Nevada National Security Site Underground Test Area (UGTA) Tour

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Nevada National Security Site (NNSS)

- NNSS has many diverse roles to support the U.S. nuclear weapons stockpile stewardship missions and also supports other U.S. Department of Energy (DOE), Department of Defense, and Department of Homeland Security programs.
- DOE National Nuclear Security Administration Nevada Field Office responsible for oversight.
- ~1,360 square miles of federally-owned and controlled land, surrounded by ~4,500 square miles of federally-owned and controlled land (U.S. Air Force).
- Located ~65 miles northwest of Las Vegas.

- 1,149 total U.S./U.S.-U.K. nuclear detonations
  - 1,021 at NNSS
    - 100 atmospheric
    - 921 underground
- A nuclear test may include more than one (1) detonation
NNSS Nuclear Testing 1951 – 1992

First NNSS nuclear test: ABLE

First detonation contained underground: RAINIER

Last U.S. atmospheric nuclear test at the NNSS: LITTLE FELLER I

BANEBERRY: Accidental release of radioactivity detected off site; better site characterization and containment evaluation resulted

First underground test at NNSS: UNCLE

Last U.S. nuclear underground test: DIVIDER


Count

Atmospheric

Underground

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Log No. 2014-xxx
EMPLACEMENT
COLLAPSED CRATERS

ACCIDENTAL RELEASE OF RADIOACTIVITY
POST-TEST SAMPLE ANALYSIS

Photographs from CMS-05-010_JMK, 2005
Regional Geologic Setting

NNSS lies within the Southwestern Nevada Volcanic Field, which includes 8 known calderas that formed between 15 million years ago (Ma) and 8 Ma.
Regional Geologic Setting

– Rocks at the NNSS ~ 12,200 m (40,000 ft) thick and span more than 500 million years in age

– Diverse depositional environments and geologic processes
  - Marine clastic and carbonate deposition
  - Volcanic activity
  - Igneous intrusion
  - Alluvial basin-filling deposition
NNSS
Geologic Setting

• At the NNSS, contractional structural events are older than 100 Ma and resulted in
  – Thick deposits of Mississippian siliciclastic rocks
  – Formation of thrust faults, and associated imbricate thrusts and folds

[Map of NNSS region with geological features labeled and legend]

Legend:
- Quaternary playa deposits
- Pliocene and Quaternary basaltic rocks
- Quaternary/Tertiary alluvial sediments
- Tertiary volcanic rocks
- Mesozoic granitic rocks
- Paleozoic and Precambrian sedimentary rocks
- Mississippian siliciclastic rocks
- Syncline
- Anticline
- Thrust fault
- NNSS boundary
- Yucca Flat model area boundary

Major Pre-Cenozoic structural features of the NNSS region
Modified from BN (2006)
NNSS Geologic Setting

- Widespread basin-and-range extensional faulting at the NNSS
  - Normal and strike-slip faults
  - Alluvium-filled basins (e.g., Frenchman Flat and Yucca Flat)
NNSS UGTA Corrective Action Units

- CAU 97: Yucca Flat/Climax Mine – 747 detonations
- CAU 98: Frenchman Flat – 10 detonations
- CAU 99: Rainier Mesa/Shoshone Mountain – 68 detonations
- CAU 101: Central Pahute Mesa – 64 detonations
- CAU 102: Western Pahute Mesa – 18 detonations
Frenchman Flat Geologic Setting
Frenchman Flat Geologic Cross Section

Northwest-Southeast Cross Section through Frenchman Flat
Yucca Flat
Geologic Setting

• Yucca Flat is an alluvium-filled basin surrounded by highlands composed of volcanic and sedimentary rocks

• Topographically closed basin with a playa (seasonally dry lake) at its southern end
The main Yucca Flat basin consists of a series of west-tilted half grabens with the main basin-forming faults near the center of the basin.

Basin began forming approximately 10 Ma in response to basin-and-range extension.