



Nevada Site Specific Advisory Board *Table of Contents*

**Full Board Meeting Handouts for
Wednesday, January 18, 2017**

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choose the radio button-Pages and enter just the pages that you want printed,
then choose print**

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Sites and Debris Briefing (Work Plan Item #1)
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NSSAB minutes, agendas, recommendations, meeting dates and locations, handouts, and member application may be accessed at the NSSAB website at: www.nss.gov/NSSAB

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NSSAB MEETING ATTENDANCE

Full Board Meetings

October 2016 through September 2017 (FY 2017)

Name	11/9/16	1/18/17	2/15/17	3/15/17	4/19/17	6/21/17	8/16/17	9/20/17	Max Terms
MEMBERS									
Michael Anderson	E								2020
Amina Anderson	√								2020
Arcadio Bolanos	√								2022
Francis Bonesteel	√								2022
Michael D'Alessio	√								2020
Pennie Edmond	√								2020
Karen Eastman	√								2022
Raymond Elgin	√								2022
Charles Fullen	√								2022
Richard Gardner	√								2022
Donald Neill	√								2020
Autumn Pietras	√								2022
Edward Rosemark	√								2018
Steve Rosenbaum	√								2020
William Sears	√								2018
Cecilia Flores Snyder	E								2020
Richard Stephans	√								2022
Jack Sypolt	√								2017
Richard Twiddy	√								2022
Dina Williamson-Erdag	E								2022
LIAISONS									
Clark County	√								
Consolidated Group of Tribes & Organizations	E								
Esmeralda County Commission	E								
Nye County Commission	U								
Nye County Emergency Management	E								
Nye Co. Nuclear Waste Repository Project Office	√								
State of NV Division of Env Protection	√								
U.S. Natl Park Service	E								
KEY: √ = Present E - Excused V=Vacant U = Unexcused RM = Remove RS = Resign									

Corrective Action Alternatives Recommendation for Corrective Action Unit 576



Tiffany Lantow

Soils Activity Lead

U.S. Department of Energy (DOE), Nevada Field Office

January 18, 2017



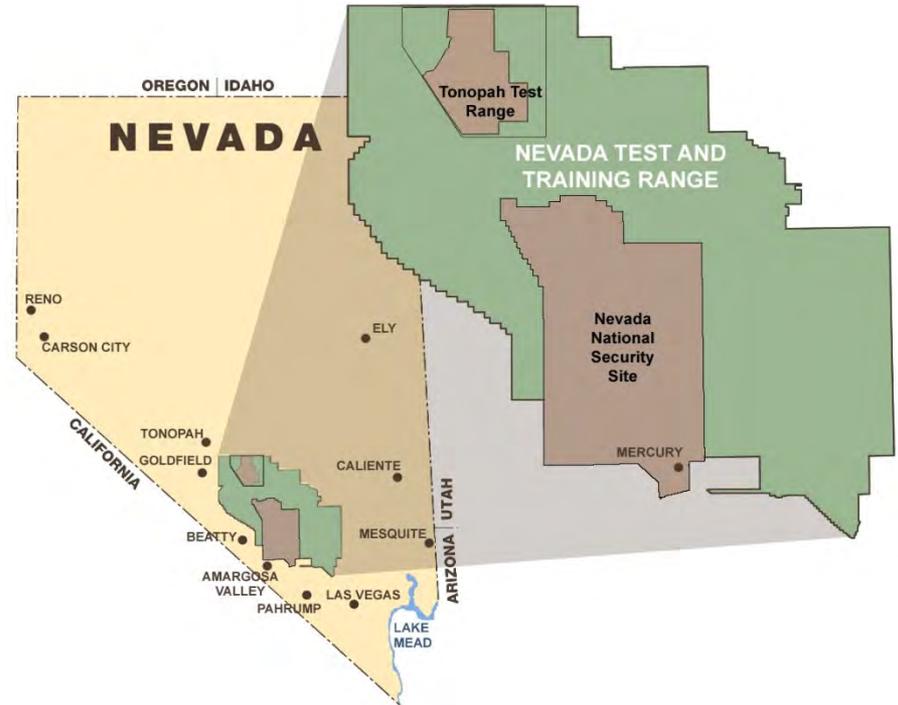
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Soils Activity Background

- Atmospheric nuclear weapons tests, nuclear safety experiments, and evaluation tests for peaceful uses of nuclear explosives conducted at the Nevada National Security Site (NNSS) and Nevada Test and Training Range (operated by the U.S. Air Force) resulted in the radioactive contamination of surface and near surface soils



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Soils Activity Background

(continued)

- 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
 - Remediating means to select a closure option (clean close, closure in place, etc.)



Soils Activity Background

(continued)

- Ensuring appropriate controls (i.e. 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)



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Terminology

- Corrective Action Site (CAS) - A site that has been identified as needing remediation
- Corrective Action Unit (CAU) - A grouping of Corrective Action Sites that are similar in remediation technique, type of contaminants or proximity to each other

There are 32 Soils CAUs
which consist of 148 CASs*

* As of 11/30/16



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Remediation Processes

- Corrective Action Investigation Plan (CAIP) – Details the investigation plan and provides information for planning investigation activities
- Site Investigation – Act of conducting field characterization activities
- Corrective Action Decision Document (CADD) – Describes the results of the characterization, multiple corrective action alternatives, and the recommended corrective action alternative and the rationale for its selection
- Corrective Action Plan (CAP) – Plan for implementing the selected corrective action



Remediation Processes

(continued)

- Closure Field Work - Implementation of the selected corrective action at the site
- Closure Report (CR) – Documented overview and results of corrective actions implemented, closure verification information, and use restriction and monitoring requirements (when applicable)

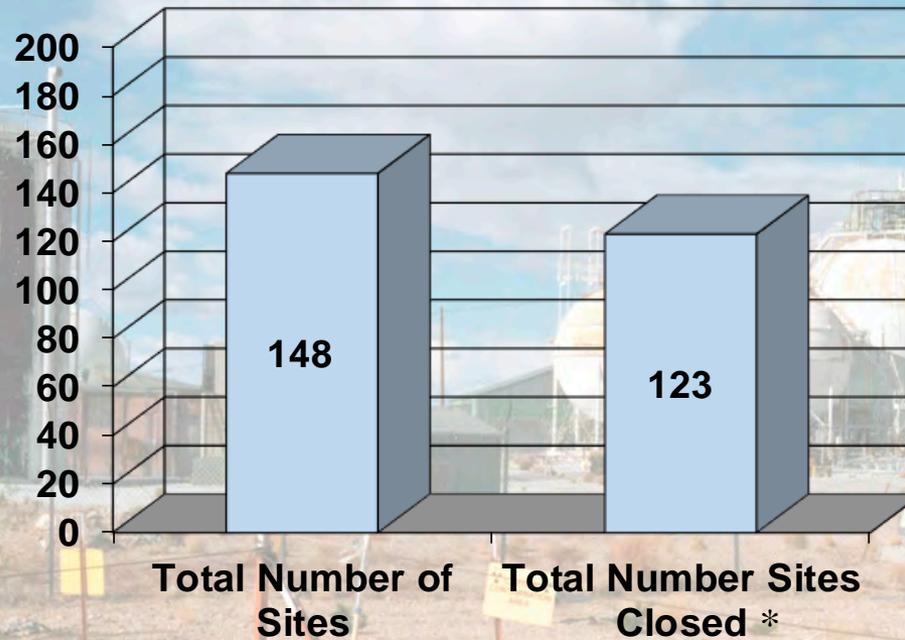
Note: All documents must be approved by NDEP



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Soils Activity



* As of 11/30/16

- 123 Closed Soils Sites:
 - 9 were Clean Closed
 - 48 were Closed in Place
 - 66 were No Further Action



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NSSAB Work Plan Item 1

Provide a recommendation, from a community perspective, on which corrective action alternative (closure in place or clean closure) should be selected by DOE for CAU 576 – Miscellaneous Radiological Sites and Debris



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CAU 576, Miscellaneous Radiological Sites and Debris Overview

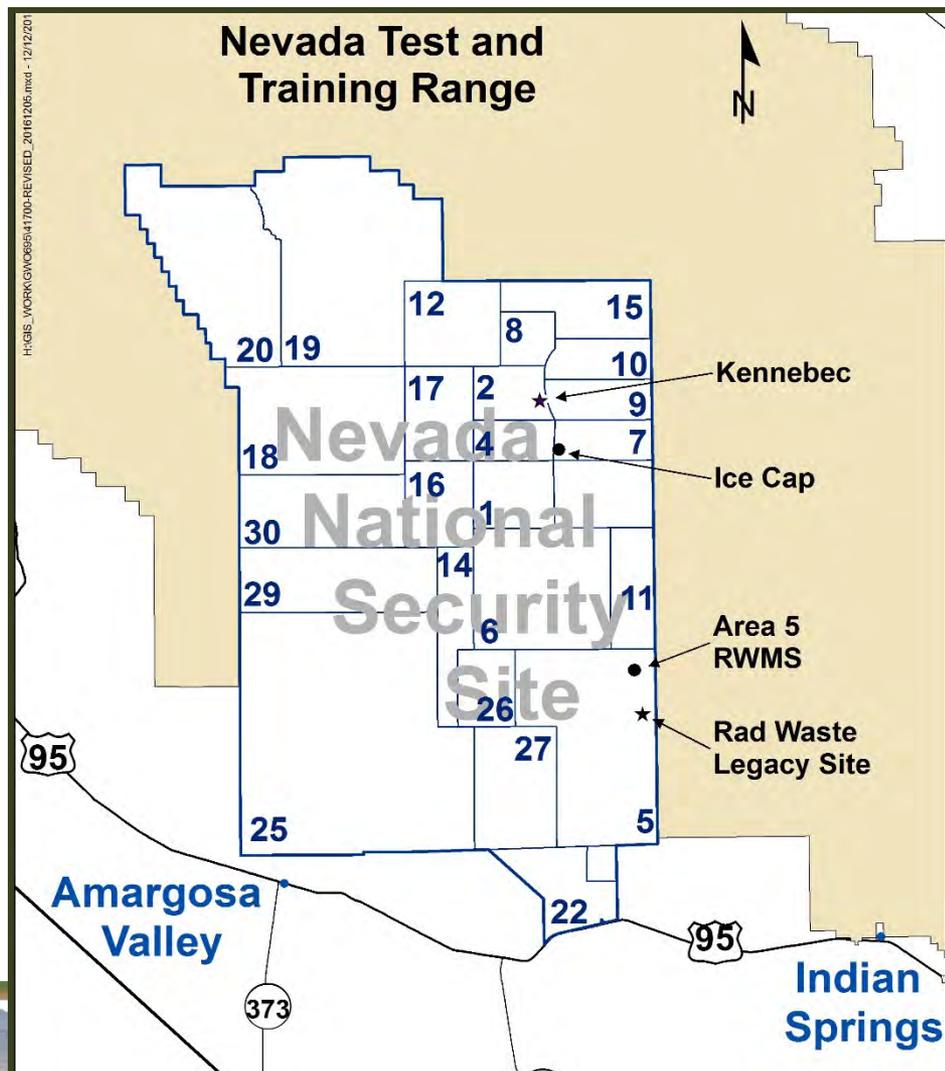
- CAU 576 includes sites discovered on the NNSS during other Soils investigations and while researching potential CASs as part of the Soils Activity closeout
 - Over 80 sites were evaluated, resulting in six CASs and the creation of CAU 576
 - The six CASs consist of
 - Radiochemical piping, surface and subsurface
 - Rad waste legacy site
 - Debris (lead bricks, battery, etc.)



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Location of CASs for CAU 576



- Two of the six CASs require corrective action alternative analysis
 - Kennebec
 - Rad Waste Legacy Site



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Kennebec

- A low-yield weapons-related test of a nuclear device intended for a specific type of weapon system
 - Conducted June 25, 1963, as part of Operation Storax
- Engineering drawings reflect a radiochemical piping layout
- Historically, radiochemical piping systems (gas-sampling assemblies) were designed to collect test gases for radiochemical analysis



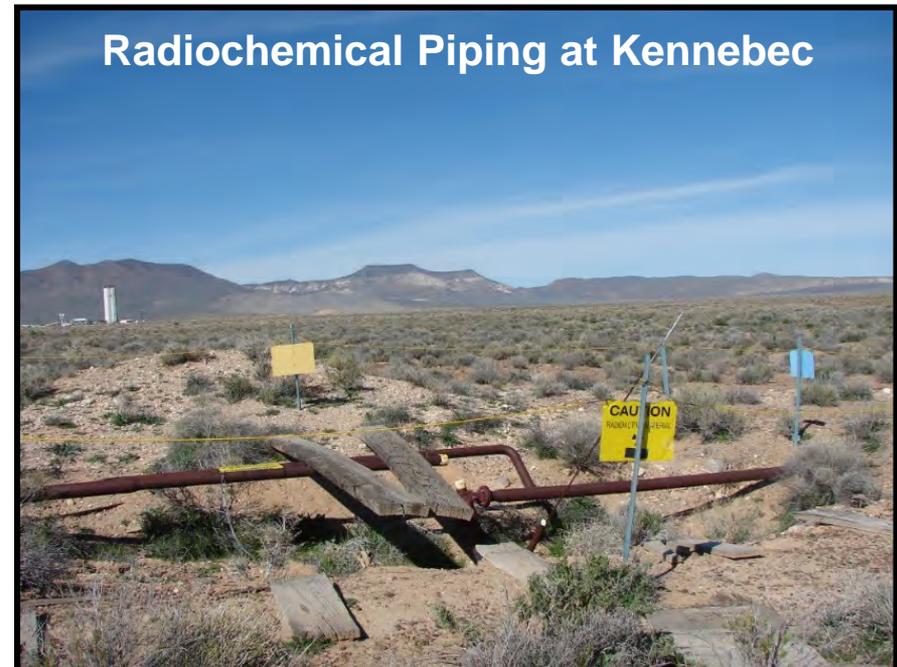
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Kennebec

(continued)

- Current field conditions reflect subsurface piping coming from an emplacement borehole, past a vault area, to the surface at the gas-sampling assembly and then continuing to the west where the exhaust pipe ends near a soil mound
- Principal contaminant of concern is residual cesium-137 in the interior of the piping



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Rad Waste Legacy Site

- Site identified from a 1965 Frenchman Flat Quadrangle Map
- Radiologically elevated soil and debris exist on the surface (30 feet square) to a depth of approximately one foot
- Source of the contamination is unknown but is suspected to be associated with nearby nuclear testing activities
- Principal contaminant of concern is plutonium-contaminated debris and soil



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CAU 576 Field Activities

- Further field activities scheduled for early 2017
 - Terrestrial radiological surveys
 - Radiological soil sampling and thermoluminescent dosimeter placement
 - Geophysical surveys
- Anticipate new data will validate existing characterization data and information for waste management activities



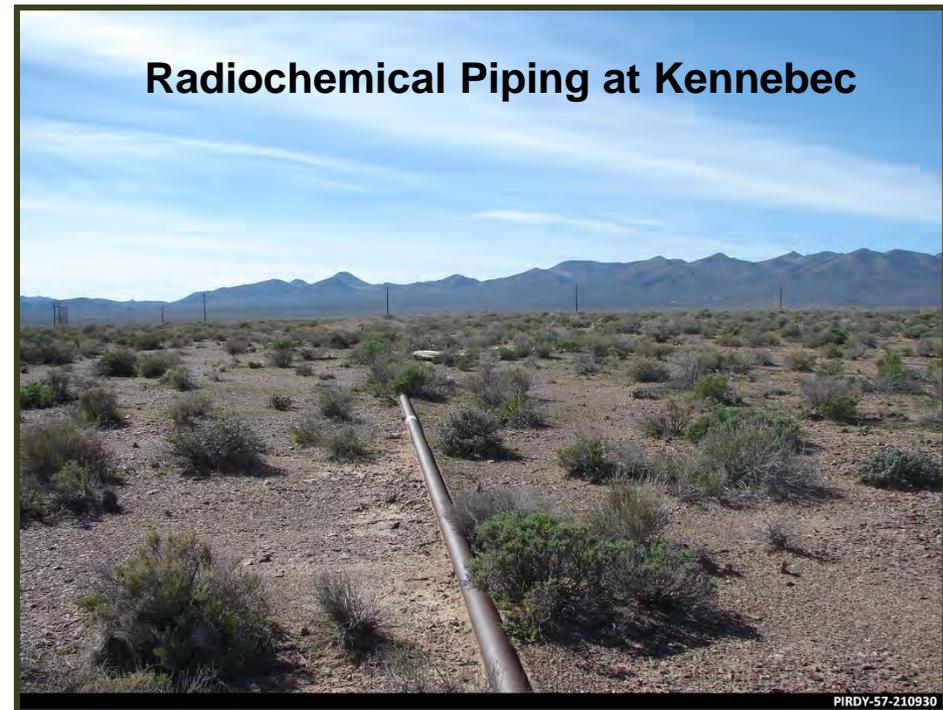
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NSSAB Involvement

- DOE requests NSSAB provide a recommendation on selection of a Corrective Action Alternative for the Kennebec and the Rad Waste Legacy Site
- Possible Corrective Action Alternatives*
 - Closure in Place with use restrictions
 - Clean Closure

*Corrective Action Alternatives evaluated based on general standards and remedy selection decision factors defined by the U.S. Environmental Protection Agency [EPA] (40 CFR 300.430(e)(9))



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Corrective Action Alternatives EPA General Standards

- Corrective Action Alternatives must meet the following standards:
 - 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



Corrective Action Alternatives

EPA Remedy Selection Decision Factors

- Short-term reliability and effectiveness
- Reduction of toxicity, mobility, and/or volume
- Long-term reliability and effectiveness
- Feasibility
- Cost



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Assumptions



- Site remains in government control
- Site workers have radiological training
- No public access
- If this changes, site closures may be reevaluated



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Evaluation - Kennebec

- Clean Closure
 - Excavate piping, vaults, and contaminated soil within the site
 - Dispose of piping and soil at the NNSA Area 5 Radioactive Waste Management Site (RWMS)
 - Recycle lead debris
 - Soil/debris volume estimate: ~2,500 cubic feet
 - Refill excavation with clean native soil
- Closure in Place
 - Establish FFACO Use Restriction



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Evaluation – Kennebec

(continued)

Corrective Action Alternatives	Pros	Cons
<p>Clean Closure</p> <p>Remove ~ 2,500 cubic feet of soil/debris</p>	<p>Reduces environmental risk by removing hazard</p> <p>Long-term reliability and effectiveness</p> <p>Eliminates long-term monitoring and maintenance costs</p>	<p>Moderate occupational risk during removal due to heavy equipment operations, cutting contaminated piping systems, and excavation of underground tanks</p> <p>Moderate cost associated with waste packaging and disposal</p> <p>Compliance with the Historical Preservation Act will require additional evaluation and documentation</p>
<p>Closure in Place</p>	<p>Feasible and cost effective</p> <p>Minimal environmental risk</p> <p>Consistent with other similar sites</p> <p>Preserves the historical significance of the site</p> <p>Use restrictions (including monitoring and maintenance) can be removed when radiological dose decays below action level.</p> <p>Regardless of the dose level, the dose will diminish by 50% in 30 years.</p>	<p>Controls exposure but does not remove hazard</p> <p>Will require long-term monitoring and maintenance costs</p>



Evaluation – Rad Waste Legacy Site

- Clean Closure
 - Remove debris pile, segregate any potential source material
 - Dispose at the NNSS Area 5 RWMS
 - Soil/debris volume estimate is ~900 cubic feet
- Closure in Place
 - Establish FFACO Use Restriction for debris area and post as required
 - Area is ~900 square feet



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Evaluation – Rad Waste Legacy Site

(continued)

Corrective Action Alternatives	Pros	Cons
<p>Clean Closure</p> <p>Remove ~ 900 cubic feet of soil and debris</p>	<p>Reduces environmental risk by removing hazard</p> <p>Long-term reliability and effectiveness</p> <p>Eliminates long-term monitoring and maintenance costs</p>	<p>Moderate occupational risk during soil and debris removal</p> <p>Minimal cost associated with removal, waste packaging, and disposal</p>
<p>Closure in Place</p>	<p>Feasible and cost effective</p> <p>Minimal environmental risk</p> <p>Consistent with other similar sites</p>	<p>Controls exposure but does not remove hazard</p> <p>Will require long-term monitoring and maintenance costs. Dose reduction to decay is considered to be insignificant due to the long-lived radionuclides.</p>



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Summary of Options

Site	Closure Options
Kennebec (CAS 02-99-12)	Clean Closure
	Closure in Place
	Rationale:
Rad Waste Legacy Site (CAS 05-19-04)	Clean Closure
	Closure in Place
	Rationale:



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CAU 576 Next Steps



- DOE considers NSSAB recommendations due by February 15, 2017
- Corrective Action Alternatives discussion with NDEP – March 2017
- Complete final Corrective Action Decision Document/Corrective Action Plan – September 2017



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Internal Peer Review Process Improvement Work Plan Item 6



Bill Wilborn

Underground Test Area (UGTA) Activity Lead
U.S. Department of Energy (DOE),
Nevada Field Office
January 18, 2017



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Historic Nuclear Testing Impacts on the Groundwater

- 828 underground nuclear tests conducted at the Nevada National Security Site (NNSS) from 1951 to 1992
- Underground tests conducted at depths ranging from approximately 90 to 4,800 feet below the ground surface
- One-third of these tests occurred near or below the water table
- Some radioactive contamination detected in groundwater on the NNSS and the Nevada Test and Training Range



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NNSS Groundwater Program Objectives

- Because of the significant worker safety concerns and cost associated with any type of active remediation, the DOE in consultation with the State of Nevada Division of Environmental Protection (NDEP) has selected an end state that requires modeling and monitoring strategy that is documented in the Federal Facilities Agreement and Consent Order (FFACO)



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NNSS Groundwater Program Objectives (continued)

- This strategy is supported with the following activities
 - Tackle challenges using investigative methods, such as drilling wells to investigate the hydrology and geology (UGTA)
 - Sample wells, analyze samples, and build computer models from gathered data (UGTA)
 - Implement controls to prevent access to contaminated groundwater (UGTA and National Nuclear Security Administration)
 - Ongoing monitoring of wells on and off the NNSS (National Nuclear Security Administration)
 - Establish a comprehensive long-term monitoring network to ensure public protection (UGTA)



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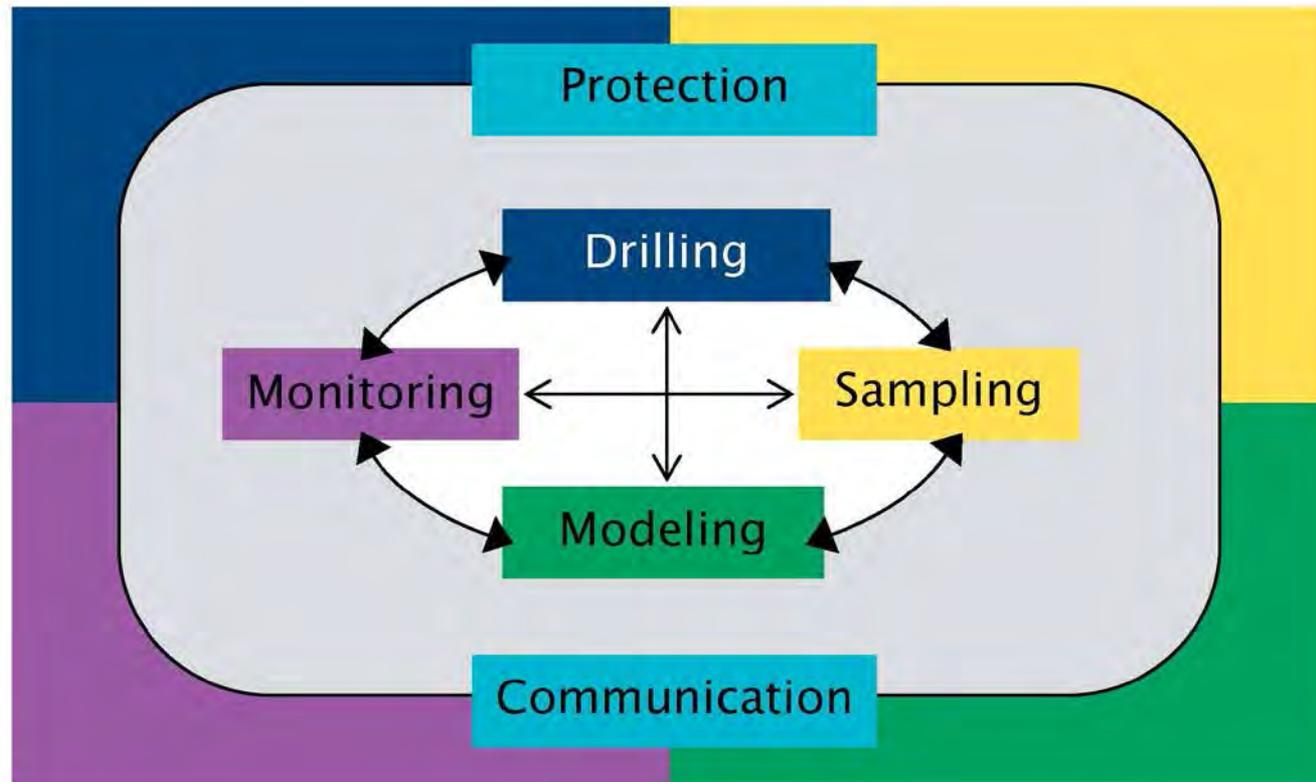
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Log No. 2017-008

Understanding Groundwater... an Integrated Approach



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UGTA Closure Strategy

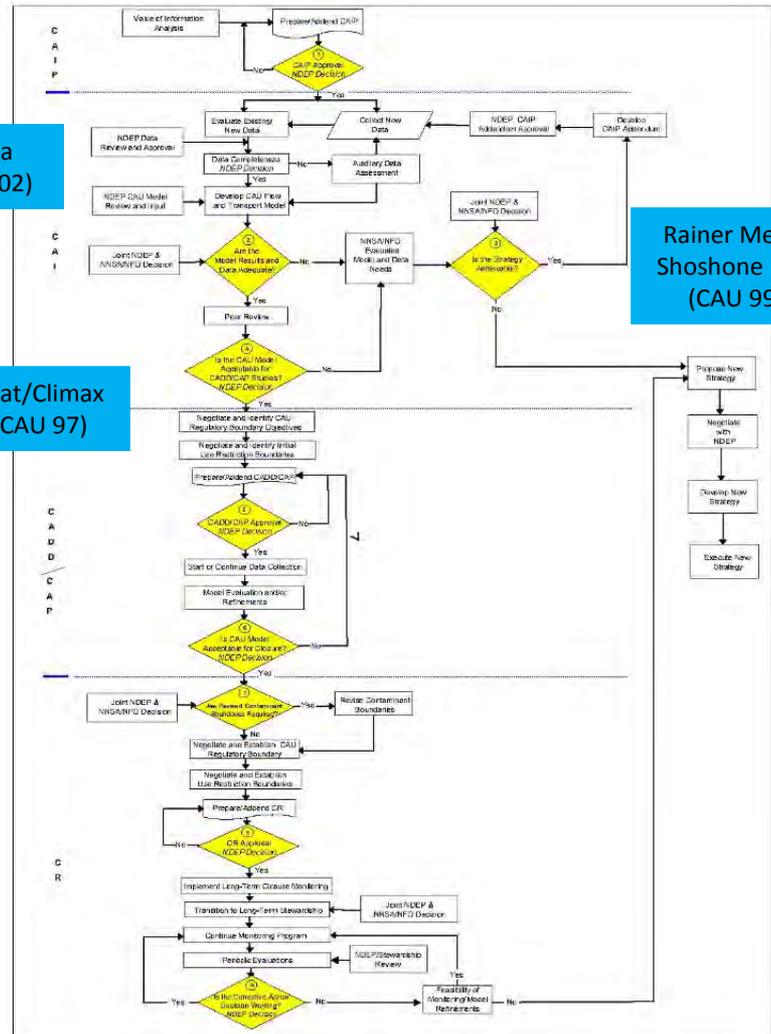
- Implemented in four stages
 - Corrective Action Investigation Plan (CAIP)
 - Corrective Action Investigation (CAI)
 - Corrective Action Decision Document/Corrective Action Plan (CADD/CAP)
 - Closure Report (CR)
- Nine decision points (yellow diamonds)

Pahute Mesa
(CAU 101 & 102)

Yucca Flat/Climax
Mine (CAU 97)

Rainier Mesa/
Shoshone Mtn
(CAU 99)

Frenchman
Flat (CAU 98)



UGTA Closure Strategy

(continued)

- Corrective Action Investigation (CAI) [some Corrective Action Units (CAU) may require a Phase I and II]
 - Corrective Action Investigation Plan (CAIP)
 - Data collection
 - Modeling
 - Contaminant boundary
 - External peer review



UGTA Closure Strategy

(continued)

- Corrective Action Decision Document/
Corrective Action Plan (CADD/CAP)
 - Model evaluation
 - Use restriction boundary
 - Regulatory boundary negotiations with NDEP



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UGTA Closure Strategy

(continued)

- Closure
 - Closure Report (CR)
 - Address regulatory boundary changes if necessary
 - Closure in place with long-term monitoring
 - Institutional controls



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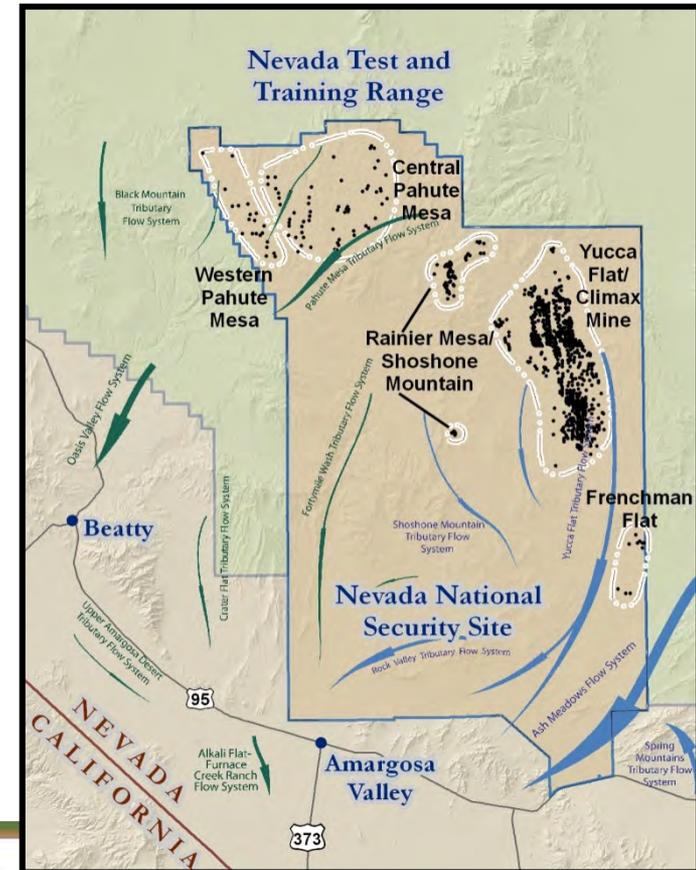
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UGTA CAU Status

- Frenchman Flat (CAU 98)
In closure, performing annual groundwater monitoring
- Yucca Flat/Climax Mine (CAU 97)
Finishing External Peer Review comment responses, moving into CADD/CAP (collect and evaluate new data to address key uncertainties and defend that the CAU is acceptable for closure)
- Rainier Mesa/Shoshone Mountain (CAU 99)
Modeling is being conducted under an Alternative Modeling Strategy
- Central Pahute Mesa (CAU 101) and Western Pahute Mesa* (CAU 102)
Preparing Phase II CAI (characterize site and develop groundwater and contaminant transport models)



*Western and Central Pahute Mesa are managed as one entity



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NSSAB Work Plan Item 6

From a community perspective, the NSSAB will provide recommendations as to how the internal peer review process could be enhanced



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Log No. 2017-008

Internal Peer Reviews

- Internal independent reviews* that examine broad issues of technical quality and consistency and address whether the work being performed is sufficient to achieve the UGTA strategy goals
 - Includes members of the UGTA Team that are not directly involved with the specific CAU under review
 - In contrast, an External Peer Review brings in scientific experts in multiple disciplines from outside the UGTA Team

*Also referred to as Pre-emptive Reviews (PER)



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Internal Peer Reviews

(continued)

- Important and long-standing quality improvement process
- Identified in the UGTA Quality Assurance Plan
- Assures work is comprehensive, accurate, in keeping with the state of the art, and consistent with CAU goals
- Reviews data, documents, software/codes, analyses, models, and technical briefings



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Internal Peer Review Goals

- Ensures work is technically adequate, competently performed, and properly documented
- Maintains high technical standards and consistency in products that are reviewed
- Aids in focusing CAU studies on UGTA Activity objectives defined in FFACO
- Provides early identification of technical/strategy issues
- Gives assurance to the NDEP that work in progress and final reports are technically sound



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Process and Responsibilities

Activity	UGTA Federal Activity Lead	PER Chairperson	Science Advisor	CAU Lead	EPS* UGTA Project Manager	EPS UGTA Integration Manager	PER Committee Member, NDEP Employee, and Nye County Representative	Contract Manager
Select PER Chairperson	Select chairperson	N/A	Advise UGTA Federal Activity Lead	N/A	N/A	N/A	N/A	N/A
Select PER members	Select PER members	N/A	Advise UGTA Federal Activity Lead	N/A	N/A	N/A	N/A	Determine availability of selected member
Initiate PER review	Authorize review	N/A	Advise UGTA Federal Activity Lead	Identify the need for PER	Identify the need for PER	N/A	N/A	N/A
Ensure funding is available for PER committee members to participate	Authorize funding	N/A	N/A	Plan PER with EPS UGTA Project and Integration managers	Plan PER with CAU Lead and EPS UGTA Integration manager	Coordinate PER with Contract Managers and UGTA Federal Activity Lead	N/A	Work with EPS UGTA Integration Manager and UGTA Federal Activity Lead to ensure funding is available
Identify PER Objective and Determine guiding questions	Provide support/guidance as needed	Work with Science Advisor, CAU Lead, and EPS UGTA Project Manager to develop questions	Work with PER Chairperson, CAU Lead, and EPS UGTA Project Manager to develop questions	Work with PER Chairperson, Science Advisor, and EPS UGTA Project Manager to develop questions	Work with PER Chairperson, Science Advisor, and CAU Lead to develop questions	N/A	N/A	N/A
Develop schedule for review	N/A	Work with CAU Lead, EPS UGTA Integration Manager, and committee members to develop schedule	N/A	Work with PER Chairperson and EPS UGTA Integration Manager to develop schedule	N/A	Work with PER Chairperson and CAU Lead to develop schedule and communicate the schedule to Contract Managers	N/A	Identify whether any schedule conflicts exist

*EPS is the Environmental Program Services contractor, currently Navarro



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Process and Responsibilities

(continued)

Activity	UGTA Federal Activity Lead	PER Chairperson	Science Advisor	CAU Lead	EPS UGTA Project Manager	EPS UGTA Integration Manager	PER Committee Member, NDEP Employee, and Nye County Representative	Contract Manager
Conduct reviews	N/A	Coordinate review; ensure members receive necessary information; compile comments; develop overview comments	Monitor PER review; interact with committee; and inform UGTA Federal Activity Lead of issues/concerns	Provide materials to PER Chairperson and committee members, as needed	N/A	N/A	Provide review comments to PER Chairperson, and review/accept overview comments	Report schedule and budget issues to EPS UGTA Integration Manager and UGTA Federal Activity Lead
Participate in comment resolution process	Resolve differing opinions that cannot be resolved by consensus of the Science Advisor, PER Chairperson, CAU Lead, and EPS UGTA Project Manager	Work with committee and CAU Lead to resolve comments; post review process documentation on SharePoint site	Advise PER Chairperson, CAU Lead, EPS UGTA Project Manager and/or UGTA Federal Activity Lead to resolve comments as necessary	Work with authors to develop comment responses and PER Chairperson to facilitate comment resolution	Advise CAU Lead as needed	N/A	Provide feedback on proposed comment responses to the PER Chairperson	N/A
Manage potential outcomes of review process	Solicit/receive guidance to determine necessity for remedial work scope; authorize work scope	Support PER committee as needed; work with CAU Lead and Science Advisor to ensure unresolved comments are resolved before products are finalized	Advise UGTA Federal Activity Lead, and provide assistance as needed; work with CAU Lead and PER Chairperson to ensure unresolved comments are resolved before products are finalized	Ensure work resulting from the PER is coordinated with other CAU studies; track comments that have yet to be resolved	Support CAU Lead as needed	Provide support to UGTA Federal Activity Lead to integrate new work scope required as an outcome of the PER	N/A	Work with EPS UGTA Integration Manager to plan remedial work if needed



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UGTA Leads and Committee Members



DOE

UGTA Federal Activity Lead: **Bill Wilborn**

Nevada Field Office UGTA Quality Assurance Contact: **Kevin Cabble**

Nevada Field Office Project Controls Lead: **Andy Weber**

NDEP

Bureau Chief: **Chris Andres**

UGTA Branch Supervisor: **Mark McLane**

UGTA Hydrologist/Modeler: **Britt Jacobson**



NEVADA DIVISION OF
**ENVIRONMENTAL
PROTECTION**

Nye County

Grant Manager: **Darrell Lacy**

Geologist: **John Klenke**

Contract Geologist: **Jamie Walker**

National Security Technologies LLC

Vision • Service • Partnership

Environmental Program Services (EPS)

UGTA Project Manager: **Ken Rehfeldt**

UGTA Integration Manager **Brian Haight**



Navarro Research and Engineering, Inc.



Science Advisors

Pahute Mesa and Rainier Mesa/Shoshone Mountain: **Chuck Russell**

Yucca Flat/Climax Mine and Frenchman Flat: **Irene Farnham**

Contract Managers

Los Alamos National Laboratory (LANL): **Kay Birdsell**

National Security Technologies (NSTec): **Ken Ortego**

Desert Research Institute (DRI): **Karl Pohlmann**

Lawrence Livermore National Laboratory (LLNL):

Andy Tompson

U.S. Geological Survey (USGS): **Jeff Sanders**

CAU Leads

Frenchman Flat: **Brian Haight**

Pahute Mesa: **Ken Rehfeldt**

Yucca Flat / Climax Mine: **Ed Kwicklis**

Rainier Mesa/Shoshone Mountain: **Andy Tompson**

Tompson

Committee Members

DRI: hydrologist, modeler/hydrologist, modelers (2)

LANL: radiochemist, hydrologist, modelers (2)

LLNL: geochemist, modelers (2)

Navarro: hydrogeologist, geochemist, engineer, modelers (4)

NSTec: engineer, geologists (2)

NDEP: regulators (2)

Nye County: geologists (2)

USGS: modeler, geologists (3)



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Upcoming Internal Peer Reviews

- Rainier Mesa/Shoshone Mountain (CAU 99) – August/September 2017
 - Flow and Transport Document
 - Alternative Modeling Strategy
 - GoldSim simplified modeling approach
- Yucca Flat/Climax Mine (CAU 97) – March/April 2017
 - CADD/CAP
 - Pending closure of External Peer Review and NDEP approval to advance to the CADD/CAP stage
- Pahute Mesa (CAU 101/102) – July 2017 (pending)
 - Review water balance analyses (discharge, boundary, recharge, and chemistry)



What to Expect

- Very technical exchange between the UGTA Leads and committee members
- Not a rubber stamp of approval
- Sessions held in Las Vegas, Nevada and may include conference calls
- Each session usually lasts between 3 and 5 hours
- Dates typically not set more than 30 days in advance
- Agendas are set based on what needs to be accomplished
- Each session has a different subject matter – very dynamic dialogue/debate



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NSSAB Path Forward

- Choose up to two members to observe Internal Peer Review sessions (beneficial to have same members for each CAU for consistency)
 - UGTA Science Advisors hold prebrief and debrief meetings with NSSAB in coordination with each Internal Peer Review session to address any questions, clarify information, and to assist with their updates to the NSSAB
- Members attending Internal Peer Review sessions will provide timely written updates after each session that will be emailed to the NSSAB
- Provide a recommendation by the Full Board as to how the internal peer review process could be enhanced at the August 16, 2017 meeting



NSSAB Volunteers

Internal Peer Review	NSSAB Volunteers
A. Rainier Mesa/Shoshone Mountain (CAU 99) ~ Alternative Modeling Strategy	#1.
	#2.
B. Rainier Mesa/Shoshone Mountain (CAU 99) ~ GoldSim simplified modeling approach (note: suggest these be the same volunteers as for A.	#1.
	#2.
C. Yucca Flat/Climax Mine (CAU 97) ~ CADD/CAP	#1.
	#2.
D. Pahute Mesa (CAU 101/102) ~ Review water balance analyses (discharge, boundary, recharge, and chemistry)	#1.
	#2.



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