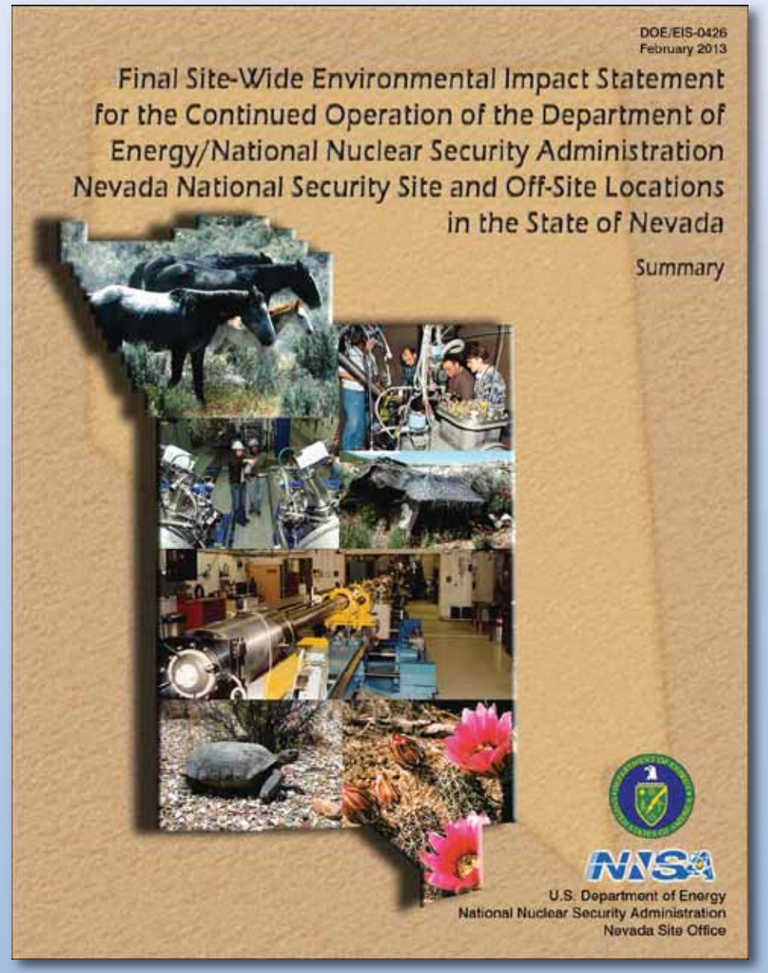
Why Prepare a New Site-Wide Environmental Impact Statement?

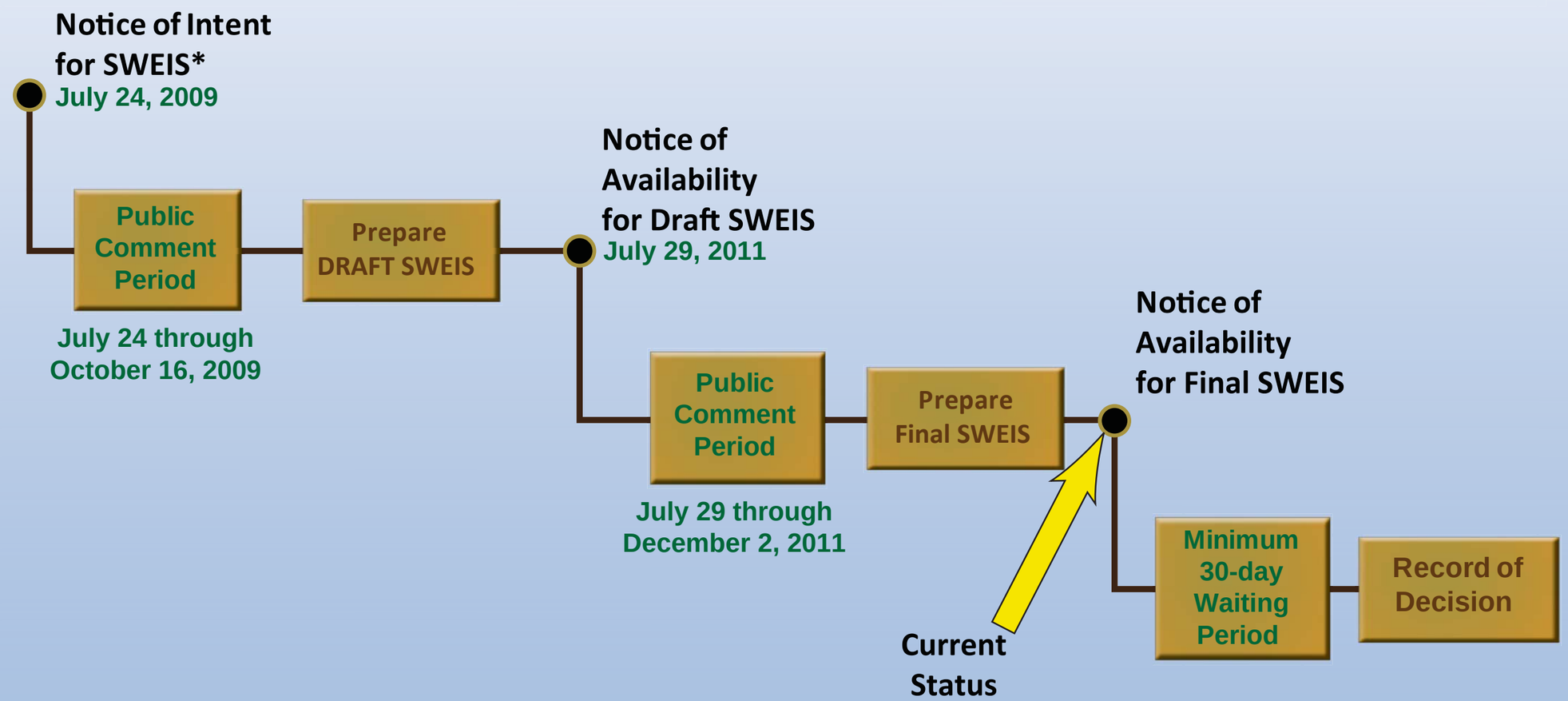
- The National Environmental Policy Act (NEPA) requires that Federal agencies determine the impact of their actions on the natural and human environments and disclose those impacts to the public
- Requested by stakeholders in 2008
- Driven by current missions and proposed changes in Nevada National Security Site activities
- Updates the environmental baseline



National Nuclear Security Administration

Log No. 2011-308

National Environmental Policy Act (NEPA) Process



*Site-Wide Environmental Impact Statement

National Nuclear Security Administration

Log No. 2011-270

National Nuclear Security Administration Sites in Nevada

- Consists of the Nevada National Security Site (NNSS), the Remote Sensing Laboratory (RSL), the North Las Vegas Facility (NLVF), and portions of the Tonopah Test Range (TTR)
- NNSS is 1,360 square miles of federally-owned and controlled land surrounded by approximately 4,500 square miles of federally-owned and controlled land located northwest of Las Vegas, Nevada
- RSL and NLVF (located in the Las Vegas Valley) provide support for the NNSS
- TTR is a 280 square mile site on U.S. Air Force managed land, located east of Goldfield and Tonopah, Nevada

National Nuclear Security Administration

Log No. 2011-285

Purpose and Need for Agency Action

- Support the NNSA Stockpile Stewardship Program which ensures a safe and reliable nuclear weapons stockpile without underground nuclear testing
- Support the national security missions of the NNSA, and other Federal agencies
- Maintain the capability to conduct underground nuclear testing
- Support U.S. Department of Energy Environmental Management missions
- Support renewable energy development

Cygnus (located in the U1a Complex) is a large X-ray machine used in subcritical experiments

Groundwater characterization specialists collect drill cuttings from well drilling discharge fluids

The U1a Complex is an underground laboratory at the Nevada National Security Site

National Nuclear Security Administration

Log No. 2011-257

Affected Environment: Resource Areas Analyzed

- Land Use
- Infrastructure and Energy
- Transportation
- Socioeconomics
- Geology and Soils
- Hydrology
- Biological Resources
- Air Quality and Climate
- Visual Resources
- Cultural Resources
- Waste Management
- Human Health
- Environmental Justice

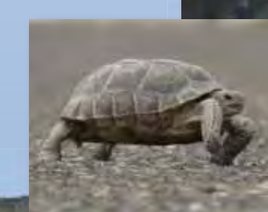
Land Use

Cultural Resources

Transportation

Air Quality

Waste Management



Biological

National Nuclear Security Administration

Log No. 2011-262

Alternatives Considered

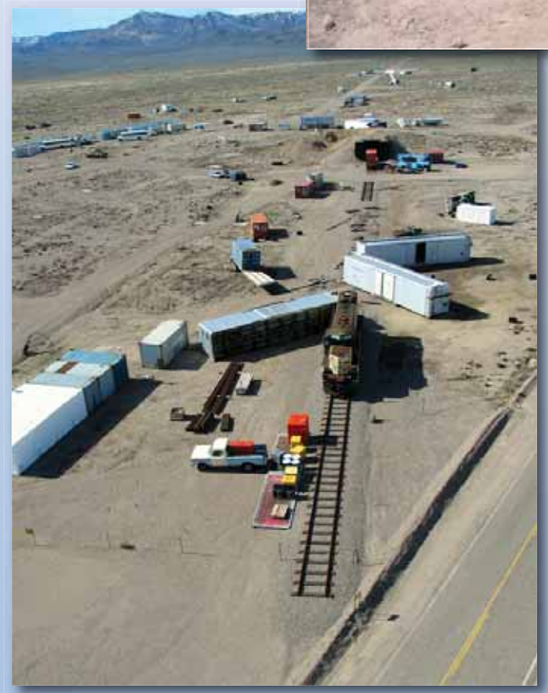
- No Action Alternative – reflects the use of existing facilities and ongoing projects to maintain operations consistent with activity levels in recent years

- Expanded Operations Alternative – includes the capabilities and projects described under the No Action Alternative, with some activities conducted more frequently, plus newly proposed projects, and facility construction activities

- Reduced Operations Alternative – includes the same types of activities as the No Action Alternative, however, for many programs, the levels of operations would be reduced; northwest portion of the Nevada National Security Site (zoned "Limited Use") would not be maintained and most activities would not be conducted in that zone

- The Final Site-Wide Environmental Impact Statement identifies a Preferred Alternative which is a "hybrid" alternative containing elements of each action alternative, dependent upon mission needs

Tank excavation at the Nevada National Security Site



T-1 Area provides a transportation accident scene, which can be used for a variety of realistic disaster scenarios

National Nuclear Security Administration

Log No. 2011-257

NNSA Missions in Nevada

- National Security/Defense Mission Programs
  - Stockpile Stewardship & Management
  - Nuclear Emergency Response
  - Nonproliferation & Counterterrorism
  - Work-for-Others (Homeland Security, Department of Defense)

- Non-Defense Mission Programs
  - General Site Support and Infrastructure
  - Renewable Energy
  - Other Research and Development

Conceptual Solar Array

Security Training

- Environmental Management Mission Programs
  - Environmental Restoration
  - Waste Management

Joint Actinide Shock Physics Experimental Research (JASPER)

Low-Level Radioactive Waste Disposal

Remediation Activities

Site Infrastructure Support

National Nuclear Security Administration

Log No. 2011-262

Stockpile Stewardship and Management Program

Major Facilities and Activities:

- Device Assembly Facility
  - Plutonium experiment support
  - Houses Criticality Experiments Facility
  - Special nuclear material storage
  - Damaged Nuclear Weapon Disposition Program activities
- U1a
  - Dynamic plutonium experiments
- Joint Actinide Shock Physics Experimental Research Facility
  - Shock physics experiments using a two-stage gas gun
- Big Explosives Experimental Facility
  - High explosives tests and experiments

Device Assembly Facility

Cygnus at U1a

Joint Actinide Shock Physics Experimental Research Facility (JASPER)

Big Explosives Experimental Facility (BEEF)

National Nuclear Security Administration

Log No. 2011-273

Other National Security Programs

T-1 Training Area

Nonproliferation Test and Evaluation Complex

- Nuclear Emergency Response
  - Conduct Weapons of Mass Destruction (WMD) Training for first responders
  - Support the Nuclear Emergency Support Team, the Federal Radiological Monitoring and Assessment Center, the Accident Response Group and the Radiological Assistance Program
  - Disposition of improvised nuclear devices
- Nonproliferation and Counterterrorism
  - Support U.S. efforts in the areas of arms control and nuclear nonproliferation and to control the spread of WMDs
  - Provide nuclear forensics capabilities
  - Provide counterterrorism research, development and training capabilities

Radiological/Nuclear Countermeasures Test and Evaluation Complex

- Work for Others
  - Provide facilities and locations for non-NNSA organizations, such as the U.S. Departments of Defense and Homeland Security, to conduct tests, experiments, exercises and training to support development of technologies and tactics to detect and defeat a broad range of threats to national security
  - Support research, development and training for dealing with hazardous materials incidents

National Nuclear Security Administration

Log No. 2011-271

Tonopah Test Range

- NNSA's primary mission at the Tonopah Test Range (TTR) is to ensure U.S. nuclear weapons systems meet the highest standards of safety and reliability

- Activities are conducted under the conditions set forth in a land use permit from the U.S. Air Force and are the responsibility of the Sandia Site Office, located in Albuquerque, New Mexico

- Activities include flight-testing of gravity weapons (bombs); drop and impact testing of conventional weapons; and research, development, and evaluation of nuclear* weapons components and delivery systems

B2 bomber drops a B61 Joint Test Assembly

Post-test activities include excavation and recovery of the buried B83 Joint Test Assembly

*ONLY weapons or weapons simulators incapable of producing a nuclear explosion are used in tests and experiments at TTR

National Nuclear Security Administration

Log No. 2011-265

Ongoing Monitoring at and near the Nevada National Security Site (NNSS)

Offsite Community Monitoring

NNSS Water Sampling Activities

Jack Rabbit in Area 3 of NNSS

- **Air.** Air emissions are monitored at 16 stations on the NNSS to ensure compliance with federal regulations
- **Water**. Specialists periodically sample approximately 90 wells, springs, and surface water locations on and surrounding the NNSS
- **Biota**. Biologists conduct ongoing monitoring studies of plants and animals
- Independent offsite air and water monitoring conducted by the Community Environmental Monitoring Program at 29 stations in communities surrounding the NNSS
- Environmental monitoring results published annually in the *NNSS Environmental Report* (available at www.nv.energy.gov/library/publications/aser.aspx)

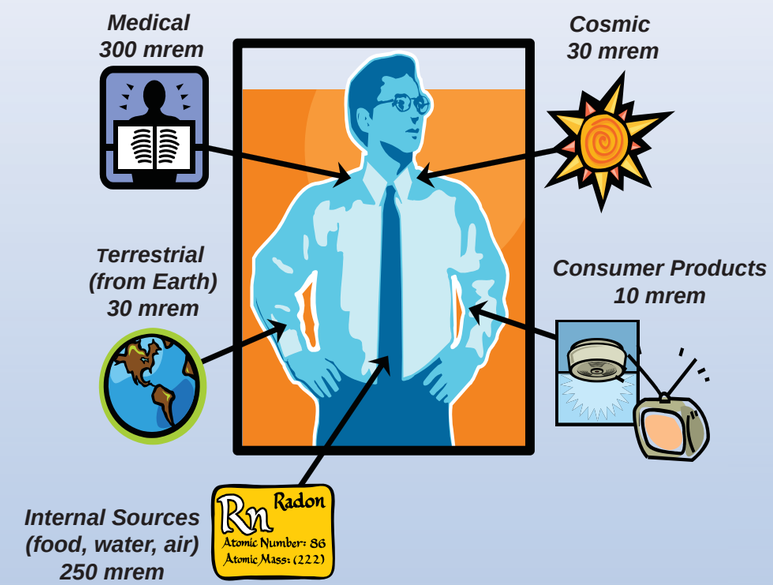
National Nuclear Security Administration

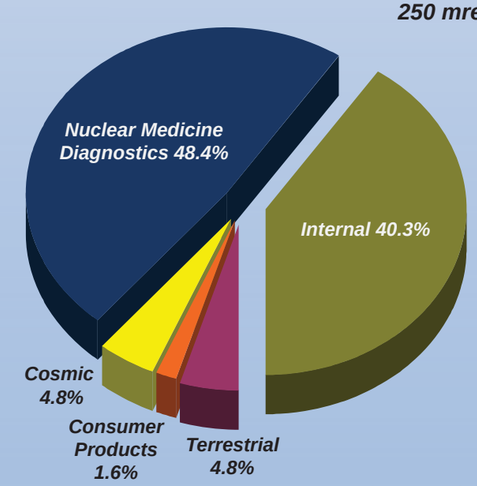
Log No. 2011-289

Radiation Information

- RAD (Radiation Absorbed Dose) is the amount of energy actually absorbed by a material, such as human tissue
- Rem measures the biological damage (dose) of the absorbed radiation
- A millirem (mrem) is one-thousandth of a rem

Average Annual Radiation Source and Dose*





The average person receives approximately 620 mrem of radiation per year from all sources. The maximum legal radiation dose limit for a person whose profession permits exposure is 5,000 mrem per year.

Source: National Council on Radiation Protection & Measurements Report No. 160, March 3, 2009

National Nuclear Security Administration

Log No. 2011-272

Human Health Effects

- Estimated annual radiation dose from normal Nevada National Security Site (NNSS) facility operations to the "maximally exposed individual" (MEI)* - 2.7 to 4.8 millirem from all pathways
  - Dose is overestimated by assuming the MEI is on site or at the site boundary
  - Doses to members of the public would be much less

NNSS worker wears device that monitors radiation exposure during soil sampling

- Regulatory limit for annual radiation dose to the public from U.S. Department of Energy/NNSA operations via all pathways - 100 millirem

- Doses and risks are evaluated for a range of hypothesized accidents using accepted models and assumptions that overestimate the potential risk

* Maximally exposed individual – A hypothetical individual whose location and habits result in the highest total radiological exposure (and thus dose) from a particular source for all relevant exposure routes (e.g., inhalation, ingestion, direct exposure).

National Nuclear Security Administration

Log No. 2011-272

Radioactive Waste Management at the Nevada National Security Site (NNSS)

Disposal activities at the NNSS Area 5 Radioactive Waste Management Site

- Each alternative provides an upper-limit waste volume that may be disposed
- The No Action and Reduced Operations Alternatives reflect recent trends in low-level radioactive waste (LLW) receipts at the NNSS and permit limits for mixed LLW disposal
- The Expanded Operations Alternative reflects maximum long-term waste forecasts from the U.S. Department of Energy Complex

Workers conduct a radiological survey of a waste package prior to disposal in an excavated disposal cell at the NNSS Area 5 Radioactive Waste Management Site

Ten-Year Waste Disposal Estimates (cubic feet)

	No Action Alternative	Expanded Operations Alternative	Reduced Operations Alternative
LLW	15,000,000	48,000,000	15,000,000
MLLW	900,000	4,000,000	900,000
Total	15,900,000	52,000,000	15,900,000

National Nuclear Security Administration

Log No. 2011-259

Analysis of Transportation Impacts

- NNSA's decision to maintain existing routing preferences is captured in the Nevada National Security Site Waste Acceptance Criteria and will not be addressed in the Record of Decision for the Final Site-Wide Environmental Impact Statement
- Analyzed a number of scenarios involving the transportation of radioactive waste and material using either truck or mostly rail modes of transport
- Used science-based, standard methodologies and computer models to calculate findings
- Estimated potential human health impacts to individuals (average person or worker) and the general population along transportation routes
  - Evaluated effects from incidental exposure (an individual in proximity to a truck transporting radioactive waste and material) and general effects from traffic accidents
  - Considered all reasonably conceivable accidents (i.e., minor to serious) when determining radiological and non-radiological risk

Shipping documentation for a radioactive waste shipment is verified upon arrival at the Nevada National Security Site.

National Nuclear Security Administration

Log No. 2011-269

Environmental Restoration

- Responsible for addressing radioactive groundwater contamination resulting from historic underground nuclear testing by determining location, extent, and movement of groundwater contamination through well drilling and monitoring
- Characterize and remediate surface soils contaminated as a direct result of historic nuclear experimentation and testing
- Remediate support facilities contaminated by radioactive and hazardous constituents during historic nuclear research, development and testing activities
- Environmental Restoration activities are conducted in accordance with the Federal Facility Agreement and Consent Order with the State of Nevada Division of Environmental Protection

Characterization well drilling activities on the Nevada National Security Site

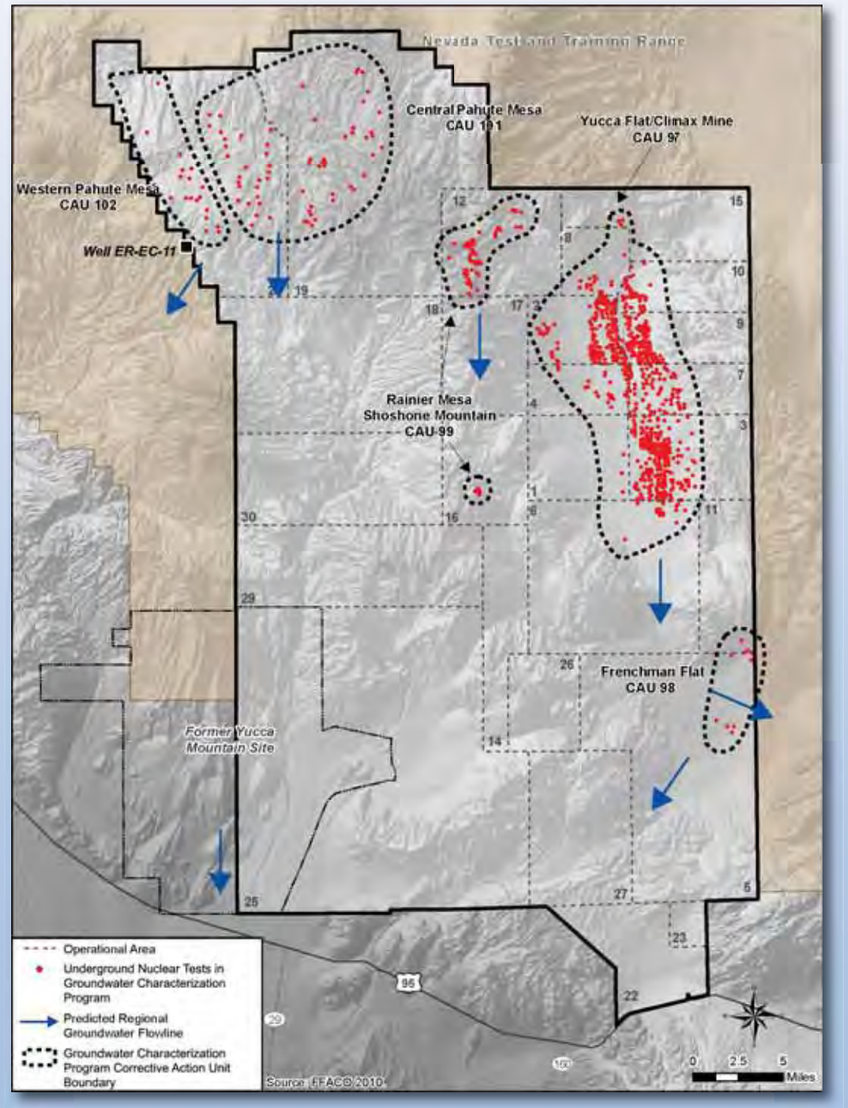
Industrial Sites activities on the Nevada National Security Site

Soil characterization activities on the Nevada National Security Site

National Nuclear Security Administration

Log No. 2011-268

Groundwater at the NNSS



- Groundwater studies are ongoing for five separate Corrective Action Units (CAUs) on the Nevada National Security Site (NNSS)
  - CAU boundaries determined by location of past underground nuclear tests and geologic setting
  - Groundwater studies include monitoring wells on the NNSS and off-site locations
  - In 2009, NNSA detected tritium below U.S. Environmental Protection Agency Safe Drinking Water Act standards in well ER-EC-11 on U.S. Air Force-managed land
- None of the activities under the three alternatives would cause groundwater contamination or alter ongoing studies

Crews drill a groundwater characterization well at the NNSS

NNSS groundwater program drill site at sunset

National Nuclear Security Administration

Log No. 2011-260

NNSS Groundwater Use

Hydrographic basins and active water wells (potable and non-potable) at the NNSS

- Total groundwater withdrawals at the Nevada National Security Site (NNSS) would range from 622 to 862 acre feet per year (excluding commercial solar power generation facility)

- NNSA groundwater withdrawal rates would be lower than the sustainable yield* for the affected hydrological basins (i.e., Yucca Flat, Frenchman Flat, and the Jackass Flats and Buckboard Mesa elements of the Fortymile Canyon basin)

*Sustainable yield is the perennial yield of the basin minus any water already committed to other users by the State Engineer

National Nuclear Security Administration

Log No. 2011-260

Renewable Energy

- NNSA is proactively pursuing energy efficiency projects and renewable energy sources
- Under each alternative, NNSA considers allowing future commercial solar power generation facilities at the Nevada National Security Site
- Expanded Operations Alternative also considers a potential future Geothermal Demonstration Project and development of a NNSA-proposed 5-megawatt photovoltaic power facility
- Implementation of energy conservation and efficiency measures is also addressed in each alternative

National Nuclear Security Administration
Log No. 2011-261

Consolidated Group of Tribes and Organizations (CGTO)

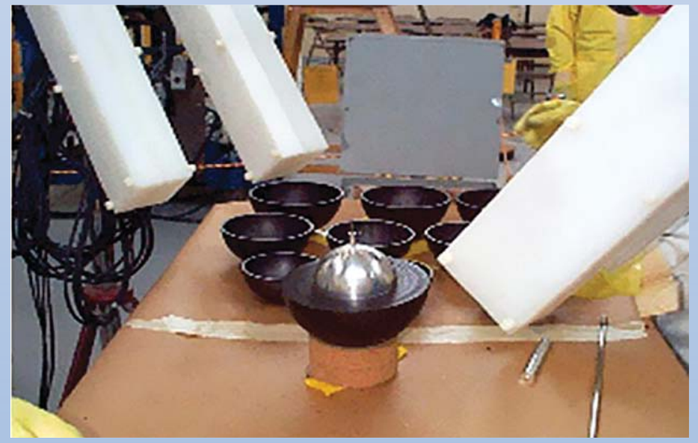
- NNSA has worked with 16 culturally affiliated tribes and one tribal organization under the CGTO since 1991
- The CGTO appointed the American Indian Writers Subgroup (AIWS) to provide text for U.S. Department of Energy/NNSA National Environmental Policy Act documents beginning with the 1996 Nevada Test Site Environmental Impact Statement
- Text boxes written by the AIWS are identified by the CGTO logo and presented throughout the Nevada National Security Site Final Site-Wide Environmental Impact Statement (SWEIS); Appendix C of the SWEIS contains the full AIWS text

National Nuclear Security Administration

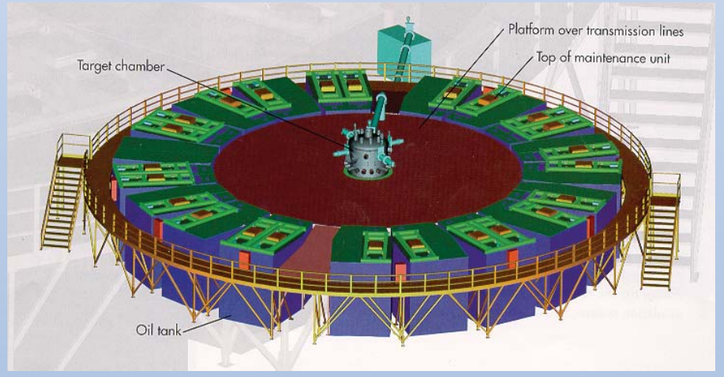
Log No. 2011-258

Preferred Alternative

- "Hybrid" alternative of select elements from each action alternative
- Selected as Preferred Alternative upon consultation with key program officials and Nevada Site Office management, and through consideration of public comments
- Documented in ***Table S-1, Comparison of Mission-Based Program Activities Under the Proposed Alternatives and Identification of the Preferred Alternative*** in the Final Site-Wide Environmental Impact Statement Summary



Conduct up to 500 criticality operations, training, and other operations per year at the National Criticality Experiments Research Center at the Device Assembly Facility in Area 6 of the Nevada National Security Site (No Action)



Decommission and disposition the Atlas Facility (Reduced Operations)

Conduct up to 36 shock physics experiments per year using actinide targets at JASPER in Area 27 of the Nevada National Security Site (Expanded Operations)

National Nuclear Security Administration