



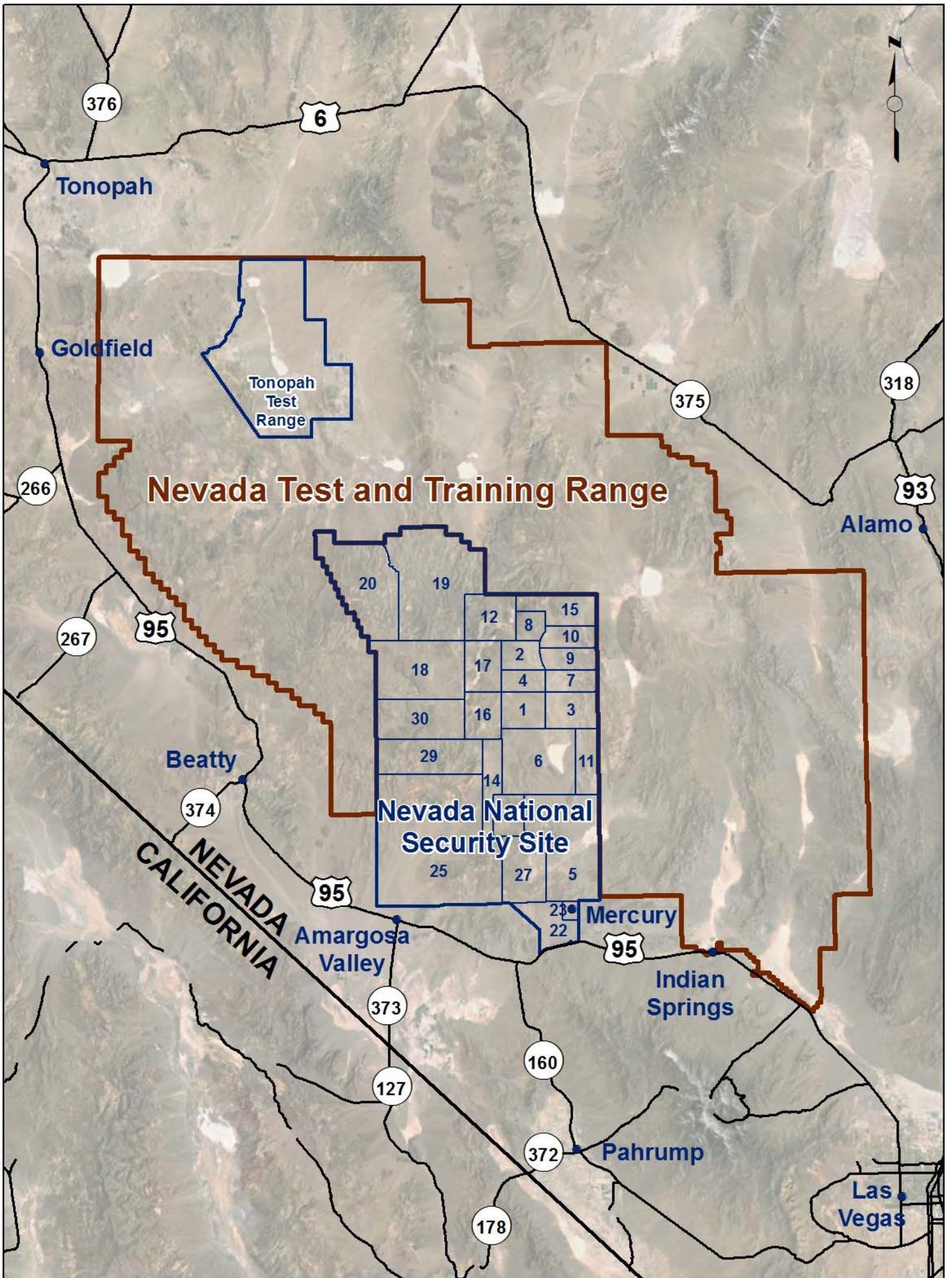
Nevada Site Specific Advisory Board Table of Contents

**Full Board Meeting Handouts for
Wednesday, February 18, 2015**

**Please note: For your convenience, this Table of Contents
has a link to the first page of each handout.**

**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**

Page 2	Map of the Nevada National Security Site (NNSS) and the (8) Environmental Management Site Specific Advisory Board Locations
Page 4	Attendance Spreadsheet
Page 5	NSSAB Recommendation and DOE Response for Annual NNSS Environmental Report (Work Plan Item #5)
Page 11	Draft Recommendation Letter for Assessment of the Underground Test Area (UGTA) Quality Assurance Plan Implementation (Work Plan Item #8)
Page 14	Model Evaluation Completion and Moving to Closure in Frenchman Flat
Page 37	UGTA Groundwater Closure Strategy



U.S. DEPARTMENT OF ENERGY ENVIRONMENTAL MANAGEMENT SITE-SPECIFIC ADVISORY BOARDS



NSSAB MEETING ATTENDANCE

Full Board Meetings

October 2014 through September 2015 (FY 2015)

Name	11/19/14	1/21/15	2/18/15	3/25/15	5/20/15	7/15/15	9/16/15	Max Terms
MEMBERS								
Michael Anderson	E	√						2020
Amina Anderson	√	√						2020
Michael D'Alessio	√	√						2020
Pennie Edmond	√	√						2020
Donna Hruska	√	√						2016
Janice Keiserman	√	√						2018
James Manner	√	√						2020
Michael Moore	√	√						2016
Donald Neill	√	√						2020
Edward Rosemark	√	√						2018
Steve Rosenbaum	√	√						2020
William Sears	√	√						2018
Thomas Seley	√	√						2020
Cecilia Flores Snyder	√	√						2020
Jack Sypolt	√	√						2017
James Tallant	√	√						2020
Francisca Vega	√	√						2020
LIAISONS								
Clark County	√	√	E					
Consolidated Group of Tribes and Organizations	√	√	E					
Elko County Commission	U	U	V					
Esmeralda County Commission	E	E						
Lincoln County Commission	U	U	E					
Nye County Commission	E	E						
Nye Co. Nuclear Waste Repository Project Office	√	√						
State of NV Division of Env Protection	√	√						
U.S. Natl Park Service	E	√	E					
White Pine Co. Commission	U	U						
KEY: √ = Present V=Vacant E = Excused U = Unexcused RM = Remove RS = Resign								



Nevada Site Specific Advisory Board

January 21, 2015

Mr. Scott A. Wade
Environmental Management
U.S. Department of Energy, Nevada Field Office
P. O. Box 98518
Las Vegas, NV 89193-8518

SUBJECT: Recommendation for Annual Nevada National Security Site
Environmental Report (NNSER) ~ Work Plan Item #5

Dear Mr. Wade,

The Nevada Site Specific Advisory Board (NSSAB) was asked to provide a recommendation, from a community perspective, to the U.S. Department of Energy (DOE) on how the Annual NNSER could be enhanced (i.e., readability, presentation of information, likes and dislikes between NNSER and other DOE sites Annual Site Environmental Reports).

After an educational session, a briefing, and Board discussion during the November 19, 2014 Full Board meeting, the NSSAB divided into four groups to review the following sections of the NNSER and compare to other DOE Environmental Reports that pertain to Environmental Management activities: 1) Summary, 2) Chapter 5, Section 5.1: Water Monitoring, 3) Chapter 10, Section 10.1: Waste Management, and 4) Chapter 11: Environmental Restoration.

In regard to the summary, the NSSAB felt that the document is at the right technical level and that the varied format, i.e. text, sequence, graphs, figures, pictures, colors, etc., enhances the report for readability by the public. In comparison, the NSSAB thought that the NNSER summary's overall presentation is better than other DOE environmental reports.

Overall, the majority of the NSSAB felt that the information included in the chapters is very technical for the general lay person without a science background. However, the NSSAB understands that a technical tone is required, but recommends that the reading level of the chapters meets the expected reading level of the general public. In addition, the NSSAB felt that it was difficult to refer from each chapter to the appendices and recommends adding hyperlinks to the online NNSER.

In both the summary and chapters, the NSSAB would like to see a glossary or sidebar of acronyms and to limit the use of acronyms and technical use of terms. Also, the tables, maps, and figures are valuable to explain/illustrate the subject matter, although some captions need additional detail and information and suggest that the font size in legends be increased for readability.

Members

Michael Anderson
Amina Anderson
Michael D'Alessio
Pennie Edmond
Donna Hruska, Chair
Janice Keiserman, Vice Chair
James Manner
Michael Moore
Donald Neill
Edward Rosemark
Steve Rosenbaum
William Sears
Thomas Seley
Cecilia Flores Snyder
Jack Sypolt
James Tallant
Francisca Vega

Liaisons

Clark County
Consolidated Group of Tribes
and Organizations
Elko County Commission
Esmeralda County Commission
Lincoln County Commission
Nye County Commission
Nye County Nuclear Waste
Repository Project Office
State of Nevada Division of
Environmental Protection
U.S. National Park Service
White Pine County Commission

Administration

Barbara Ulmer, Administrator
Navarro-Intera
Kelly Snyder, DDFO
*U.S. Department of Energy,
Nevada Field Office*

The NSSAB, from a community perspective, makes the following recommendations by summary/chapter:

— Summary:

- Cross reference the material in the full NNSER to the summary in the Table of Contents
- Note for clarity in the first and not the third paragraph that it is a summary document (page 1)
- Change the phrase “released into the community” to “made available to the general public” (page 4, Emergency Planning and Community Right to Know Act)
- Clarify the last sentence, *“Was the reference only to Lake Mead and Boulder City? What impact does global atmospheric testing have on surface water? Can you separate the impact of the global testing from the NNSS activities? Additionally, it appears that the focus of the last paragraph was the low detectable level of tritium and the last two sentences introduce a different thought.”* (page 12)
- Move “Understanding Radiation Dose” section before radiological monitoring sections
- Improve phrasing of, “..seven were moved out of harm’s way off roads.” to “.. seven were moved off NNSS roads.” (page 20)
- Eliminate the word “successfully” in last sentence about pumas as it implies that NNSS killed some pumas while attempting to capture them (page 21)
- Utilize U.S. customary units or list both measurements (metric system) as the picocuries per liter measurement is not understood by the general public
- Mention that all appropriate radionuclides in groundwater are sampled and explain the reason that tritium is the primary contaminant of concern
- Add small symbols to indicate the end of a section similar to newspaper and magazine articles
- Print, “Continued on Page xx...”, right after the text of the article as it currently appears that the phrase is floating at the bottom of the page and it looks like the graphs continue and not the article (page 13)
- Improve uniformity of format as the different column widths and lengths is confusing, i.e. on page 20, an article breaks and it is difficult to follow where the article continues and the small print indicating where to continue reading made it more confusing at first glance as it looks cluttered
- Increase the size of the maps to a full page (page 12)
- Add mileage distance of each community to the NNSS of the map, 2013 CEMP Water Monitoring Locations (page 12)
- Change the colors for the labels on the Types of Groundwater Sampling Locations table and the colors for the well locators on the adjacent NNSA/NFO Water Sampling Network map so they match (page 11)

— Chapter 5, Section 5.1: Water Monitoring:

- Limit the use of cross-referencing to other sections and attachments
- Standardize color-coding in figures (for example, in Figure 5-3, the color red signifies >100; in Figure 5-2, the color red signifies “Early Detection” and purple signifies “Source”; recommend changing purple to red as a danger color in Figure 5-2 which would be consistent with Figure 5-3 graphic color representation)
- Address concerns about all radionuclides found in groundwater (for example, plutonium has been detected on Pahute Mesa in Wells ER-20-5 and ER-20-7 (Kersting), but is not listed as a concern on Table 5-2, page 5-6; no mention of monitoring for increases in the amount of plutonium that has migrated 1.3 kilometer from Benham)

— Chapter 5, Section 5.1: Water Monitoring (continued):

- Change to read, "...most mobile in groundwater and are presently produced..." or "...are produced..." (page 5-4, section 5.1.1.1, first paragraph, last sentence)
- Utilize U.S. customary units or list both measurements (metric system) as the picocuries per liter measurement is not understood by the general public
- Apply percent of maximum contaminant level rather the picocuries per liter for tritium concentration results
- Mention that all appropriate radionuclides in groundwater are sampled and explain the reason that tritium is the primary contaminant of concern
- Highlight statements of great importance in a different font color, such as, "Tritium has not been detected in any NNSS PWS wells."
- Add mileage distance of each community to the NNSS (page 7-12, section 7.2.2, Figure 7-7. 2013 CEMP water monitoring locations)

— Chapter 10, Section 10.1: Waste Management:

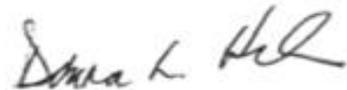
- Include a paragraph at the end of the section with a status update if the goals were met that are listed at the beginning of Chapter 10 in the green box, "Waste Management Goals"
- Add a list of Corrective Action Sites for each Corrective Action Unit
- Utilize a corresponding chart/map to illustrate the seven craters configured into five disposal cells (page 10-3, section 10.1.3, first sentence)
- Add an introduction for Section 10.4 Solid and Sanitary Waste Management

— Chapter 11: Environmental Restoration:

- Change "protective" to "that protects the public" (page 11-2, section 11.1, first paragraph-last sentence)
- Define "institutional controls" (page 11-2, , section 11.1, second paragraph-last sentence)
- Change "Western and Central" to "Central and Western" for consistency (page 11-7, section 11.1.2.2, first paragraph, first sentence)
- Change to read, "...characteristics, and hydrologic properties..." (page 11-7, section 11.1.2.2., last paragraph, first sentence)
- Update the status of tasks mentioned in 2013 Annual NNSSER in report for 2014 (page 11-9, sections 11.1.2.3 and 11.1.2.4, last sentence in both)
- Review discussion of closures completed before 2013 and consider removing from future NNSSERs as it is confusing and unnecessary as information may be accessed from previous years' reports
- Add conclusions in lay terms to the green paragraphs that explain the objectives of each activity; therefore the public may decide whether to continue pursuing the technical narrative, charts, and graphs
- Utilize both section, figure, and table numbers when referencing figures and tables from another chapter
- Employ footnotes to reference research papers rather than incorporating into the text for readability
- Increase visual aids, lists, and charts, i.e. utilize a 1,000-year timeline to reinforce the restoration activity, the current year, and the radiologic component disappearing below the horizon of safe, background levels within that time period

The NSSAB appreciates the presentations and the professionalism that Cathy Wills, the NNSER main author and editor, displayed in support of this work plan item and for the opportunity to review the Annual NNSER and provide these recommendations to the DOE on how to enhance the document for the public.

Sincerely,

A handwritten signature in black ink, appearing to read "Donna L. Hruska". The signature is fluid and cursive, with the first name "Donna" being the most prominent.

Donna L. Hruska, Chair

cc: K. G. Ellis, DOE/HQ (EM-3.2)
M. R. Hudson, DOE/HQ (EM-3.2)
E. B. Schmitt, DOE/HQ (EM-3.2)
R. F. Boehlecke, NFO
C. G. Lockwood, NFO
K. S. Knapp, NFO
P. A. Sanders, NFO
K. K. Snyder, NFO
B. K. Ulmer, N-I
NSSAB Members and Liaisons



Department of Energy
National Nuclear Security Administration
Nevada Field Office
P.O. Box 98518
Las Vegas, NV 89193-8518



FEB 11 2015

Donna L. Hruska, Chair
Nevada Site Specific Advisory Board
232 Energy Way
North Las Vegas, NV 89030

**RESPONSE TO THE NEVADA SITE SPECIFIC ADVISORY BOARD (NSSAB)
RECOMMENDATIONS REGARDING REVIEW OF THE NEVADA NATIONAL
SECURITY SITE ENVIRONMENTAL REPORT (NNSER) (WORK PLAN ITEM #5)**

I would like to thank each member of the NSSAB for their review of the NNSER Summary; Chapter 5, Section 5.1; Chapter 10, Section 10.1; and Chapter 11. The resultant review comments received by the Department of Energy (DOE) in the January 21, 2015, NSSAB correspondence were constructive and insightful on how DOE can improve the clarity, quality, and readability of this public document.

In reviewing the comments and after some discussion, we decided to group the NSSAB recommendations into several categories as it seemed they had similar themes.

We grouped together the editorial comments suggesting word changes (ex. "Improve phrasing of, "...seven were moved out of harm's way off roads." to "... seven were moved off NNS roads." (page 20)"). Many of these were regarding wording that remains similar from year to year; so these comments will be incorporated in the next edition of the NNSER, as appropriate.

We grouped together comments regarding graphical changes to existing tables/maps/figures (ex. "Change the colors for the labels on the Types of Groundwater Sampling Locations table and the colors for the well locators on the adjacent NNSA/NFO Water Sampling Network map so they match (page 11)"). For tables, figures, and maps generated specifically for the NNSER, we intend to incorporate these recommended changes into future editions of the report. Due to limited funding, we do use some figures and maps from other existing documents. We also use these to ensure consistency between reports. We will incorporate the NSSAB comments on these graphics as funding becomes available to support such changes.

We agreed with all the suggested organizational changes (ex. "Move "Understanding Radiation Dose" section before radiological monitoring sections") and will incorporate in future reports.

Some comments addressed specific technical issues (ex. "Mention that all appropriate radionuclides in groundwater are sampled and explain the reason that tritium is the primary contaminant of concern"). While in some cases we thought we had explained the specific technical issue, your review proved to be a good litmus test. It showed us that we had not clearly discussed the subject as well as we thought or the discussion was not where the public might expect it to be found. For most cases, we will address this seeming gap in explanation, such as a

better explanation of sampling design for the radiological water monitoring. One NSSAB comment suggested discussing the impacts of global atmospheric testing on surface water, but we believe this is beyond the scope or intent of this document.

Finally, we plan to include hyperlinks as part of the online NNSSER. However, we will not be adding a list of Corrective Action Sites to the NNSSER as there are more than 5,000 at the NNSS.

Again, I would like to reiterate my thanks to each member of the NSSAB for their contributions to the NNSSER review.

Please direct comments and questions to Kelly Snyder at (702) 295-2836.



Scott A. Wade
Assistant Manager
for Environmental Management

EMOS:11090.PS

cc via e-mail:

K. G. Ellis, DOE/HQ (EM-3.2)
M. R. Hudson, DOE/HQ (EM-3.2)
E. B. Schmitt, DOE/HQ (EM-3.2)
R. F. Boehlecke, NFO
K. S. Knapp, NFO
C. G. Lockwood, NFO
P. A. Sanders, NFO
K. K. Snyder, NFO
B. K. Ulmer, N-I
NSSAB Members and Liaisons
NFO Read File



Nevada Site Specific Advisory Board

February 18, 2015

Members

Michael Anderson
Amina Anderson
Michael D'Alessio
Pennie Edmond
Donna Hruska, Chair
Janice Keiserman, Vice Chair
James Manner
Michael Moore
Donald Neill
Edward Rosemark
Steve Rosenbaum
William Sears
Thomas Seley
Cecilia Flores Snyder
Jack Sypolt
James Tallant
Francisca Vega

Liaisons

Clark County
Consolidated Group of Tribes
and Organizations
Elko County Commission
Esmeralda County Commission
Lincoln County Commission
Nye County Commission
Nye County Nuclear Waste
Repository Project Office
State of Nevada Division of
Environmental Protection
U.S. National Park Service
White Pine County Commission

Administration

Barbara Ulmer, Administrator
Navarro-Intera
Kelly Snyder, DDFO
*U.S. Department of Energy,
Nevada Field Office*

Mr. Robert F. Boehlecke
Environmental Management Operations Manager
U.S. Department of Energy, Nevada Field Office
P. O. Box 98518
Las Vegas, NV 89193-8518

SUBJECT: Recommendation for Assessment of the Underground Test Area (UGTA) Quality Assurance Plan (QAP) Implementation (Work Plan Item #8)

Dear Mr. Boehlecke,

The Nevada Site Specific Advisory Board (NSSAB) was asked to provide a recommendation, from a community perspective, to the U.S. Department of Energy (DOE) on possible improvements to the assessment process and/or the UGTA QAP.

During the November 19, 2014 Full Board meeting, the NSSAB was provided a briefing on the UGTA QAP process. In support of this work plan, two NSSAB members attended and observed a two-day oversight assessment (OA) of Desert Research Institute (DRI) in December 2014. After an update by the members and Board discussion and deliberation at the January 21, 2015 Full Board meeting, the NSSAB recommends the following to the UGTA QAP process:

Item	Status	Issue	Recommendation
Notices	Sustain	DOE informed DRI via formal letter that OA would take place and attached specific assessment checklist	
Position Hand-off	Improve	New assessor on the team	A better hand-off by DOE to the new assessor could lead to better continuity in the assessment process.
Org Chart	Improve	Upon arriving, it was unclear who was giving direction. This created confusion among the different organizations.	<ul style="list-style-type: none"> • An OA Lead should be established prior to OA. • Briefing should be held to establish expectations, areas of responsibility, etc.
NSSAB Incorporation	Sustain	DOE, Navarro-Intera (N-I), and DRI were very patient, engaging, hospitable and accommodating of the observers from NSSAB	
Outlook	Sustain	Open transparency—both assessors and DRI established a positive outlook on the assessment experience. (Continuous Improvement) This leads to open, honest communication.	
Work in Parallel	Sustain	Three assessors broke off into separate functional area groups from the assessment checklist and worked simultaneously	
Approach	Sustain	Assessors were professional and thorough (evidence trail). Personable manner, and helpful throughout the questioning.	
Status Updates	Sustain	DOE/N-I continuously updated DRI representatives on status of the OA items (individual, briefings, debriefings, etc.)	
Work Distribution	Improve	Assessors' work load was unevenly distributed	
Personnel Availability	Improve	Not all the Subject Matter Experts (SME) were present for questions	Advanced notice could have been given to SME. DRI indicated they had no prior notice.
Material Availability	Improve	Some labels/equipment was not accessible by the personnel available for questions	Assessors could indicate these needs prior/DRI could pre-read assessment checklist and pull out in preparation.
Records Availability	Sustain	Pertinent procedures/records were provided to assessors prior to assessment. Other records were easily accessible throughout the assessment.	

Robert Boehlecke
February 18, 2015
Page 3

The NSSAB appreciates the opportunity to observe the DRI assessment and to provide this recommendation and extends a special thanks to the Assessment Team—Kevin Cabbie, Susan Krenzien, and Ann Koplow.

Sincerely,

Donna L. Hruska, Chair

cc: K. G. Ellis, DOE/HQ (EM-3.2)
M. R. Hudson, DOE/HQ (EM-3.2)
E. B. Schmitt, DOE/HQ (EM-3.2)
K. J. Cabbie, NFO
C. G. Lockwood, NFO
K. K. Snyder, NFO
S. A. Wade, NFO
B. K. Ulmer, N-I
NSSAB Members and Liaisons

D
D
R
R
A
A
E
E
F
F
T
T

Model Evaluation Completion and Moving to Closure in Frenchman Flat



**Greg Ruskauff, Navarro-Intera
and Nicole DeNovio, Golder Associates, Inc.**

Frenchman Flat Leads
Nevada Site Specific Advisory Board
February 18, 2015



EM *Environmental Management*

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

Outline

- Federal Facility Agreement and Consent Order (FFACO) Regulatory Strategy stages
- Frenchman Flat timeline
- Corrective Action Decision Document/Corrective Action Plan Model Evaluation Results, *“Decision/Action Stage”*
- Current status and path forward



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 2
Log# 2015-018

FFACO Regulatory Strategy Stages

- Four major stages in the FFACO strategy:
 - Corrective Action Investigation Plan (CAIP) – “*Develop the Plan*”
 - Details the investigation plan and provides information for planning investigation activities
 - Corrective Action Investigation (CAI) – “*Investigation Stage*”
 - Gather new data to enhance models developed for each of the five (5) historic underground nuclear test areas (repeat as necessary)
 - Review results: geology, hydrology, source term, groundwater and transport models, modeling approach (repeat as necessary)



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 3

Log# 2015-018

FFACO Regulatory Strategy Stages (continued)

- Corrective Action Decision Document/Corrective Action Plan (CADD/CAP) – *“Decision/Action Stage”*
 - Develop a model evaluation plan to challenge and refine model forecasts
 - Use model evaluation plan to identify locations for new wells or data collection activities
 - Use data collected to defend that the corrective action unit is acceptable for closure



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 4
Log# 2015-018

FFACO Regulatory Strategy Stages (continued)

- Closure Report (CR) – “*Closure Stage*”
 - Negotiate use restrictions and regulatory boundary
 - Establish institutional controls and requirements
 - Develop long-term closure monitoring program

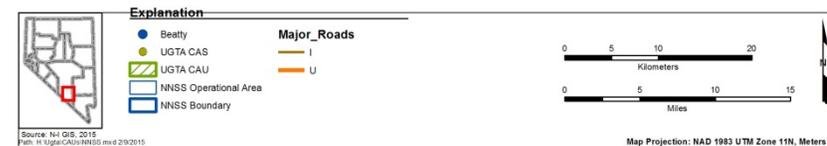
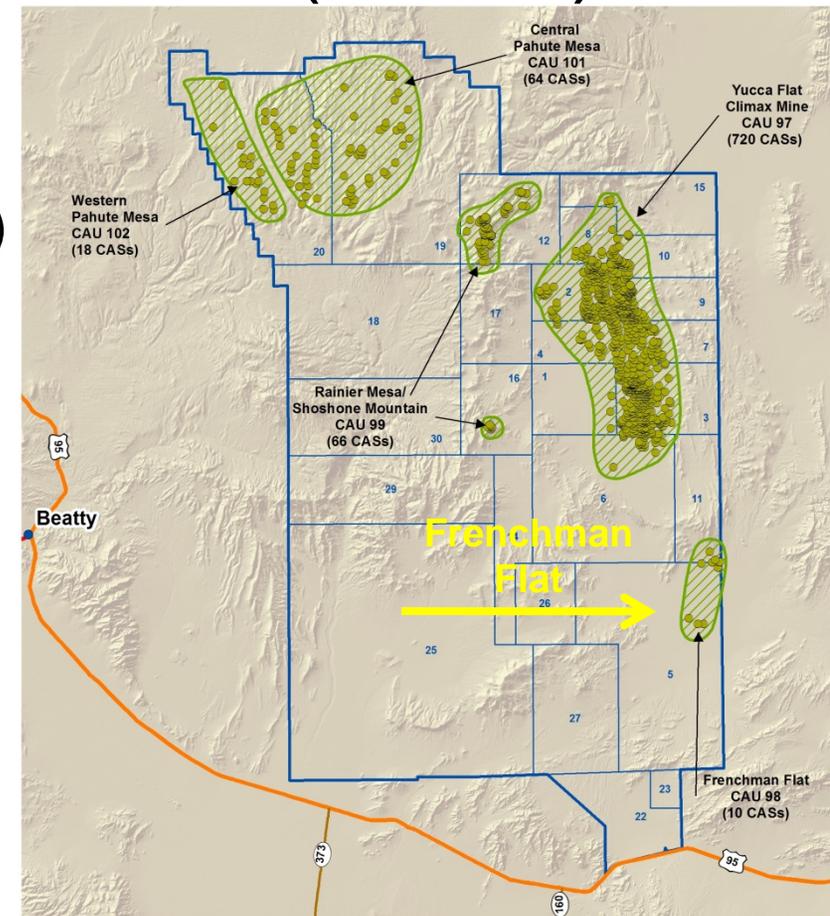


EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Underground Test Area (UGTA) Activity Corrective Action Units (CAUs)

- Frenchman Flat – CAU 98
 - 10 Corrective Action Sites (CASs)
- Yucca Flat/Climax Mine – CAU 97
- Rainier Mesa/Shoshone Mountain – CAU 99
- Central Pahute Mesa – CAU 101
- Western Pahute Mesa – CAU 102



Corrective Action Strategy Background

- Defined in Appendix VI of the FFACO (1996, as amended)
- Assumes active remediation is not feasible with current technology
- Corrective action for each CAU is a combination of characterization and modeling, monitoring, and institutional control



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 7
Log# 2015-018

Frenchman Flat Chronology

- **1950s onward**
 - Geologic and hydrologic data collection and studies
- **1999 - 2001**
 - Phase I peer review
 - Revised investigation plan
 - Initiate Phase II CAI site characterization and modeling studies (*Investigation Stage*)
 - *State of Nevada Division of Environmental Protection (NDEP) review and approval received*
- **2001 - 2003**
 - Phase II site characterization studies
 - Five new boreholes in two clusters
 - 3-D seismic reflection survey
 - Multi-well aquifer test in central test area



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 8
Log# 2015-018

Frenchman Flat Chronology

(continued)

- **2003 - 2010**
 - Data analysis and modeling reports
- **2010**
 - Phase II Peer Review

“The [peer review] team notes that the sophistication and complexity of the modeling evaluations that have been conducted are state-of-the-practice analyses that go far beyond those conducted at other contaminated sites in the United States. The peer review team is of the opinion that potential processes that could affect the migration of radionuclides in groundwater have been thoroughly evaluated.”

“...the peer review team strongly believes that the UGTA Activity should proceed to the next stage.”



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 9

Log# 2015-018

Peer Review

- Element of the UGTA strategy
- Panel of recognized experts in the fields of geology, geophysics, nuclear chemistry and hydrology/hydrological modeling with experience in planning and completing projects in applied science
- Four-day workshop and field trip kicked-off the six-month process



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 10
Log# 2015-018

Peer Review (continued)

- Overview of the UGTA Activity, site characterization, and modeling studies for the Frenchman Flat CAU
- Concluded with recommendation to proceed to next stage



NSSAB Observed Frenchman Flat Peer Review



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 11
Log# 2015-018

Frenchman Flat Chronology

(continued)

- **2011**
 - CADD/CAP document approved by NDEP
- **2012**
 - Drilled Wells ER-5-5 and ER-11-2
- **2013 - 2014**
 - Additional data collection and model evaluation
 - Model evaluation report accepted by NDEP, approved going to closure stage
 - First UGTA CAU approved to move to closure stage and to reach this major milestone
- **2015**
 - Developing closure approach and report



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 12
Log# 2015-018

Purpose of the CADD/CAP Stage

- Identify CAU regulatory boundary objectives
- Identify initial use restriction boundaries
- Collect additional data
- Evaluate CAU model (numerical and conceptual)
 - Assess confidence in site understanding
- Decision: Is the CAU model acceptable for closure?



EM Environmental Management

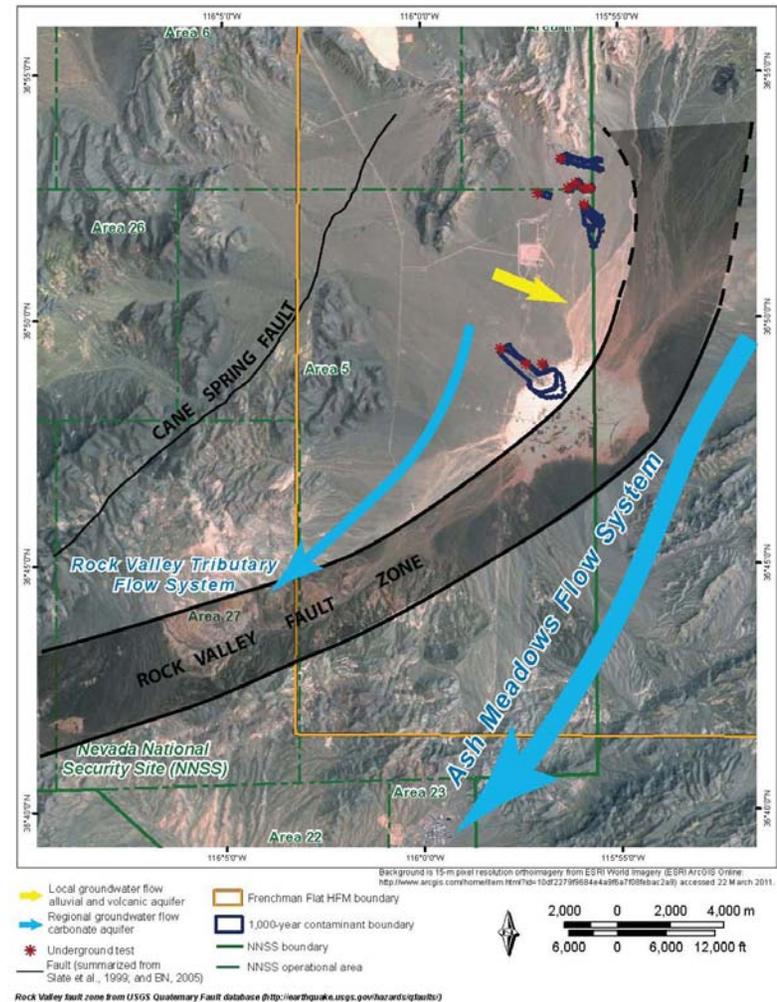
safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 13
Log# 2015-018

Regulatory and Use Restriction Boundaries

- Regulatory boundary - objective is to protect potential receptors down gradient of the Rock Valley fault system from radionuclide contamination
 - Rock Valley fault system is the expected pathway of groundwater flow out of the basin
- Use restriction boundaries - purpose is to protect on-site workers and ensure the hydrogeologic system is not disturbed



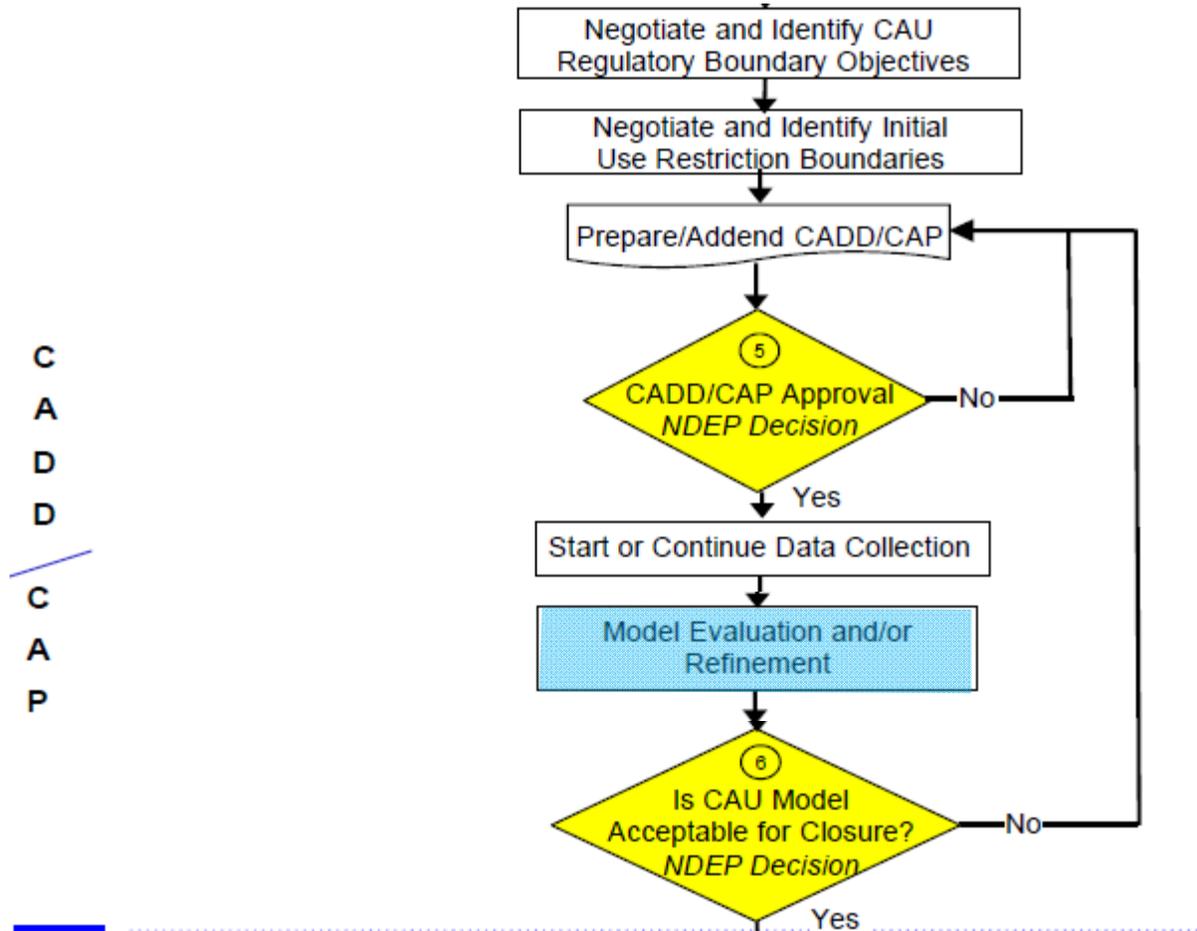
Map of the Rock Valley Fault Zone in the vicinity of the Frenchman Flat CAU, Nevada National Security Site



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

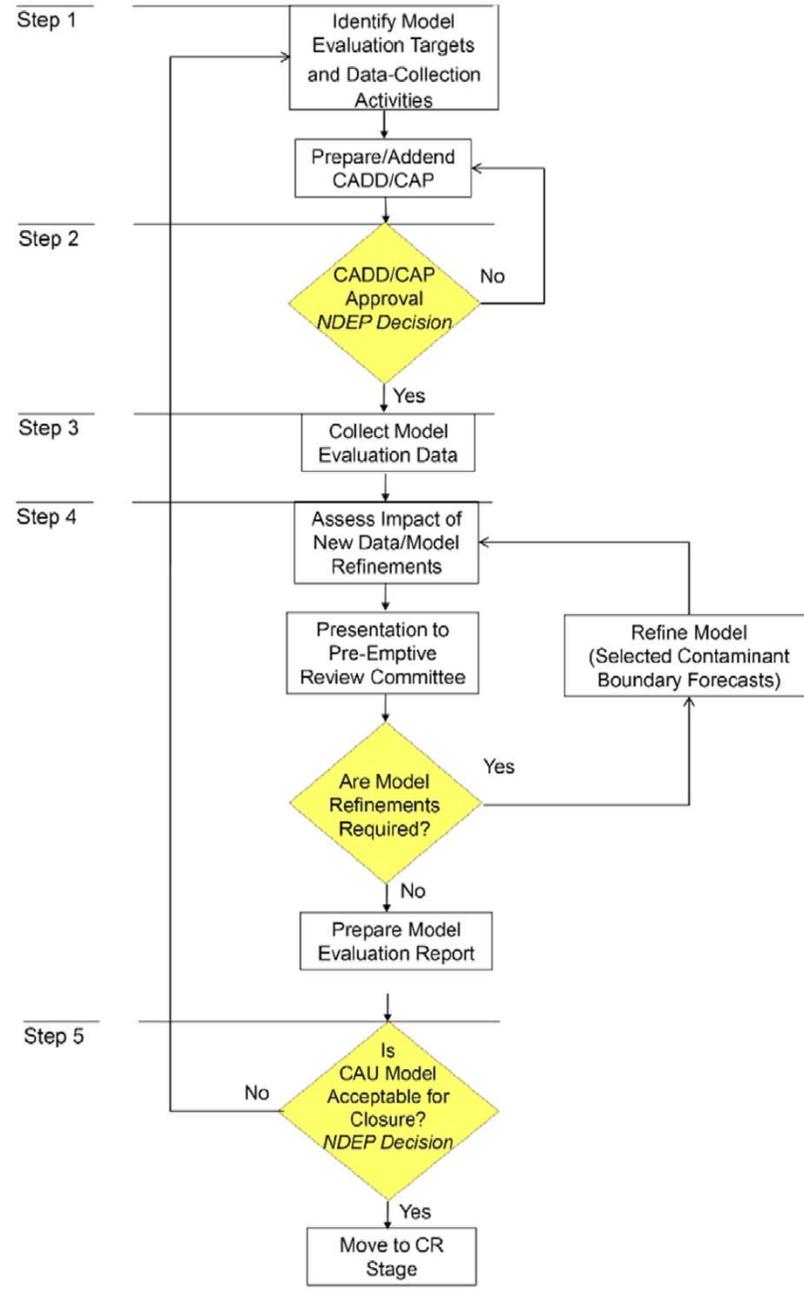
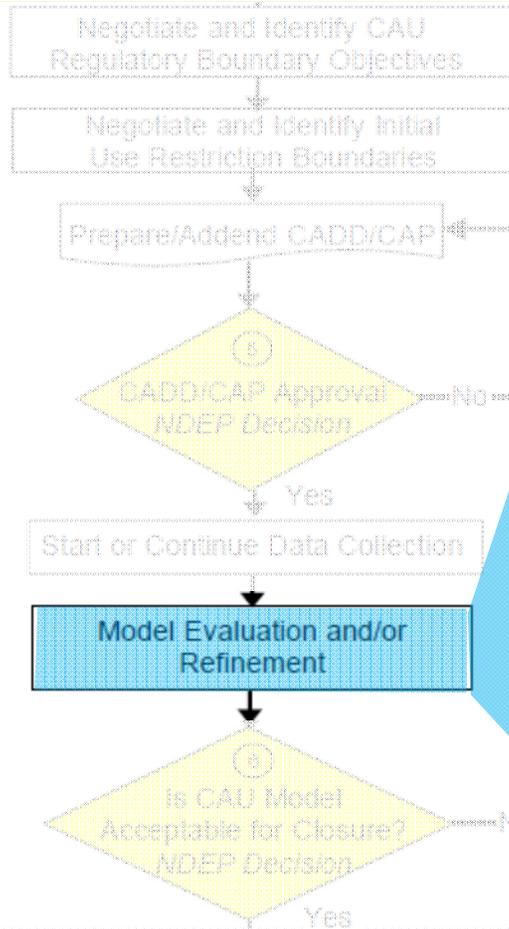
FFACO CADD/CAP Process



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Model Evaluation Process

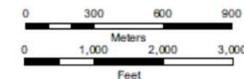
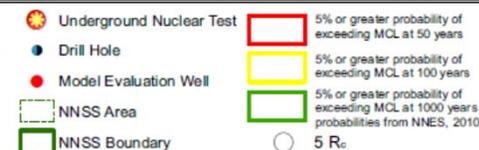
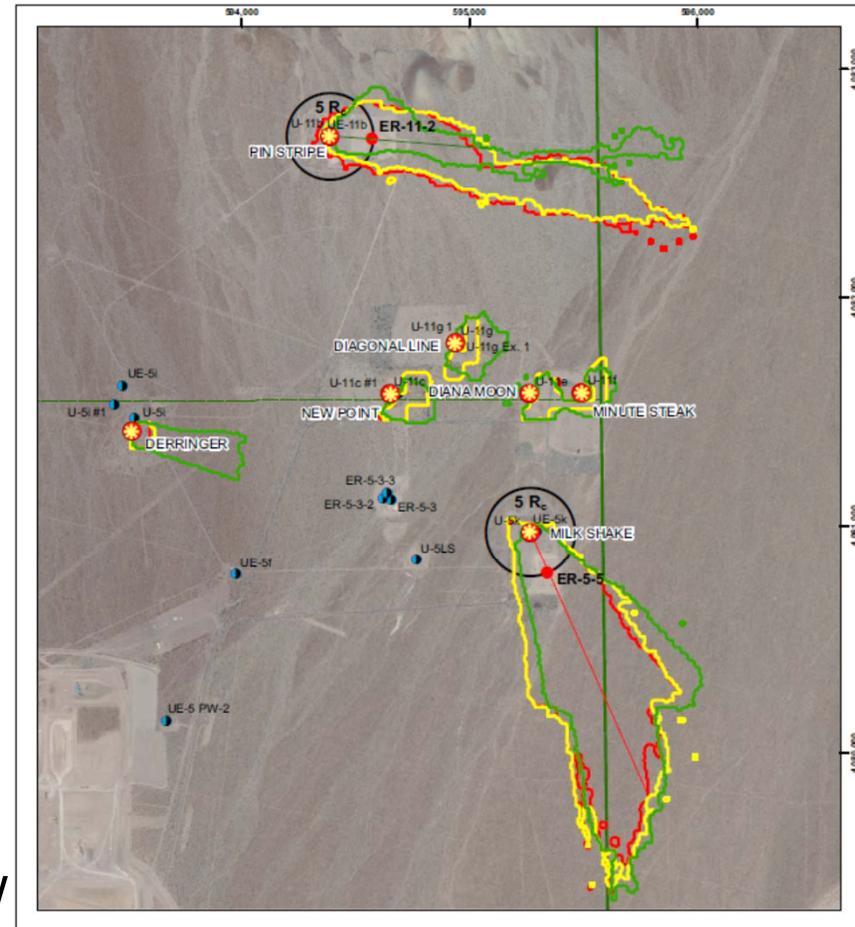


EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Data Collection

- Drilled wells:
 - ER-11-2 near PIN STRIPE
 - ER-5-5 near MILK SHAKE
- Collected:
 - Geologic data
 - Water levels
 - Water chemistry
 - Hydraulic tests
 - Radiochemistry
 - Surface geophysics
- Extra data helped demonstrate understanding of groundwater flow direction



Map Projection: NAD 1983 UTM Zone 11N, Meters
 Blank box marks and numbers are in NAD 1983 UTM Zone 11N, meters
 H:\GIS_WORK\WORKDIR - FP HSIU 1/16/15 - 06\Figures_20140721.mxd 10235014

Cavity radius is calculated using the maximum of the announced yield range in DOE/NV-209 (2000) and the equation in Pawloski (1999).



EM Environmental Management

safety ❖ performance ❖ cleanup

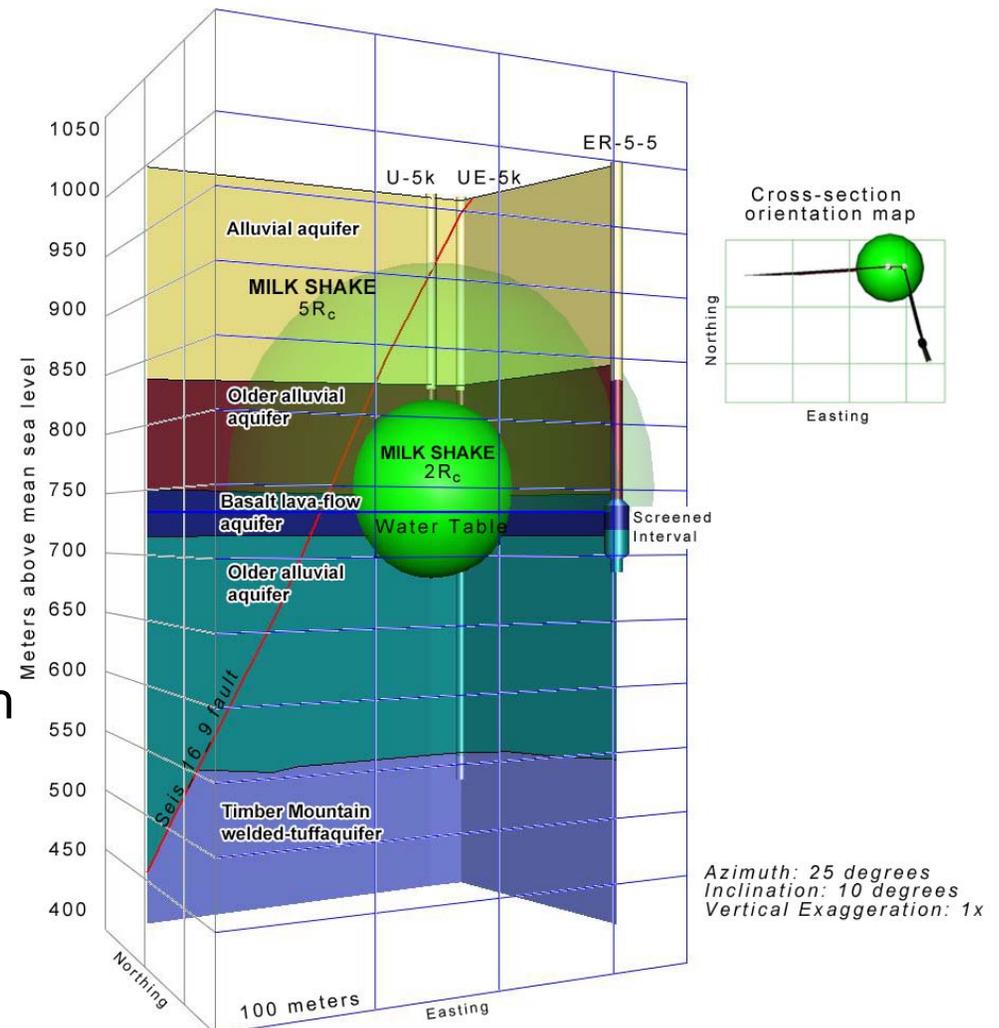
www.em.doe.gov

903FY15 – 2/18/2015 – Page 17

Log# 2015-018

MILK SHAKE Evaluation

- Models with low groundwater velocity were consistent with observed rock properties
- Tritium observed to be ~10,000x below the maximum contaminant level simulated in the most conservative models
- Observation of leading edge of the MILKSHAKE plume consistent with direction and magnitude of groundwater velocity calculated with high-quality, water-level monitoring data collected during CADD/CAP (*Decision/Action Stage*)



Cavity radius is calculated using the maximum of the announced yield range in DOE/NV-209 (2000) and the equation in Pawloski (1999).



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

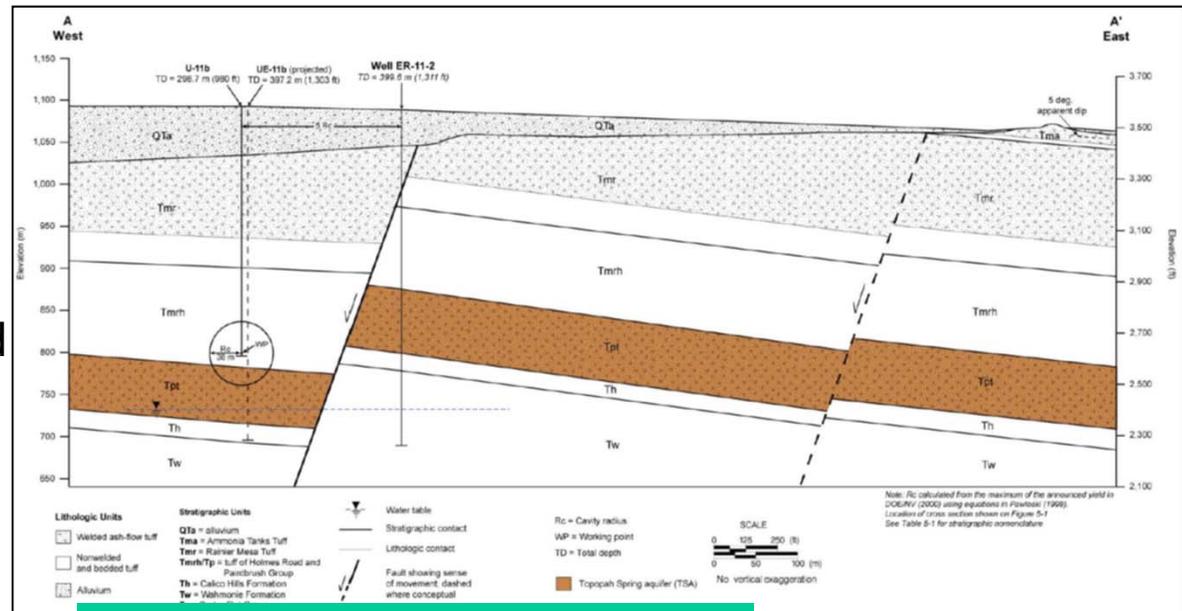
www.em.doe.gov

903FY15 – 2/18/2015 – Page 18

Log# 2015-018

PIN STRIPE Evaluation

- Well ER-11-2 (model evaluation well) shows that the transport pathway for PIN STRIPE is not continuous - indicates that models have too much transport to the east
- New conceptual model was required
 - Honored the geology that limited contaminant migration to the east (toward the regional flow system)
 - Consistent with observed water levels that demonstrated a hydraulic barrier
- Flow and transport to the south and very slow because of rock properties



Cavity radius is calculated using the maximum of the announced yield range in DOE/NV-209 (2000) and the equation in Pawloski (1999).



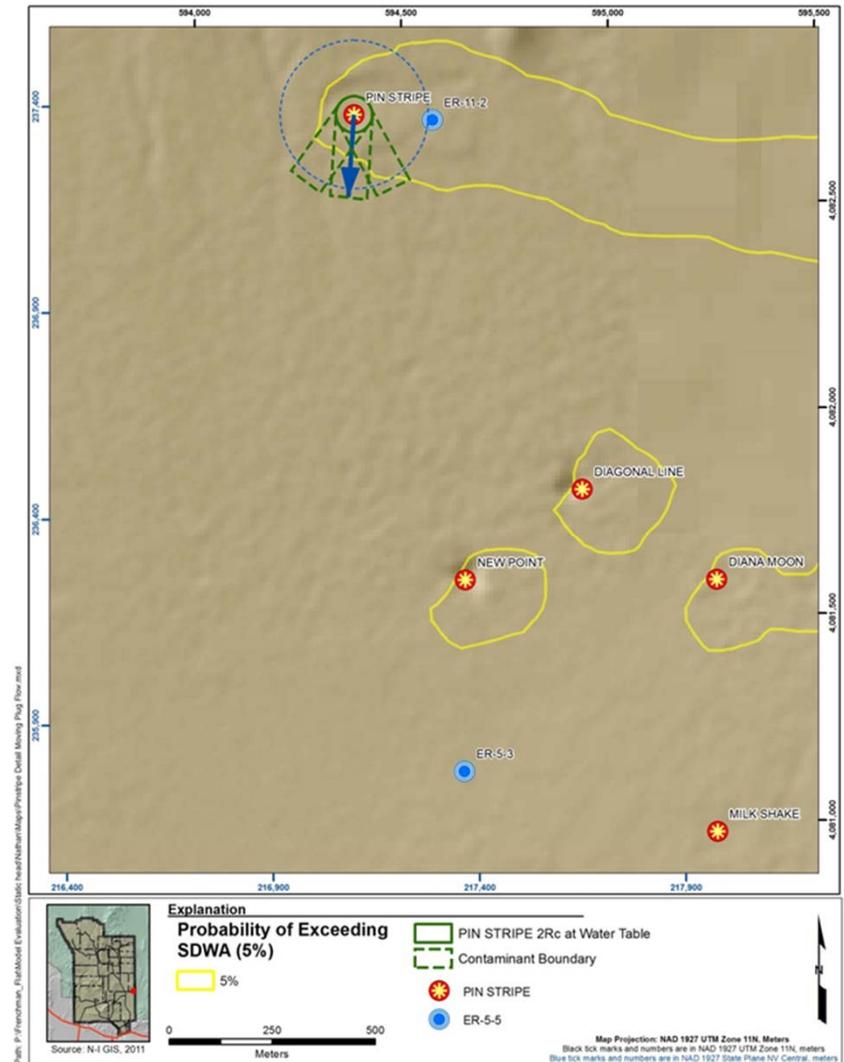
EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov
 903FY15 – 2/18/2015 – Page 19
 Log# 2015-018

Refined PIN STRIPE Contaminant Boundary

- Based on refined conceptual model developed from Well ER-11-2 geologic data
- Conceptual contaminant boundary uncertainty includes:
 - Up to a factor of 2 higher velocity
 - Groundwater flow direction
- Approximated contaminant boundary as saturated two cavity radius footprint at water table, and invoke upper-bound uncertainties to give results shown
- NDEP and the Department of Energy have agreed that the PIN STRIPE contaminant boundary presented in 2010 needs to be revised



Cavity radius is calculated using the maximum of the announced yield range in DOE/NV-209 (2000) and the equation in Pawloski (1999).



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Modeling Team Recommendations

- Groundwater velocity is slow, and observed radionuclide transport is confined to regions near tests based on the model evaluation.
- The evaluation demonstrated that there is sufficient confidence in the site conceptual model and its numerical representation to guide the development of a long-term monitoring network and institutional controls.
- For these reasons, the modeling team recommends advancing Frenchman Flat to the CR stage (*Closure Stage*) of the UGTA strategy.



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 21

Log# 2015-018

Review Committee Recommendations

- There is sufficient confidence in the Frenchman Flat model to advance to the closure stage of the UGTA strategy.
- The committee concludes that the current understanding is sufficiently reliable to design a monitoring system and develop effective institutional controls.



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 22

Log# 2015-018

Current Status and Path Forward

- Per the FFACO:
 - Step one – revise contaminant boundaries – completed
 - Step two – establish/negotiate use restrictions and regulatory boundaries
 - Step three – closure report is in progress – due to NDEP in March 2016



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

903FY15 – 2/18/2015 – Page 23
Log# 2015-018

Underground Test Area (UGTA) Groundwater Closure Strategy

