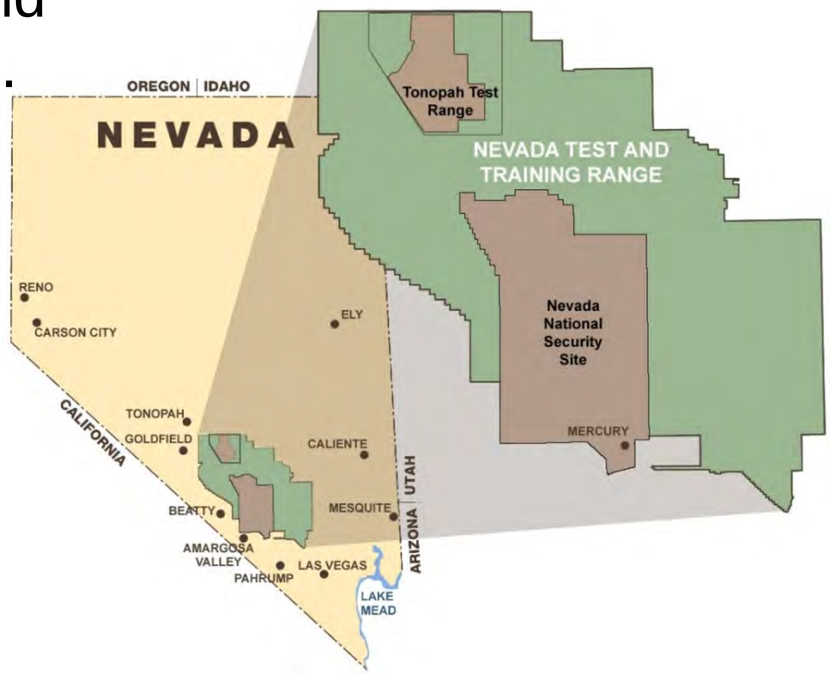
Provide a recommendation, from a community perspective, to the Department of Energy (DOE) on which corrective action alternative (closure in place or clean closure) should be selected for Corrective Action Unit 550 – Smoky Contamination Area (Soils Activity)


Smoky Ground Zero

# What are the Issues?

Surface soils at the Nevada National Security Site and the Nevada Test and Training Range (operated by the U.S. Air Force) were contaminated by:

- Historical atmospheric nuclear weapons tests
- Nuclear weapon safety experiments
- Nuclear weapon storage-transportation tests
- Evaluation tests for peaceful uses of nuclear explosives



# Addressing the Issues

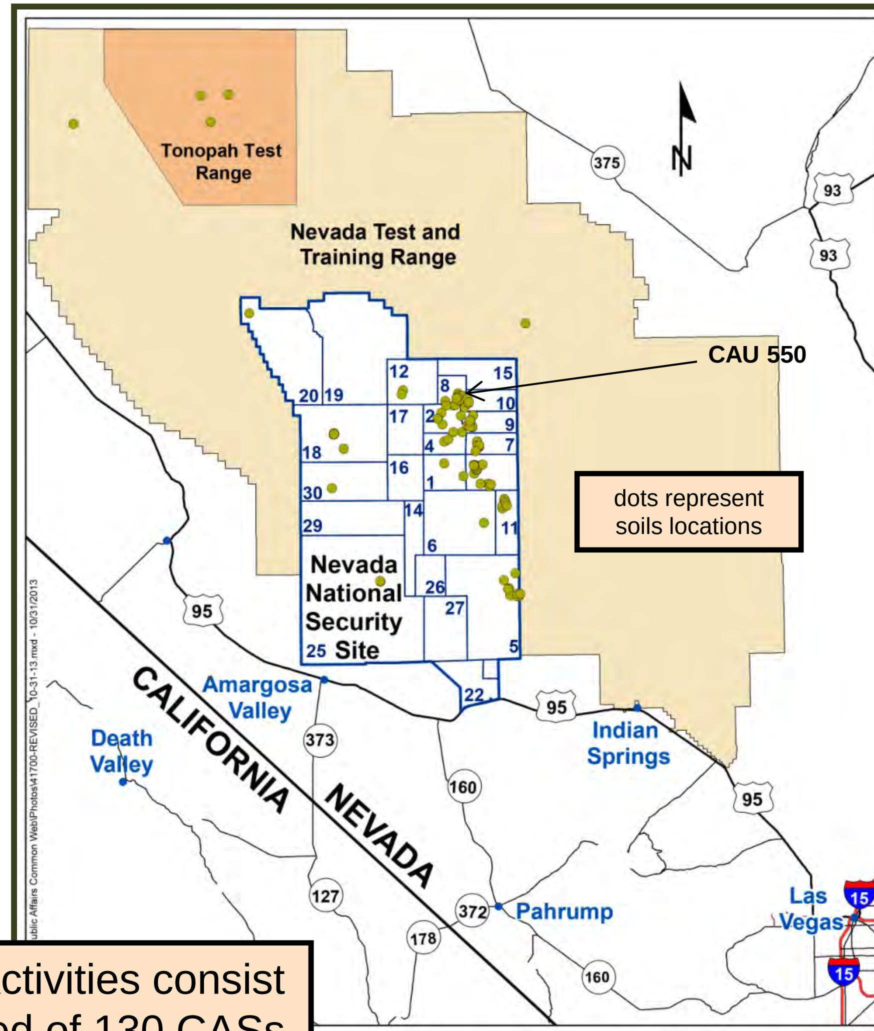
- The Soils Activity is responsible for:
  - Characterizing and/or remediating surface soil contamination
    - Characterize means to identify the nature and extent of the contamination present
    - Remediate means to select and complete a closure option (clean closure, closure in place, etc.)

# Addressing the Issues
(continued)

- The Soils Activity is responsible for:
  - Ensuring appropriate controls (i.e., signage/postings, barriers, etc.) are in place at the sites with remaining contamination
  - Conducting long-term monitoring of sites
- State of Nevada Division of Environmental Protection (NDEP) provides oversight under the Federal Facility Agreement and Consent Order (FFACO)

# Key Terminology

- Corrective Action Site (CAS)
  - A site that where a potential release of contaminants has been identified
- Corrective Action Unit (CAU)
  - Grouping of CASs that are similar in remediation technique, type of contaminants, or proximity to each other (grouped to create efficiencies)




As of 9/30/13, Soils Activities consist of 31 CAUs, comprised of 130 CASs

# Principles of Soils Strategy

- Build upon Soils Risk-Based Corrective Action Evaluation Process, which is:
  - Strategy approved by NDEP to plan, implement, and complete environmental corrective actions
    - o Compares measurements of radiological and chemical contaminant levels to risk-based action levels
- Corrective actions must be considered when site conditions exceed a final action level
- Sites are not accessible by the public

# Corrective Action Alternatives (CAAs)

- CAAs identified in FFACO:
  - Closure in place with use restrictions, as necessary
  - Clean closure (removal of contaminants, no use restrictions)
  - No further action
- CAAs evaluated based on *general standards* and *remedy selection decision factors* defined by the U.S. Environmental Protection Agency (40 CFR 300.430(e)(9)

# CAAs General Standards

- All CAAs must meet the four general standards in order to be selected for evaluation using the remedy selection decision factors:
  - Protection of human health and the environment
  - Compliance with environmental cleanup standards
  - Control the source(s) of the release
  - Comply with applicable federal, state, and local standards for waste management

# CAAs Remedy Selection Decision Factors

- Only CAAs that meet the general standards are scored on the remedy selection decision factors:
  - Short-term reliability and effectiveness
  - Reduction of toxicity, mobility, and/or volume
  - Long-term reliability and effectiveness
  - Feasibility
  - Cost

# Soils CAU/CAS Summary

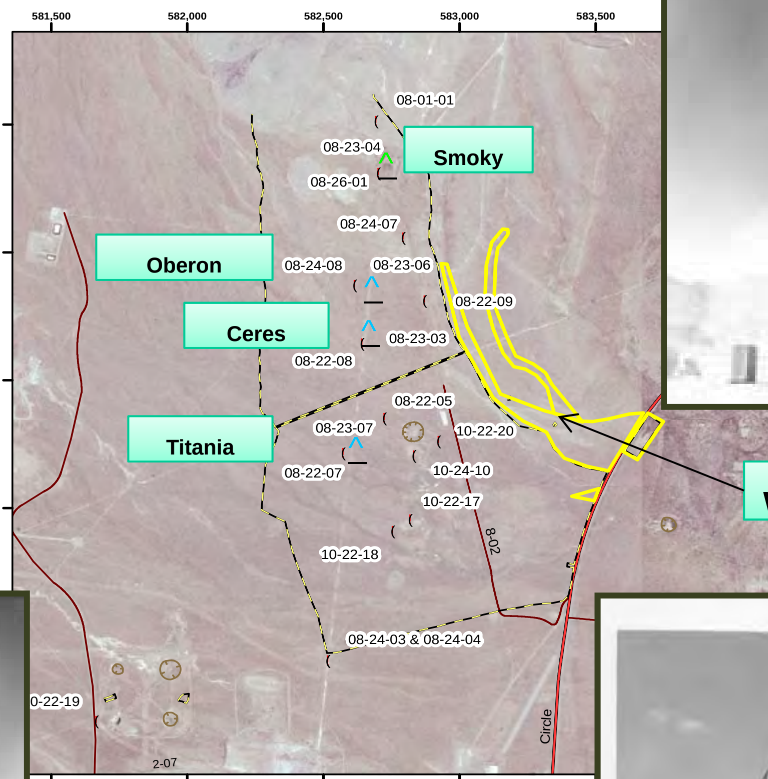
- 31 Total CAUs comprised of 130 Total CASs*
  - 69 Closed CASs
    - o 26 Closure in Place
    - o 3 Clean Closure
    - o 40 No Further Action

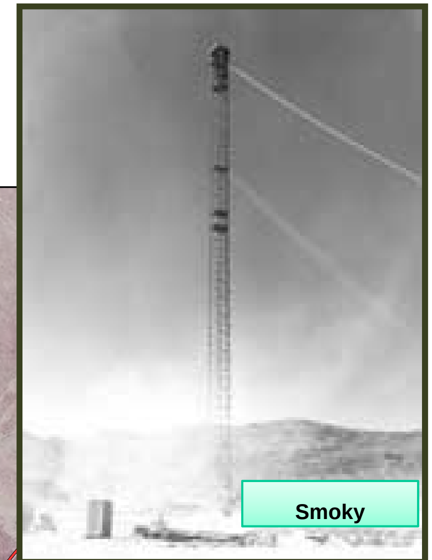
**53% of CASs Closed**

*As of 9/30/13

# CAU 550 Overview

- One weapons-related atmospheric test (Smoky)
- Three safety experiments (Ceres, Oberon, and Titania)
- Washes/drainage channels, including a depositional area located south of Circle Road
- Debris locations (15 sites)



Smoky

Smoky Detonation

Ceres, Oberon, and Titania all conducted from similar 20’ tall wooden towers

# CAU 550 Field Activities

- Field Activities
  - Sampling and radiological dose measurements conducted intermittently between August 2012 through October 2013, including:
    - Soil Sampling (chemical and radiological)
    - Terrestrial radiological surveys
    - Characterization and removal of lead debris

# CAU 550 Results

- Corrective Actions are required for:
  - The area surrounding the safety experiments (CASs 08-23-03, 08-23-06, and 08-23-07 exceed action level for radiological contamination)
  - Debris CASs 08-26-01 (lead bricks) and 08-24-08 (batteries) exceed action level for lead


# NSSAB Involvement

- DOE requests NSSAB provide a recommendation this evening on selection of a CAA for the sites identified in the following slides
- Possible CAAs
  – No Further Action
  – Closure in Place with use restrictions (UR)
  – Clean Closure

# CAA Evaluation – Safety Experiments
## (CASs 08-23-03, 08-23-06, and 08-23-07)

| CAA | Pros | Cons |
|---|---|---|
| Clean Closure<br><br>$46M (excavation and removal of ~188,000 $yds^3$ of soil and debris) | Reduces environmental risk by removing hazard<br>Long-term reliability and effectiveness<br>Eliminates long-term monitoring and maintenance costs | High occupational risk during excavation<br>Moderate risk to workers<br>High cost associated with excavation, waste packaging, and disposal |
| Closure in Place<br><br>$72K (1st year)<br>$1,500/yr (post closure) | Feasible and cost effective<br>Minimal environmental risk<br>Consistent with other similar sites | Controls exposure but does not remove hazard<br>Will require long-term monitoring and maintenance costs |

# CAA Evaluation – Debris CAS 08-24-08

## (Batteries)

| CAA | Pros | Cons |
|---|---|---|
| Clean Closure<br><br>\$14K<br>(excavation and removal of ~2.5 yds$^3$ of soil and debris) | Reduces environmental risk by removing hazard<br><br>Long-term reliability and effectiveness<br><br>Eliminates long-term monitoring and maintenance costs | Moderate occupational risk during excavation due to Batteries' location in Transferrable Contamination Boundary<br><br>High cost associated with excavation, waste packaging, and disposal<br><br>If surrounding area remains within transferrable contamination boundary, then minimal environmental benefit |
| Closure in Place<br><br>\$2K<br>(establish FFACO UR within north High Contamination Area) | Feasible and cost effective<br><br>Minimal environmental risk<br><br>Consistent with other similar sites | Controls exposure by barriers and administrative controls but does not remove hazard<br><br>Will require long-term monitoring and maintenance costs |

# CAA Evaluation – Debris CAS 08-26-01

## (Lead Bricks)

| CAA | Pros | Cons |
|---|---|---|
| Clean Closure<br><br>\$2.0M (excavation and removal of ~350 yds$^3$ of soil and debris) | Reduces environmental risk by removing hazard<br>Long-term reliability and effectiveness<br>Eliminates long-term monitoring and maintenance costs | High occupational risk during excavation<br>High cost associated with excavation, waste packaging, and disposal<br>Disregards the historic significance of the site<br>Mitigating the Historical Preservation Act would require significant documentation |
| Closure in Place<br><br>\$2K (establish FFACO UR) | Feasible and cost effective<br>Minimal environmental risk<br>Consistent with other similar sites | Controls exposure by engineered barriers and administrative controls but does not remove hazard<br>Will require long-term monitoring and maintenance costs |

# Summary of Options

| Site | Closure Options |
|---|---|
| Oberon, Ceres, and Titania Sites (CASs 08-23-03, 08-23-06, and 08-23-07) | Clean Closure |
| | Closure in Place |
| CAS 08-26-01(Lead Bricks) | Clean Closure |
| | Closure in Place |
| CAS 08-24-08 (Batteries) | Clean Closure |
| | Closure in Place |

# CAU 550 Next Step

- DOE considers NSSAB recommendations
- Complete Corrective Action Decision Document/Closure Report (CADD/CR) ~ Winter 2013/2014
  - The CADD/CR presents the CAAs and identifies the selected alternative

# Questions / Comments?

# Groundwater Open House

**Kelly Snyder**
Public Involvement
Nevada Site Specific Advisory Board (NSSAB)
November 20, 2013

# NSSAB Work Plan Item 4

- *Groundwater Open House*
  - Department of Energy (DOE) is seeking NSSAB recommendation, from a community perspective, on how the Groundwater Open House could be enhanced in the future (i.e., format, advertising, and subject matter)
  - NSSAB Members asked to attend the Groundwater Open House on December 11, 2013, at the Community Center in Beatty, Nevada, from 4:30 to 7 p.m.
    - Bus from Las Vegas available with details forthcoming
  - NSSAB recommendation requested by February 2014

# Groundwater Open House Objective

- Provide communities near the Nevada National Security Site with information on the:
  - Impacts of nuclear testing on groundwater and how the DOE is addressing these impacts through investigation and closure (under the Federal Facility Agreement and Consent Order)
  - Status of investigations



Groundwater Open House
Amargosa Valley – September 2012

# Groundwater Open House Setup

- Advertising
- Format
  - Posters
  - Presentations
  - Displays
- Subject Matter

Groundwater Open House
Amargosa Valley – September 2012

# Radionuclide Decay at Use-Restricted Soil Sites Work Plan Item 3


**Lynn Kidman**

Senior Technical Advisor, Navarro-Intera


Nevada Site Specific Advisory Board (NSSAB)

November 20, 2013

# NSSAB Work Plan Item #3

Provide recommendations, from a community perspective, that answer the following two questions: are there any improvements or enhancements to be made to the report? What should the Department of Energy's actions be when the radionuclides in the use-restricted areas have decayed?

# Scope and Purpose

- Scope:
  - Previously closed Soils sites with Federal Facility Agreement and Consent Order (FFACO) and Administrative use restrictions based on dose
- Purpose:
  - This report provides the estimated time when dose will reduce sufficiently to remove the use restriction

# Background

- Use restrictions consist of contaminant boundaries that are entered into the site-wide geographic information system (GIS)
- Use restrictions are put in place to warn site workers of the presence of contamination at levels of potential concern

# Background
(continued)

- FFACO use restrictions are implemented where dose could exceed 25 millirem/year (mrem/yr) based on current and projected land use – these require a higher level of control to include warning signs
- Administrative use restrictions are implemented where dose could exceed 25 mrem/yr if the site were to be used for industrial activities – this is a lower level of control and do not require signage
- Both use restriction types are controlled administratively

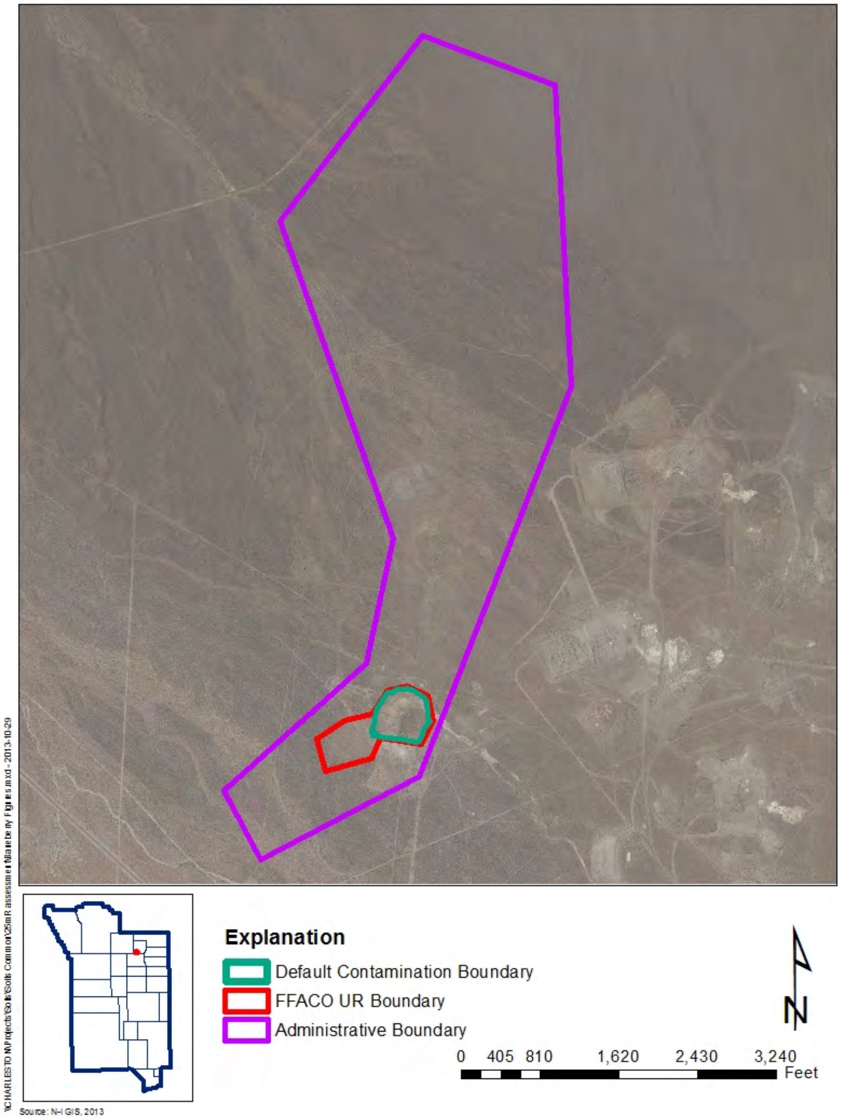
# Methodology

- As radioactive decay progresses, dose generally decreases
- Calculate future dose:
  - Use the highest current dose from any location at each use restriction
  - Select time intervals
  - Adjust for site-specific differences
  - Select time that produces a dose <25 mrem/yr action level


Note: natural background dose is approx. 300 mrem/yr

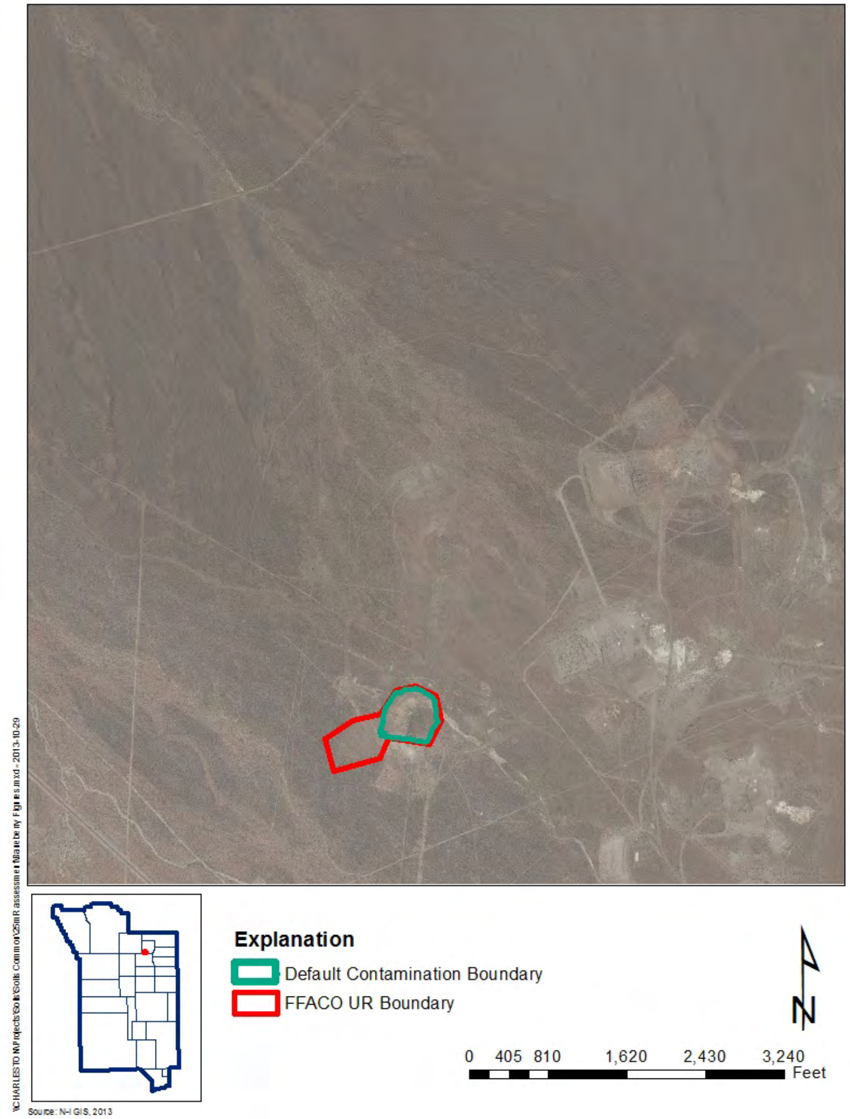
# Corrective Action Unit (CAU) 365, Baneberry Contamination Area

- Present
  - FFACO and Administrative use restrictions have been established at site
  - FFACO use restriction includes area of Default Contamination Boundary (i.e., crater boundary)



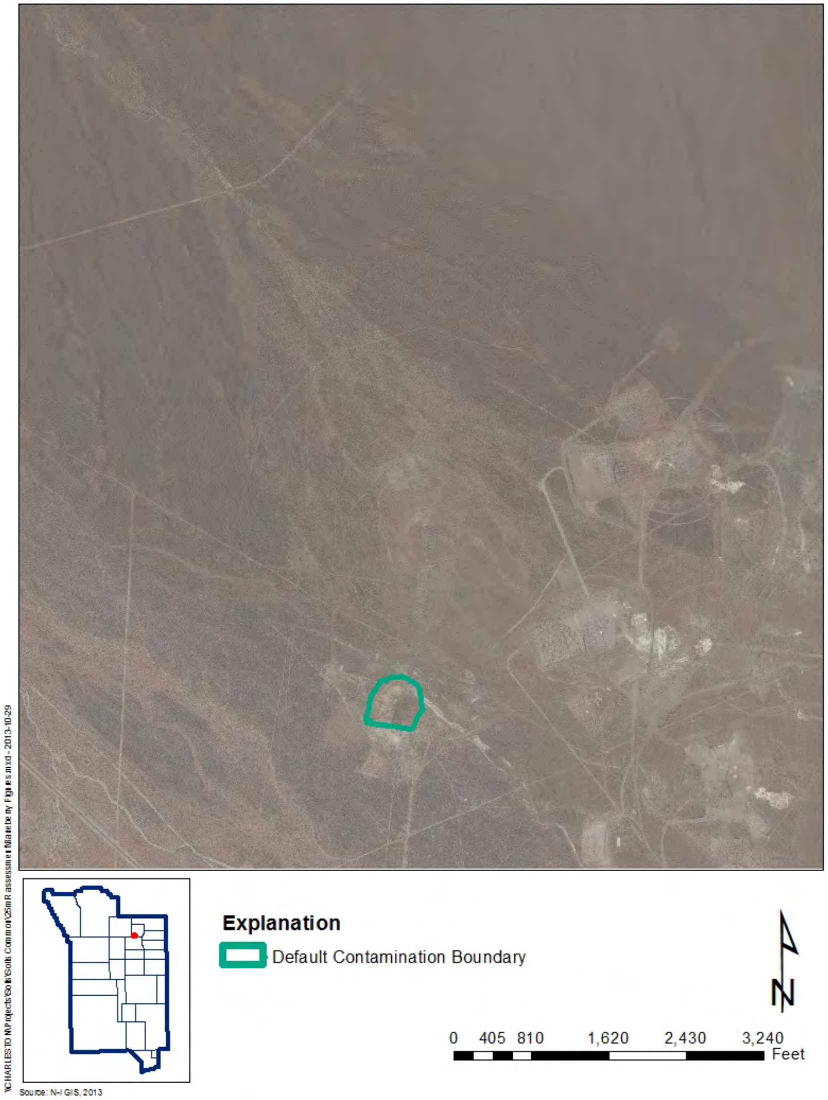
# CAU 365, Baneberry Contamination Area
(continued)

- 2041
  - Consider removal of Administrative use restriction



# CAU 365, Baneberry Contamination Area (continued)

- 2171
  - Consider shrinking FFACO use restriction to include only the area of the Default Contamination Boundary



# Results

- 14 FFACO use restrictions
  - Three (3) could have size reduction in 30, 60, and 70 years
- 12 Administrative use restrictions
  - Five (5) could be removed in 30 (2), 50, 160, and 320 years

# NSSAB Input

- Provide recommendations, from a community perspective, that answer the following two questions: are there any improvements or enhancements to be made to the report? What should the Department of Energy's actions be when the radionuclides in the use-restricted areas have decayed?
- Recommendation requested by February 2014

# Additional Considerations for NSSAB Input

- Provide recommendations, from a community perspective, what should DOE consider when removing use restrictions?
- Recommendation requested by February 2014

Navarro-Intera

# Estimated Time When Dose at Selected NNSS Soils Sites Falls Below 25 mRem/yr

September 2013

## Estimated Time When Dose at Selected NNSS Soils Sites Fall Below 25 mRem/yr.

## Purpose

The purpose of this analysis is to estimate the time at which the radionuclide inventory at 15 Soils Activity sites completed before May 2013 have decayed below a concentration at which the associated TED is less than the 25 mrem/yr dose criteria for the Industrial Use Area (IA) use scenario. Results are also provided for the Remote Work Area (RW) and the Occupational Use Area (OU) use scenarios. These land use scenarios are described in the Soils Risk-Based Corrective Action Evaluation Process (RBCA) (NNSA/NFO, 2013).

## Methodology

A detailed description of the current methodology used in this analysis is provided in the RBCA document. Detailed descriptions of strategy and methodology for the original investigations are provided in the closure documents specific to each CAU, these are listed in the Reference section below. Site-specific soil sample data is input into the RESRAD computer code to determine internal dose rates, and TLDs are used to measure external dose rates. Future internal and external dose rates were calculated using RESRAD. The external dose rates were then adjusted using a correction factor (the ratio of measured external to calculated external dose). Appendix A provides the methodology used to calculate the future dose rates, and calculations for each site.

For each site, an estimated time for the dose to decay below the 25 mrem/yr is provided; however, it should be noted that additional concerns may remain at the site beyond this time frame. These include the presence of chemical contamination and areas where radioactivity was not able to be characterized. Areas where characterization was not possible are established as default contamination boundaries (DCBs). Within the DCBs, doses above 25 mrem/yr are assumed to exist. They include areas of removable contamination, contaminated waste dumps (CWDs), craters, ejecta piles, and fissures. DCBs at each site are noted Table 1.

## Results

This section provides the estimated time required for dose at a site to decay below 25 mrem/yr for the IA and OU scenarios for 15 Soils Activity sites. The estimated times to decay below 25 mrem/yr for the IA scenario and conclusions for each site are provided in Table 1.

**CAU 104, Area 7 Yucca Flat Atmospheric Test Sites (CAU 104)**

- **07-23-03, Atmospheric Test Site T-7C**
- **07-23-04, Atmospheric Test Site T7-1**
- **07-23-05, Atmospheric Test Site**
- **07-23-06, Atmospheric Test Site T7-5a**
- **07-23-07, Atmospheric Test Site - Dog (T-S)**

- **07-23-08, Atmospheric Test Site - Baker (T-S)**
- **07-23-09, Atmospheric Test Site - Charlie (T-S)**
- **07-23-10, Atmospheric Test Site – Dixie**
- **07-23-11, Atmospheric Test Site – Dixie**
- **07-23-12, Atmospheric Test Site - Charlie (Bus)**
- **07-23-13, Atmospheric Test Site - Baker (Buster)**
- **07-23-14, Atmospheric Test Site – Ruth**
- **07-23-15, Atmospheric Test Site T7-4**
- **07-23-16, Atmospheric Test Site B7-b**
- **07-23-17, Atmospheric Test Site - Climax**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 300 years.

Based on the data collected during the CAI, the doses at all locations within CAU 104 were found to be below 25 mrem/yr under the OU scenario.

**CAU 365, Baneberry Contamination Area (CAU 365 Baneberry)**

- **CAS 08-23-02, U-8d Contamination Area**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 160 years.

The dose at this site was found to exceed 25 mrem/yr under the OU scenario. Dose is expected to be below 25 mrem/yr in approximately 30 years.

**CAU 366, Area 11 Plutonium Valley Dispersion Sites (CAU 366)**

- **CASs 11-23-02, Radioactively Contaminated Area A**
- **CASs 11-23-03, Radioactively Contaminated Areas B**
- **CASs 11-23-04, Radioactively Contaminated Areas C**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 70,000 years.

Based on the data collected during the CAI, the doses at all locations within CAU 366 were found to be below 25 mrem/yr under the OU scenario.

**CAU 367, Area 10 Sedan, Ess, and Uncle Unit Craters (CAU 367 Sedan, Ess, and Uncle)**

- **10-45-01, U-10h Crater (Sedan)**
- **10-45-02, Ess Crater Site**
- **10-45-03, Uncle Crater Site**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 50 years.

Based on the data collected during the CAI, the dose at all locations within Sedan, Ess, and Uncle was found to be below 25 mrem/yr under the OU scenario.

**CAU 370, T-4 Atmospheric Test (T-4)**

- **CAS 04-23-01, Atmospheric Test Site T-4**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 60 years.

Based on the data collected during the CAI, the dose at all locations within T-4 was found to be below 25 mrem/yr under the OU scenario.

**CAU 371, Johnnie Boy Crater and Pin Stripe**

- **CAS 18-45-01, U-18j-2 Crater (Johnnie Boy)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 30 years.

Based on the data collected during the CAI, the dose at all locations within Johnnie Boy was found to be below 25 mrem/yr under the OU scenario.

- **CAS 11-23-05, Pin Stripe Contamination Area (Pin Stripe)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 40 years.

Based on the data collected during the CAI, the dose at all locations within Pin Stripe was found to be below 25 mrem/yr under the OU scenario.

**CAU 372, Area 20 Cabriolet/Palanquin Unit Craters**

- **CAS 18-45-02, Little Feller I Surface Crater (Little Feller I)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 52,000 years.

Based on the data collected during the CAI, the dose at all locations within Little Feller I was found to be below 25 mrem/yr under the OU scenario.

- **CAS 18-45-03, Little Feller II Surface Crater (Little Feller II)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 30,000 years.

Based on the data collected during the CAI, the dose at all locations within Little Feller II was found to be below 25 mrem/yr under the OU scenario.

- **CAS 20-23-01, U20k Contamination Area (Palanquin)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 8,300 years.

The dose at this site was found to exceed 25 mrem/yr under the OU scenario. Dose is expected to be below 25 mrem/yr in approximately 10 years.

- **CAS 20-45-01, U20L Crater (Cabriolet)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 320 years.

Based on the data collected during the CAI, the dose at all locations within Cabriolet was found to be below 25 mrem/yr under the OU scenario.

**CAU 374, Area 20 Schooner Unit Crater**

- **CAS 18-23-01, Danny Boy Contamination Area (Danny Boy)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in greater than 100,000 years.

Based on the data collected during the CAI, the dose at all locations within Danny Boy was found to be below 25 mrem/yr under the OU scenario.

- **CAU 374, Area 20 Schooner Unit Crater (Schooner)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 35,000 years.

Based on the data collected during the CAI, the dose at all locations within Schooner was found to be below 25 mrem/yr under the OU scenario.

**CAU 375, Area 30 Buggy Unit Craters**

- **CAS 25-23-22, Contaminated Soils Site (Test Cell A)**

Based on the data collected during the CAI, the dose at all locations within Test Cell A was found to be below 25 mrem/yr under the IA scenario.

Based on the data collected during the CAI, the dose at all locations within Test Cell A was found to be below 25 mrem/yr under the OU scenario.

- **CAS 30-45-01, U-30a, b, c, d, e Craters (Buggy)**

The dose at this site was found to exceed 25 mrem/yr under the IA scenario. Dose is expected to be below 25 mrem/yr in approximately 30 years.

Based on the data collected during the CAI, the dose at all locations within Buggy was found to be below 25 mrem/yr under the OU scenario.

## Summary

Table 1 shows the estimated time it will take for dose to fall below 25 mrem/yr under each use scenario using the methodology described in the current RBCA.

Of the 15 sites evaluated, 14 have at least one location that exceeds 25 mrem/yr under the IA scenario. Six sites (CAU 366, Little Feller I, Little Feller II, Palanquin, Danny Boy, and Schooner) are not expected to fall below 25 mrem/yr within the next 8,000 years. Three are expected to fall below 25 mrem/yr between 100 and 320 years. Five (T-4; Sedan, Ess, and Uncle; Johnnie Boy; Pin Stripe; and Buggy) are expected to fall below 25 mrem/yr in less than 100 years.

Only two sites (Baneberry and Palanquin) have locations that are above 25 mrem/yr under the OU scenario. These are expected to fall below 25 mrem/yr in 30 and 10 years, respectively.

One site (TCA) did not exceed 25 mrem/year under any scenario.

**Table 1. Estimated Time for Dose to Decay Below 25 mrem/year under the IA Scenario**

| Site | Default Boundary? | Estimated Time for Dose to Decay Below 25 mrem/year (years) | Notes/Conclusions |
|---|---|---|---|
| CAU 104 | Yes | 300 | No FFACO UR exists at the site. The extent of the Admin UR is based on CA conditions which are not expected to change in the foreseeable future. Dose decay will not affect the UR boundary. |
| Baneberry | Yes | 160 | The extent of the FFACO UR is based on dose exceeding the OU scenario action level and the presence of radiological contamination inside the Baneberry crater and fissure. As dose within the crater and fissure has not been assessed, dose decay will not affect evaluation of the crater and fissure areas. Dose decay may allow the UR to be collapsed to the crater and fissure default boundary in approximately 30 years. Dose within the crater and fissure has not been assessed. |
| CAU 366 | Yes | >5,000 | The extent of the FFACO UR was based on the presence of HCA conditions and two CWDs which are not expected to change in the foreseeable future. Dose decay will not affect the UR boundary. |
| Sedan, Ess, and Uncle | Yes | 50 | The extent of the FFACO UR is based on the presence of radiological contamination inside the Sedan, Ess, and Uncle craters. As dose within the craters has not been assessed, dose decay will not affect the FFACO UR boundary. The extent of the Admin UR is based on dose exceeding the IA scenario action level. Dose decay may allow the Admin UR to be removed in approximately 50 years. |
| T-4 | No | 60 | The extent of the FFACO UR is based on dose exceeding the IA scenario action level and the presence of lead debris. Dose decay may allow the UR to be collapsed to the area of lead contamination in approximately 60 years. |

| Site | Default Boundary? | Estimated Time for Dose to Decay Below 25 mrem/year (years) | Notes/Conclusions |
|---|---|---|---|
| Johnnie Boy | Yes | 30 | The extent of the FFACO UR is based on the presence of radiological contamination inside the Johnnie Boy crater. As dose within the crater has not been assessed, dose decay will not affect the FFACO UR boundary. The extent of the Admin UR is based on dose exceeding the IA scenario action level. Dose decay may allow the Admin UR to be removed in approximately 30 years. |
| Pin Stripe | Yes | 40 | The extent of the FFACO UR is based on the presence of radiological contamination inside the Pin Stripe crater and fissure. As dose within the crater and fissure has not been assessed, dose decay will not affect the FFACO UR boundary. No Admin UR exists at the site. |
| Little Feller I | Yes | >5,000 | The extent of the FFACO UR was based on the presence of HCA conditions and lead debris which are not expected to change in the foreseeable future. Dose decay will not affect the FFACO UR boundary. The extent of the Admin UR is based on dose exceeding the IA scenario action level. Dose decay may not allow the Admin UR to be removed in the foreseeable future. |
| Little Feller II | No | >5,000 | The extent of the FFACO and Admin URs were based on dose exceeding the RW and IA scenario action levels. Dose decay may allow the FFACO UR to be changed to an admin UR within 300 years but Admin UR removal is not expected in the foreseeable future. |
| Palanquin | Yes | >5,000 | The extent of the FFACO UR was based on dose exceeding the OU scenario action level and the presence of radiological contamination within the Palanquin crater. As dose within the crater has not been assessed, dose decay will not affect evaluation of the crater area. Dose decay may allow the UR to be collapsed to the area of the crater in approximately 70 years. The extent of the Admin UR was based on dose exceeding the IA scenario action level. Dose decay may not allow the Admin UR to be removed in the foreseeable future. |
| Cabriolet | Yes | 320 | The extent of the FFACO UR was based on the presence of radiological contamination within the Cabriolet crater and HCA conditions (which is not expected to change in the foreseeable future). As dose within the crater area has not been assessed, dose decay will not affect the FFACO UR boundary. The extent of the Admin UR was based on dose exceeding the IA scenario action level. Dose decay may allow the Admin UR to be removed in approximately 320 years. |
| Danny Boy | Yes | >5,000 | The extent of the FFACO UR was based on the presence of radiological contamination within the Danny Boy crater and ejecta area. As dose within the crater area has not been assessed, dose decay will not affect the FFACO UR boundary. The extent of the Admin UR was based on dose exceeding the IA scenario action level. Dose decay may not allow the Admin UR to be removed in the foreseeable future. |

| Site | Default Boundary? | Estimated Time for Dose to Decay Below 25 mrem/year (years) | Notes/Conclusions |
| --- | --- | --- | --- |
| Schooner | Yes | >5,000 | The extent of the FFACO UR was based on the presence of radiological contamination within the Schooner crater and ejecta area. As dose within the crater area has not been assessed, dose decay will not affect the FFACO UR boundary. The extent of the Admin UR was based on dose exceeding the IA scenario action level. Dose decay may not allow the Admin UR to be removed in the foreseeable future. |
| Test Cell A | Yes | -- | The extent of the FFACO UR was based on the assumed presence of radiological contamination within the Test Cell A industrial compound. As dose within this area could not be assessed, dose decay will not affect the FFACO UR boundary. Therefore, it is not expected to change in the foreseeable future. No Admin UR exists at the site. |
| Buggy | Yes | 30 | The extent of the FFACO UR was based on the presence of radiological contamination within the Buggy crater. As dose within the crater area has not been assessed, dose decay will not affect the FFACO UR boundary. The extent of the Admin UR was based on dose exceeding the IA scenario action level. Dose decay may allow the Admin UR to be removed in approximately 30 years. |

## References


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

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

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2013. Written Communication. Subject: “Soils Risk-Based Corrective Action Evaluation Process,” Rev. 1, DOE/NV--1475. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2009. Corrective Action Decision Document/Closure Report for Corrective Action Unit 370: T-4 Atmospheric Test Site, Nevada Test Site, Nevada, Rev. 0, DOE/NV--1320. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2010. Corrective Action Decision Document/Closure Report for Corrective Action Unit 371: Johnnie Boy Crater and Pin Stripe, Nevada Test Site, Nevada, Rev. 0, DOE/NV--1395. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2011. Corrective Action Decision Document/Closure Report for Corrective Action Unit 367: Area 10 Sedan, Ess and Uncle Unit Craters, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1451. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2011. Corrective Action Decision Document/Closure Report for Corrective Action Unit 365: Baneberry Contamination Area, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1465. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2011. Corrective Action Decision Document/Closure Report for Corrective Action Unit 372: Area 20 Cabriolet/Palanquin Unit Craters, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1444. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2011. Corrective Action Decision Document/Closure Report for Corrective Action Unit 374: Area 20 Schooner Unit Crater, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1456. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2011. Corrective Action Decision Document/Closure Report for Corrective Action Unit 375: Area 30 Buggy Unit Craters, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1458. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2012. Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 104: Area 7 Yucca Flat Atmospheric Test Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1489. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2012. Corrective Action Decision Document for corrective Action Unit 366: Area 11 Plutonium Valley Dispersion Sites, Nevada National Security Site, Nevada, Rev. 0, DOE/NV--1488. Las Vegas, NV.

# Appendix A

# Decay Rate Calculations

**Location with TLD and SOIL SAMPLE:**

1.) Calculate Dose Values at $Time_0$
  a. Run $Time_0$ RESRAD using soil sample results for the location
    i. Use values as reported in CADD, except for Pu-238, Pu-239/240, and Pu-241. For these, check the CAU spreadsheet and use inferred values. For some sites, inferred values are also reported in the CADD (CAU 104 and 366).
    ii. For plots, use the average of all samples collected at the location.
  b. $Time_0$ Internal Dose = All Pathways – Ground
  c. $Time_0$ Total Corrected Dose = $Time_0$ Internal Dose + Measured External Dose (reported in the CADD or obtained from spreadsheet)
  d. External Dose Ratio = $Time_0$ Measured External Dose/$Time_0$ Ground
2.) For future doses, use the External Dose Ratio calculated for $Time_0$
  a. Use soil sample result as described for $Time_0$
  b. $Time_x$ Internal Dose = All Pathways – Ground
  c. $Time_x$ External Dose = $Time_x$ Ground x External Dose Ratio
  d. $Time_x$ Total Dose = $Time_x$ internal dose + $Time_x$ external dose

**Location with TLD ONLY:**

1.) $Time_0$ Total Dose for the TLD Only location is reported in the CADD or can be found in the CAU spreadsheet. It is reported as the average TED.
2.) Find the location with the highest average dose that has soil sample results (HLSS)
  a. Calculate HLSS $Time_0$ Internal Dose, External Dose, Total Corrected Dose, and External Dose Ratio as described for locations with TLD and Soil Sample
3.) Calculate $Time_x$ Total Dose for TLD location using values from HLSS
  a. TLD Only to HLSS Ratio = $Time_0$ Total Dose at TLD Only Location/$Time_0$ Total Dose at HLSS
  b. $Time_x$ Total Dose TLD Only Location = $Time_x$ Total Dose at HLSS * TLD Only to HLSS Ratio

# CAU 104

## IA Location A153

**Time Zero Dose (mr/yr)**

| All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
|---|---|---|---|---|---|
| 70.87 | 53.62 | 17.25 | 308.20 | 325.45 | 5.75 |

**Year X Dose (mr/yr)**

| Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) |
|---|---|---|---|---|---|
| 290 | 17.40 | 1.61 | 15.79 | 9.25 | 25.04 |
| 300 | 17.32 | 1.57 | 15.75 | 9.02 | 24.77 |
| 310 | 17.25 | 1.53 | 15.72 | 8.81 | 24.52 |

## RW Location A153

**Time Zero Dose (mr/yr)**

| All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
|---|---|---|---|---|---|
| 11.94 | 9.03 | 2.91 | 51.80 | 54.71 | 5.74 |

**Year X Dose (mr/yr)**

| Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) |
|---|---|---|---|---|---|
| 10 | 8.60 | 5.71 | 2.90 | 32.73 | 35.62 |
| 20 | 6.62 | 3.73 | 2.88 | 21.41 | 24.30 |
| 30 | 5.41 | 2.54 | 2.87 | 14.56 | 17.44 |

**This location is not above 25 mr OU at Time Zero**

# Baneberry

| IA Location A98 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 3010.00 | | 3007.00 | 3.00 | 937.60 | 940.60 | 0.31 |
| Year X Dose (mr/yr) | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 150 | 90.28 | 89.87 | 0.41 | 28.02 | 28.43 | |
| | 160 | 71.80 | 71.42 | 0.38 | 22.27 | 22.65 | |
| | 170 | 57.13 | 56.77 | 0.36 | 17.70 | 18.06 | |

| RW Location A98 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 507.00 | | 506.50 | 0.50 | 157.50 | 158.00 | 0.31 |
| Year X Dose (mr/yr) | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 70 | 95.89 | 95.73 | 0.16 | 29.77 | 29.93 | |
| | 80 | 76.13 | 76.00 | 0.13 | 23.63 | 23.76 | |
| | 90 | 60.45 | 60.33 | 0.12 | 18.76 | 18.88 | |

| OU Location A98 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (OU, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 150.70 | | 150.50 | 0.20 | 46.90 | 47.10 | 0.31 |
| Year X Dose (mr/yr) | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 20 | 90.92 | 90.80 | 0.12 | 28.30 | 28.42 | |
| | 30 | 71.90 | 71.80 | 0.10 | 22.37 | 22.47 | |
| | 40 | 57.01 | 56.92 | 0.09 | 17.74 | 17.83 | |

# CAU 366

| IA Location B21 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 269.00 | | 38.65 | 230.35 | 119.80 | 350.15 | 3.10 |
| Year X Dose (mr/yr) | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 60000 | 21.95 | 2.19 | 19.76 | 6.80 | 26.56 | |
| | 70000 | 15.58 | 2.15 | 13.43 | 6.66 | 20.09 | |
| | 80000 | 11.26 | 2.12 | 9.14 | 6.56 | 15.70 | |

| RW Location B21 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 45.31 | | 6.51 | 38.80 | 20.10 | 58.90 | 3.09 |
| Year X Dose (mr/yr) | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 9000 | 24.34 | 0.51 | 23.83 | 1.56 | 25.40 | |
| | 10000 | 23.43 | 0.50 | 22.93 | 1.54 | 24.47 | |
| | 11000 | 22.56 | 0.49 | 22.07 | 1.53 | 23.59 | |

**This location is not above 25 mr OU at Time Zero**

# Sedan, Ess, and Uncle

**IA**
**Location AT55**

| **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| | 27.62 | 26.91 | 0.71 | 59.70 | 60.41 | 2.22 |

| **Year X Dose (mr/yr)** | | | | | |
|---|---|---|---|---|---|
| Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) |
| 40 | 12.86 | 12.17 | 0.69 | 27.00 | 27.69 |
| 50 | 10.73 | 10.05 | 0.68 | 22.30 | 22.98 |
| 60 | 9.05 | 8.38 | 0.67 | 18.58 | 19.26 |

**This location is not above 25 mr RW at Time Zero**

**This location is not above 25 mr OU at Time Zero**

## T-4

| IA Location K | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | | 70.37 | | 68.26 | 2.11 | 135.54 | 137.65 | 1.99 |
| | **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | | 50 | 16.52 | 14.56 | 1.96 | 28.91 | 30.87 | |
| | | 60 | 13.38 | 11.45 | 1.93 | 22.74 | 24.67 | |
| | | 70 | 11.10 | 9.19 | 1.91 | 18.25 | 20.16 | |

**This location is not above 25 mr RW at Time Zero**

**This location is not above 25 mr OU at Time Zero**

# Johnnie Boy

| IA Location BN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 30.68 | | 30.62 | 0.06 | 43.30 | 43.36 | 1.41 |
| **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 20 | 18.08 | 18.00 | 0.08 | 25.45 | 25.53 | |
| | 30 | 14.35 | 14.27 | 0.08 | 20.18 | 20.26 | |
| | 40 | 11.62 | 11.54 | 0.08 | 16.32 | 16.40 | |

**This location is not above 25 mr RW at Time Zero**

**This location is not above 25 mr OU at Time Zero**

## Pin Stripe

| IA Location AA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | | 16.61 | | 16.56 | 0.05 | 43.30 | 43.35 | 2.61 |
| | **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | | 30 | 10.80 | 10.73 | 0.07 | 28.06 | 28.13 | |
| | | 40 | 9.16 | 9.09 | 0.07 | 23.76 | 23.83 | |
| | | 50 | 7.83 | 7.76 | 0.07 | 20.29 | 20.36 | |

**This location is not above 25 mr RW at Time Zero**

**This location is not above 25 mr OU at Time Zero**

## Little Feller I

| IA Location AQ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 181.10 | | 33.09 | 148.01 | 85.50 | 233.51 | 2.58 |
| **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 51000 | 20.70 | 3.00 | 17.70 | 7.75 | 25.45 | |
| | 52000 | 20.03 | 3.00 | 17.03 | 7.74 | 24.78 | |
| | 53000 | 19.38 | 2.99 | 16.39 | 7.73 | 24.12 | |

| RW Location AQ | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 30.51 | | 5.57 | 24.94 | 14.37 | 39.31 | 2.58 |
| **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 600 | 23.20 | 1.65 | 21.55 | 4.24 | 25.80 | |
| | 700 | 22.73 | 1.41 | 21.32 | 3.65 | 24.96 | |
| | 800 | 22.35 | 1.23 | 21.12 | 3.17 | 24.29 | |

**This location is not above 25 mr OU at Time Zero**

# Little Feller II

## IA Location BT19

Location BT19 is TLD only so the decay ratio for highest location with a soil sample (BE) was used.

| Highest Location With Soil Sample (HLSS) Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio HLSS (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| | 52.85 | 32.50 | 20.35 | 150.80 | 171.15 | 4.64 |

| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (Calculated in CAU spreadsheet) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) |
|---|---|---|---|---|---|
| | na | na | 35.40 | 262.50 | 297.90 |

| Year X Dose (mr/yr) | Year X HLSS | All Pathways HLSS (RESRAD) | External HLSS (RESRAD) | Internal HLSS (RESRAD) | Corrected External HLSS (RESRAD External * External Ratio) | Total Corrected Dose HLSS | Total Corrected Dose This Location (This Location TED T0/ HLSS TED at T0 * Total Corrected Dose Results for HLSS ) |
|---|---|---|---|---|---|---|---|
| | 20000 | 3.83 | 2.94 | 0.89 | 13.64 | 14.53 | 25.29 |
| | 30000 | 3.54 | 2.92 | 0.62 | 13.56 | 14.18 | 24.68 |
| | 40000 | 3.34 | 2.91 | 0.44 | 13.49 | 13.93 | 24.24 |

## RW Location BT19

Location BT19 is TLD only so the decay ratio for highest location with a soil sample (BE) was used.

| Highest Location With Soil Sample (HLSS) Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio HLSS (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| | 8.90 | 5.47 | 3.43 | 25.34 | 28.77 | 4.63 |

| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (Calculated in CAU spreadsheet) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) |
|---|---|---|---|---|---|
| | na | na | 5.95 | 44.10 | 50.05 |

| Year X Dose (mr/yr) | Year X HLSS | All Pathways HLSS (RESRAD) | External HLSS (RESRAD) | Internal HLSS (RESRAD) | Corrected External HLSS (RESRAD External * External Ratio) | Total Corrected Dose HLSS | Total Corrected Dose This Location (This Location TED T0/ HLSS TED at T0 * Total Corrected Dose Results for HLSS ) |
|---|---|---|---|---|---|---|---|
| | 270 | 4.63 | 2.77 | 1.86 | 12.80 | 14.67 | 25.52 |
| | 280 | 4.53 | 2.71 | 1.82 | 12.53 | 14.36 | 24.98 |
| | 290 | 4.44 | 2.65 | 1.79 | 12.27 | 14.06 | 24.46 |

**This location is not above 25 mr OU at Time Zero**

# Palanquin

| IA Plot CP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 439.40 | | 374.20 | 65.20 | 582.70 | 647.90 | 1.56 |
| **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 8200 | 24.73 | 0.55 | 24.18 | 0.86 | 25.04 | |
| | 8300 | 24.64 | 0.55 | 24.09 | 0.86 | 24.95 | |
| | 8400 | 24.55 | 0.55 | 24.00 | 0.86 | 24.86 | |

| RW Plot CP | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 74.01 | | 63.02 | 10.99 | 97.90 | 108.89 | 1.55 |
| **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 60 | 19.82 | 10.10 | 9.72 | 15.69 | 25.41 | |
| | 70 | 18.17 | 8.62 | 9.56 | 13.38 | 22.94 | |
| | 80 | 16.89 | 7.50 | 9.40 | 11.64 | 21.04 | |

| OU Plot CP | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | All Pathways (RESRAD) | | External (RESRAD) | Internal (RESRAD) | External (OU, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
| | 22.65 | | 18.73 | 3.92 | 29.14 | 33.06 | 1.56 |
| **Year X Dose (mr/yr)** | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) | |
| | 5 | 18.07 | 14.19 | 3.88 | 22.08 | 25.96 | |
| | 10 | 15.04 | 11.20 | 3.84 | 17.42 | 21.26 | |
| | | | | 0.00 | 0.00 | 0.00 | |

# Cabriolet

**IA Location DK**

| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| | 63.77 | 47.25 | 16.52 | 134.67 | 151.19 | 2.85 |

| Year X Dose (mr/yr) | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) |
|---|---|---|---|---|---|---|
| | 310 | 13.17 | 6.46 | 6.71 | 18.41 | 25.12 |
| | 320 | 12.98 | 6.38 | 6.61 | 18.17 | 24.77 |
| | 330 | 12.80 | 6.29 | 6.51 | 17.93 | 24.44 |

**RW Location DK**

| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| | 10.74 | 7.96 | 2.78 | 22.62 | 25.40 | 2.84 |

| Year X Dose (mr/yr) | Year X | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | Corrected External (RESRAD External * External Ratio) | Total Corrected Dose (RESRAD Internal + Corrected External) |
|---|---|---|---|---|---|---|
| | 5 | 9.25 | 6.52 | 2.72 | 18.54 | 21.27 |
| | | | | 0.00 | 0.00 | 0.00 |
| | | | | 0.00 | 0.00 | 0.00 |

**This location is not above 25 mr OU at Time Zero**

# Danny Boy

## IA Location AT23

Location AT23 is TLD only so the decay ratio for highest location with a soil sample (Location AT05 [Plot AA]) was used.

| | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio HLSS (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| **Highest Location With Soil Sample (HLSS) Time Zero Dose (mr/yr)** | 23.01 | 11.73 | 11.28 | 21.10 | 32.38 | 1.80 |

| | All Pathways (RESRAD) | External (RESRAD) | Internal (Calculated in CAU spreadsheet) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) |
|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | na | na | 81.83 | 153.00 | 234.83 |

| | Year X HLSS | All Pathways HLSS (RESRAD) | External HLSS (RESRAD) | Internal HLSS (RESRAD) | Corrected External HLSS (RESRAD External * External Ratio) | Total Corrected Dose HLSS | Total Corrected Dose This Location (This Location TED T0/ HLSS TED at T0 * Total Corrected Dose Results for HLSS ) |
|---|---|---|---|---|---|---|---|
| **Year X Dose (mr/yr)** | 100000 | 2.39 | 2.15 | 0.24 | 3.86 | 4.10 | 29.76 |
| | | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | 0.00 | 0.00 | 0.00 | 0.00 |

## RW Location AT23

Location AT23 is TLD only so the decay ratio for highest location with a soil sample (Location AT05 [Plot AA]) was used.

| | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio HLSS (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| **Highest Location With Soil Sample (HLSS) Time Zero Dose (mr/yr)** | 3.88 | 1.98 | 1.90 | 3.50 | 5.40 | 1.77 |

| | All Pathways (RESRAD) | External (RESRAD) | Internal (Calculated in CAU spreadsheet) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) |
|---|---|---|---|---|---|
| **Time Zero Dose (mr/yr)** | na | na | 13.78 | 25.70 | 39.48 |

| | Year X HLSS | All Pathways HLSS (RESRAD) | External HLSS (RESRAD) | Internal HLSS (RESRAD) | Corrected External HLSS (RESRAD External * External Ratio) | Total Corrected Dose HLSS | Total Corrected Dose This Location (This Location TED T0/ HLSS TED at T0 * Total Corrected Dose Results for HLSS ) |
|---|---|---|---|---|---|---|---|
| **Year X Dose (mr/yr)** | 70 | 2.78 | 0.94 | 1.85 | 1.66 | 3.51 | 25.63 |
| | 80 | 2.71 | 0.87 | 1.84 | 1.55 | 3.39 | 24.77 |
| | 90 | 2.66 | 0.82 | 1.83 | 1.46 | 3.29 | 24.06 |

**This location is not above 25 mr OU at Time Zero**

# Schooner

## IA Location BT03

Location BT03 is TLD only so the decay ratio for highest location with a soil sample (Location BT14 [Plot BE]) was used.

| Highest Location With Soil Sample (HLSS) Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio HLSS (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| | 24.25 | 22.36 | 1.89 | 54.50 | 56.39 | 2.44 |

| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (Calculated in CAU spreadsheet) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) |
|---|---|---|---|---|---|
| | na | na | 18.51 | 225.10 | 243.61 |

| Year X Dose (mr/yr) | Year X HLSS | All Pathways HLSS (RESRAD) | External HLSS (RESRAD) | Internal HLSS (RESRAD) | Corrected External HLSS (RESRAD External * External Ratio) | Total Corrected Dose HLSS | Total Corrected Dose This Location (This Location TED T0/ HLSS TED at T0 * Total Corrected Dose Results for HLSS ) |
|---|---|---|---|---|---|---|---|
| | 30000 | 2.51 | 2.29 | 0.22 | 5.57 | 5.79 | 25.03 |
| | 35000 | 2.47 | 2.28 | 0.19 | 5.56 | 5.75 | 24.85 |
| | 40000 | 2.44 | 2.28 | 0.17 | 5.55 | 5.71 | 24.69 |

## RW Location BT03

Location BT03 is TLD only so the decay ratio for highest location with a soil sample (Location BT14 [Plot BE]) was used.

| Highest Location With Soil Sample (HLSS) Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (RESRAD) | External (IA, Average) | Total Corrected Dose (RESRAD Internal + Measured External) | External Ratio HLSS (Measured/RESRAD) |
|---|---|---|---|---|---|---|
| | 4.08 | 3.77 | 0.32 | 9.20 | 9.52 | 2.44 |

| Time Zero Dose (mr/yr) | All Pathways (RESRAD) | External (RESRAD) | Internal (Calculated in CAU spreadsheet) | External (RW, Average) | Total Corrected Dose (RESRAD Internal + Measured External) |
|---|---|---|---|---|---|
| | na | na | 3.12 | 37.80 | 40.92 |

| Year X Dose (mr/yr) | Year X HLSS | All Pathways HLSS (RESRAD) | External HLSS (RESRAD) | Internal HLSS (RESRAD) | Corrected External HLSS (RESRAD External * External Ratio) | Total Corrected Dose HLSS | Total Corrected Dose This Location (This Location TED T0/ HLSS TED at T0 * Total Corrected Dose Results for HLSS ) |
|---|---|---|---|---|---|---|---|
| | 5 | 3.17 | 2.85 | 0.31 | 6.97 | 7.28 | 31.31 |
| | 10 | 2.54 | 2.24 | 0.31 | 5.46 | 5.77 | 24.80 |
| | 15 | 2.09 | 1.79 | 0.30 | 4.38 | 4.68 | 20.11 |

**This location is not above 25 mr OU at Time Zero**

<table>
<tr><td colspan="9">Buggy</td></tr>
<tr><td rowspan="7">IA<br>Location BT31<br><br>Location B13 is TLD only so the decay ratio for highest location with a soil sample (Location B04 [Plot BA]) was used.</td><td>Highest Location With Soil Sample (HLSS)</td><td colspan="2">All Pathways (RESRAD)</td><td>External (RESRAD)</td><td>Internal (RESRAD)</td><td>External (IA, Average)</td><td>Total Corrected Dose (RESRAD Internal + Measured External)</td><td>External Ratio HLSS (Measured/RESRAD)</td></tr>
<tr><td>Time Zero Dose</td><td colspan="2">38.02</td><td>37.98</td><td>0.04</td><td>62.70</td><td>62.74</td><td>1.65</td></tr>
<tr><td rowspan="2">Time Zero Dose (mr/yr)</td><td colspan="2">All Pathways (RESRAD)</td><td>External (RESRAD)</td><td>Internal (Calculated in CAU spreadsheet)</td><td>External (IA, Average)</td><td>Total Corrected Dose (RESRAD Internal + Measured External)</td><td rowspan="2"></td></tr>
<tr><td colspan="2">na</td><td>na</td><td>6.60</td><td>66.10</td><td>72.70</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td rowspan="2">Year X Dose (mr/yr)</td><td>Year X HLSS</td><td>All Pathways HLSS (RESRAD)</td><td>External HLSS (RESRAD)</td><td>Internal HLSS (RESRAD)</td><td>Corrected External HLSS (RESRAD External * External Ratio)</td><td>Total Corrected Dose HLSS</td><td>Total Corrected Dose This Location (This Location TED T0/ HLSS TED at T0 * Total Corrected Dose Results for HLSS )</td></tr>
<tr><td>20<br>30<br>40</td><td>16.73<br>12.30<br>9.44</td><td>16.68<br>12.25<br>9.39</td><td>0.05<br>0.05<br>0.05</td><td>27.54<br>20.22<br>15.51</td><td>27.59<br>20.27<br>15.56</td><td>31.97<br>23.49<br>18.03</td></tr>
<tr><td colspan="9"></td></tr>
<tr><td colspan="9">This location is not above 25 mr RW at Time Zero</td></tr>
<tr><td colspan="9"></td></tr>
<tr><td colspan="9">This location is not above 25 mr OU at Time Zero</td></tr>
</table>

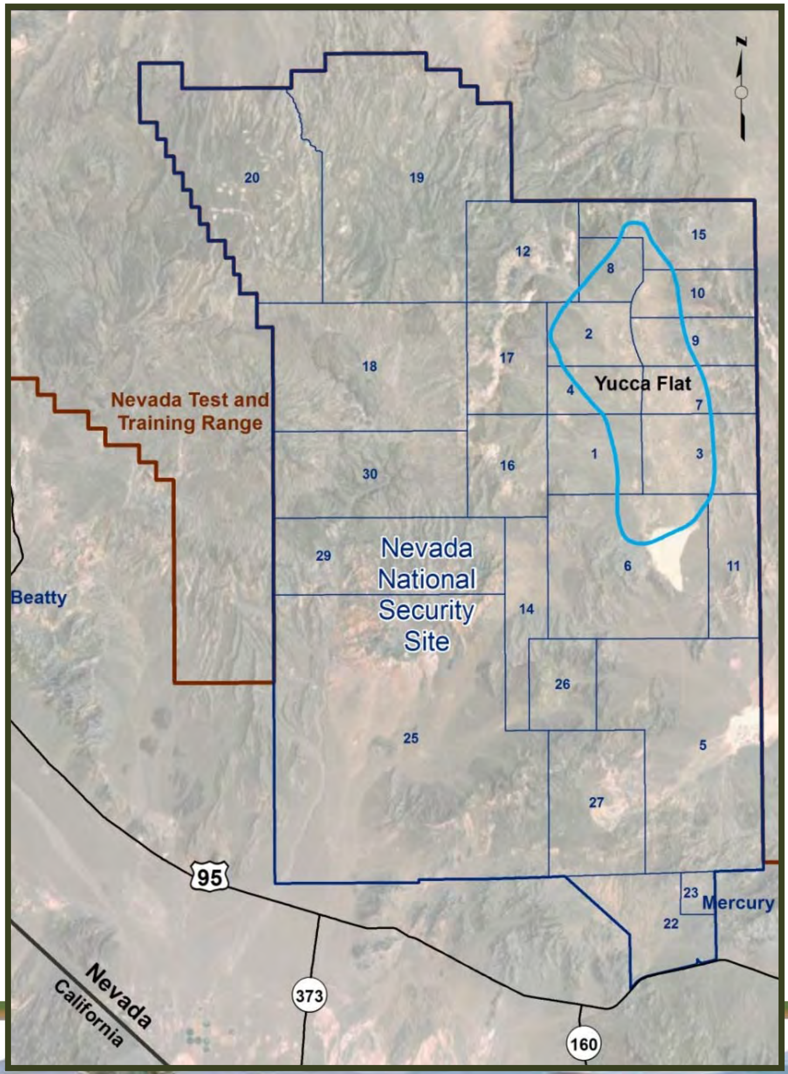
# External Peer Review for Yucca Flat

**Bill Wilborn**
Underground Test Area (UGTA) Activity Lead
Nevada Site Specific Advisory Board (NSSAB)
November 20, 2013

# NSSAB Work Plan Item 2

- *External Peer Review for Yucca Flat*
  - Department of Energy (DOE) is seeking NSSAB recommendation, from a community perspective, on what types of representation should be on the external peer review panel and how the questions could be enhanced
  - NSSAB recommendation requested this evening

# Yucca Flat Location



# Background for External Peer Review (EPR)

- Required by the Federal Facility Agreement and Consent Order (FFACO) during the Corrective Action Investigation stage
- Held once internal review and State of Nevada Division of Environmental Protection (NDEP) acceptance of the Corrective Action Unit (CAU) flow and transport modeling work is completed and documented
- Specific questions are developed for the EPR to answer after completing their evaluation *(these questions are presented for NSSAB consideration later in the presentation)*

# Background for EPR
(continued)

- Second CAU to undergo peer review
  – Frenchman Flat in 2010

Frenchman Flat Peer Review Pre-Visit

# EPR Process

- EPR consists of scientific experts in multiple disciplines (i.e., regulatory, geology, hydrology, physics, modeling, radiochemistry, etc.)
- Planning to completion typically takes a full year
- Conduct a mock-up peer review internally to prepare
- Provide tour, presentations, and discussions for EPR members to become familiar with activity

EPR members receive briefings during 2010 French Flat review

# EPR Process
(continued)

- EPR anticipated to involve many hours of work per reviewer over a six month period
  - EPR expected to read and review over 2,000 pages of technical information, view the modeling outcomes, etc.
- DOE and EPR participate in additional discussions after review is completed, if necessary
- DOE receives report and close-out from the EPR
- DOE will complete additional work if necessary, or request approval from NDEP for the Yucca Flat model

# NSSAB Work Plan Item 2

- *External Peer Review for Yucca Flat*
  - DOE is seeking NSSAB recommendation, from a community perspective, on what types of representation should be on the external peer review panel and how the questions could be enhanced

# Criteria for Yucca Flat EPR Members

- During the search, DOE is concentrating on the following technical fields:
  - Geology
  - Hydrogeology
  - Groundwater flow and transport modeling
  - Uncertainty analysis
  - Geochemistry/radiochemistry
  - Unsaturated-zone processes
  - Regulatory risk analysis
- Ideally, candidates will have practical, real-world experience conducting or reviewing hydrologic or contaminant transport studies within a regulatory environment

# Criteria for Yucca Flat EPR Members
(continued)

- Geologist
  - Expert to evaluate the geologic conceptual and framework models and its relationship to hydrogeologic setting
    - Experience in rock deformation effects on hydrogeologic processes and parameters around nuclear detonations
- Hydrogeologist
  - Expert to review interpretations of geologic, hydrologic and geochemical/radiochemical data to form an internally consistent interpretation of the Yucca Flat basin flow and transport system
    - Experience in hydrology of arid environment with deep groundwater tables

# Criteria for Yucca Flat EPR Members
(continued)

- Unsaturated-Zone Hydrologist
  - Expert with knowledge of unsaturated-zone flow and transport processes
    - Experience in modeling liquid and/or gas-phase transport processes
- Groundwater Flow and Transport Modeler
  - Expert with broad experience modeling groundwater flow and transport
    - Experience in fractured/faulted dual-porosity groundwater systems

# Criteria for Yucca Flat EPR Members
(continued)

- Geochemist/Radiochemist
  - Expert with understanding of processes and geochemical factors affecting transport of radionuclides in groundwater
    - Experience in applying naturally occurring isotopic and chemical variations to the interpretation of groundwater systems
- Regulator
  - Expert with earth science/nuclear waste background
    - Experience in evaluating compliance with regulatory standards and/or use of models to inform decision-making

# Questions for EPR

1. Are the approaches, assumptions, and results consistent with the use of the models as decision tools for meeting FFACO regulatory requirements?
   a. Are the models of sufficient scale/resolution to adequately forecast contaminant transport in the Yucca Flat/Climax Mine setting?
   b. Have the key processes been included in the models?
   c. Are the flow and transport modeling results and uncertainties technically sound and defensible?

2. Are the datasets and modeling results adequate for a transition to model evaluation studies in the Corrective Action Decision Document/Corrective Action Plan stage—the next stage in the UGTA strategy for the Yucca Flat/Climax Mine CAU?

# NSSAB Input

- Provide DOE a recommendation, from a community perspective, on what types of representation should be on the external peer review panel and how the questions could be enhanced
- Recommendation requested this evening
- Thanks for your input!

November 6, 2013

David Huizenga
Senior Advisor for Environmental Management
U.S. Department of Energy, EM-1
1000 Independence Avenue, SW
Washington, DC 20585

Dear Senior Advisor Huizenga:

The Environmental Management Site-Specific Advisory Board (EM SSAB) recommends that the U.S. Department of Energy (DOE) develop and make available to the public graphic representations of the current and planned EM legacy waste disposition paths. Some years ago the DOE created such maps in conjunction with the League of Women Voters and they were presented at two national Waste Disposition workshops. The maps were accompanied by large 3D displays using the map of the U.S. as the base, overlaid by stacks of colored plastic boxes representing types and relative quantities of nuclear waste that were placed in the locations where the waste would be generated or interim stored with an arrow stretched from that location to the final disposal site with dates for disposal inside the arrows. The 3D visuals were profound and easily understood, and paper, color-coded graphics were provided to the participants in the workshop to keep.

The EMSSAB requests that DOE resurrect or re-create these “disposition maps” and make them publicly available online. We realize that for security reasons certain wastes can’t be quantified but that is a small portion of the waste to be disposed. These maps would be incredibly beneficial to the EMSSAB and would increase the public’s ability to understand the waste types, quantities and plans for disposal so they can become more informed as opportunities for public engagement in decisions of waste disposal arise.

The EMSSAB volunteers to work with the DOE-EM on the development and/or updating of the maps and could be the first public reviewers of the graphics to help ensure the maps are easily understood by the public.

Steve Hudson, Chair
Hanford Advisory Board

Herb Bohrer, Chair
Idaho National Laboratory Site EM Citizens Advisory Board

Kathleen Bienenstein, Chair
Nevada SSAB

Carlos Valdez, Chair
Northern New Mexico Citizens' Advisory Board

David Hemelright, Chair
Oak Ridge SSAB

Ben Peterson, Chair
Paducah Citizens Advisory Board

William Henderson, Chair
Portsmouth SSAB

Donald Bridges, Chair
Savannah River Site Citizens Advisory Board

cc: Kristen Ellis, EM-3.2
Catherine Alexander, EM-3.2

ENVIRONMENTAL MANAGEMENT SITE-SPECIFIC ADVISORY BOARD

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November 6, 2013

David Huizenga
Senior Advisor for Environmental Management
U.S. Department of Energy, EM-1
1000 Independence Avenue, SW
Washington, DC 20585

Dear Senior Advisor Huizenga:



**Title:**
Funding for cleanup U.S. Department of Energy (DOE) sites should be maintained as a top priority.

**Background:**
Sites across the complex are chartered with cleaning up the waste generated by legacy, Cold War and national defense efforts. Each site has served a specific purpose in developing the nuclear age which the world now lives in. Because of these efforts, contaminated waste resides in each site, which brings considerable health and safety risk to humans and the environment.

Protecting human health and the environment from hazardous waste produced by these sites should be the top priority for all involved. To date, clean-up efforts, as it relates to legacy and Cold War efforts in and around each site, have been jeopardized because of federal funding.

**Observations and Comments:**
Over the past several years, the federal government has made several budget cuts to programs around the country. In addition, the government also continues to operate under a "continuing resolution" and other "sequestrations" conditions. This has slowed the progress of clean-up efforts around the country, and has put sites at jeopardy of not meeting regulated deadlines. With sites unable to meet statutory deadlines, it opens up the possibility of regulatory agencies having the right to assess excessive fines, which takes away funding from clean-up efforts. Operating under these situations and sequestration conditions does not reduce the risk to human health and safety and to the environment as a whole. It also condones the possibility of using clean-up funds to pay fines. Clean-up funding should have special dispensation from federal budget cuts, sequestrations and continuing resolutions that lower funding levels. EM funding should be held harmless when these conditions are present.

**Recommendation:**
The Environmental Management Site-Specific Advisory Board (EM-SSAB) recommends that DOE make every effort possible, including addressing Congress with this recommendation, to ensure that EM funding for all sites across the DOE Complex should be maintained as a top priority as it relates to across the board cut-backs in federal funding, operating under continuing resolutions and any other sequestrations. Federal budget cuts should not include funding for remediation or clean-up efforts.

**Intent:**
It is the intent of the EM-SSAB to make every possible effort to protect the environment and reduce the risk to human health and safety by securing the best possible funding scenario of EM budgets and to ensure clean-up efforts are not slowed or put in jeopardy.



| | | |
|---|---|---|
| Steve Hudson, Chair<br>Hanford Advisory Board | Herb Bohrer, Chair<br>Idaho National Laboratory Site EM Citizens Advisory Board | Kathleen Bienenstein, Chair<br>Nevada SSAB |
| Carlos Valdez, Chair<br>Northern New Mexico Citizens' Advisory Board | David Hemelright, Chair<br>Oak Ridge SSAB | Ben Peterson, Chair<br>Paducah Citizens Advisory Board |
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cc: Kristen Ellis, EM-3.2
Catherine Alexander, EM-3.2

**ENVIRONMENTAL MANAGEMENT SITE-SPECIFIC ADVISORY BOARD**

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| **Oak Ridge** | **Paducah** | **Portsmouth** | **Savannah River** |

November 6, 2013

David Huizenga
Senior Advisor for Environmental Management
U.S. Department of Energy, EM-1
1000 Independence Avenue, SW
Washington, DC 20585

Dear Senior Advisor Huizenga:



**Background**

The Environmental Management Site-Specific Advisory Board (EM SSAB) wishes to thank the U. S. Department of Energy (DOE) for taking action toward lifting the suspension on unrestricted use of non-contaminated metals and equipment from radiological areas. This action, which would preserve metals and materials that would otherwise be treated as waste, demonstrates DOE's commitment to achieving its policies of waste minimization and pollution prevention.

The EM SSAB believes that DOE made the right decision in researching and publishing the *Programmatic Environmental Assessment for the Recycle of Scrap Metals Originating from Radiological Areas (DRAFT)****.*** Responsible stewardship of government resources by recycling, reclamation, and reuse will help preserve the precious natural resources of this nation for future generations and our national security. The EM SSAB looks forward to the final decision of the Programmatic Environmental Assessment as the DOE seeks to align itself with Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*.

The EM SSAB has long advocated recycling and reuse of excess metals and materials by the DOE as an environmentally responsible method for the DOE to deal with waste and preserve national assets. The EM SSAB also believes it would benefit DOE and the nation if the Department develops and implements a strategy to educate the general public on benefits and risks of recycling metals from DOE EM sites.

Recently, the DOE implemented a pilot study at the Portsmouth Gaseous Diffusion Plant (GDP) site to study nickel processing. The EM SSAB looks forward to reviewing the results of the year-long trial of the carbonyl process recently authorized at Portsmouth.

The EM SSAB believes that the DOE should make a final decision on standards for free-release of metals and equipment. International standards, long used by other industrialized nations, provide the regulatory framework for determining free-release standards in developed nations. It is probable that materials which have been imported into the United States have been released from their country of origin on the basis of the International Atomic Energy Agency standards. Therefore, it would seem that the United States would also adopt these standards as the criteria by which human health and the environment are protected. While we are not advocating a reduction in protection, we are advocating that uniform standards be established based on those already adopted by other industrialized nations.

There are vast amounts of contaminated, high quality nickel and other metals that should be reclaimed when DOE facilities undergo decontamination and decommissioning (D&D). The Paducah GDP and Portsmouth GDP cascades, for example, are made up of several components such as compressors and converters, along with miles of associated piping. These components are constructed of nickel, monel, copper, nickel-plated steel, aluminum, and other valuable materials. If these components are treated as waste, they will consume volumes of space in disposal cells. In cases where the technology is not currently available for decontamination, high value materials should be stored pending development of innovative technologies.

Another option for disposition of volumetrically contaminated assets could be restricted reuse of the reclaimed assets by DOE-authorized nuclear facilities, the commercial nuclear industry, or Nuclear Regulatory Commission licensees authorized to possess the material. Nickel currently stored at Paducah and Oak Ridge, along with the volumes that will be generated during the D&D of the GDPs could be used in this manner and still be compliant with the moratorium of January 12, 2000, which prohibits free-release of volumetrically contaminated scrap metals.

<u>Recommendation</u>

Besides the DOE making a final decision on release of clean metals originating from radiological areas, the EM SSAB recommends DOE establish a comprehensive and structured recycling program to address volumetrically contaminated metals. This action offers the following benefits:

- Support environmental sustainability goals by recovery of many hundreds of tons of valuable materials and components that are of value to the nation's economy.
- Generate significant revenue to both DOE and host communities.
- Reduce footprint of on-site or off-site disposal cells.
- Minimize disposal costs.
- Reduce site legacy costs.

DOE should develop a strategy to educate the general public on benefits and risks of recycling metals from DOE EM sites.

The EM SSAB recommends DOE adopt International Atomic Energy Agency standards or their equivalence in determining which metals and materials meet the criteria for free-release and provide a report on the impact of this action.  As a part of adopting the IAEA standards DOE should develop a public education component.

The EM SSAB recommends that in cases where technology is not currently available for decontamination, high value materials should be stored pending development of innovative technologies.



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cc: Kristen Ellis, EM-3.2
Catherine Alexander, EM-3.2

FY 2014 NSSAB Meetings with Topics

February 19, 2014:

- NSSAB recommendation on Radionuclide Decay at Use-Restricted Soil Sites
- NSSAB recommendation on ways to improve the Groundwater Open House
- Presentation on NNSS Communication Plan for Groundwater Sampling Results
- Presentation on Rainier Mesa/Shoshone Mountain Peer Review Panel (briefing may be changed to March 19 or May 21)

March 19, 2014:

- NSSAB recommendation on NNSS Communication Plan for Groundwater Sampling Results
- Presentation on FY 2016 Baseline Prioritization
- NSSAB recommendation on FY 2016 Baseline Prioritization

May 21, 2014:

- Presentation on Radioactive Waste Acceptance Program Assessment Improvement Opportunities
- NSSAB recommendation on Rainier Mesa/Shoshone Mountain Peer Review Panel

July 16, 2014:

- NSSAB recommendation on Radioactive Waste Acceptance Program Assessment Improvement Opportunities
- NSSAB recommendation on ways to improve communication to the community regarding waste transportation and disposal

September 17, 2014:

- Develop FY 2015 Work Plan Items