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Nuclear Materials Management
U.S. Department of Energy, National Nuclear Security
Administration Nevada Site Office (NNSA/NSO)

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Abstract:

In light of the changing Defense Complex mission, the high cost to storing and protecting nuclear materials, and in consideration of scarcity of resources, it is imperative that the U.S. Department of Energy (DOE) owned nuclear materials are managed effectively. The U.S. Department of Energy, National Nuclear Security Administration (NNSA) Strategic Action Plan outlines the strategy for continuing to meet America's nuclear security goals, meeting the overall mission challenges of DOE and NNSA as well as giving focus to local missions. The mission of the NNSA/NSO Nuclear Materials Management (NMM) Program is to ensure that nuclear material inventories are accurately assessed and reported, future material needs are adequately planned, and that existing Nevada Test Site (NTS) inventories are efficiently utilized, staged, or dispositioned. The NNSA/NSO understands that the NTS has unique characteristics to serve and benefit the nation with innovative solutions to the complex problems involving Special Nuclear Materials, hazardous materials, and multi-agency, integrated operations. The NNSA/NSO is defining infrastructure requirements for known future missions, developing footprint consolidation strategic action plans, and continuing in the path of facility modernization and improvements. The NNSA/NSO is striving for the NTS to be acknowledged as an ideal location towards mission expansion and growth. The NTS has the capability of providing isolated, large scale construction and development locations for nuclear power or alternate energy source facilities, expanded nuclear material storage sites, and for new development in "green" technology.

The Nevada Test Site

The NTS represents the United States' single, unique capability to support nuclear testing and major experiments that involve SNM or highly hazardous materials. The NTS is a DOE/NNSA Defense Program Site and is established to support the Stockpile Stewardship and the National Security missions. The existing facilities and infrastructures enable the execution of technical operations and experiments in support of DOE program initiatives. NSO is continuously developing footprint consolidation plans and designing infrastructure requirements for expanded future missions.

The National Laboratories are the principal implementers as well as the critical organizations sponsoring the nuclear weapons programs executed at the NTS. The NTS is to provide support for these complex, high-hazard consequence operational activities in support of national security initiatives. National Security Technologies, LLC (NSTec), as the Management and Operations Contractor, is accountable for the

successful execution to manage the resources, facilities, and infrastructures that make up the NTS.

The NTS Mission

NSO defense programs are expected to continue as the single largest supporter of the NTS infrastructure designed to carry out DOE's Vision. NTS activities include: sub-critical and other SNM experiments in U1a; a robust dynamic materials experiment program at JASPER; Big Explosive Experimental Facility (BEEF); and the Critical Experiment Facility (CEF). Operations at the DAF include modification and staging of SNM and other nuclear components. Future activities may also include maintenance, repair, and disassembly of damaged nuclear weapons.

The NTS is being positioned to remain at the forefront in the global war on terror. The NTS will continue to grow as a state-of-the-art Weapons of Mass Destruction (WMD) Radiological Nuclear (Rad/Nuc) incident response training center as the U.S. strives to prevent the acquisition of nuclear and radiological materials for use in weapons of mass destruction and other acts of terrorism. The NTS Counter Terrorism Operations Support (CTOS) Center develops and provides venues for improving the national capability in detection, prevention, protection, response, and recovery from a terrorist act.

NTS used for NNSA Consolidation

NNSA's consolidation efforts are being designed to reduce facility and security costs by combining nuclear material inventories to fewer sites throughout the complex. This de-inventory plan will phase out operations involving CAT I/II SNM at all national laboratories. The transfer of the LANL CEF operations to the DAF is an example of this NNSA consolidation.

NTS Modernization

To accomplish these complex-wide initiatives and achieve mission objectives, NSO is in the process of rebuilding, modernizing, and improving NTS facilities and workspaces.

Safe and Secure Place

The NTS is a national asset for conducting high-hazard consequence operations and is a location that possesses all the necessary characteristics for safety and security. The size, remoteness, lack of encroachment, and its controlled access is a definite advantage to provide a safe environment for experimental and operational activities.

Selected Group of Well Trained Personnel

NSO maintains strong competencies in nuclear materials management, nuclear operations, and nuclear safety. Mutual cooperation, partnership, and teamwork form the

foundation of NSO's operational philosophy in the development of science and technology leading to many successful programs for NSO.

NSO NMM Program Development

The NSO NMM Plan provides for the continued efforts in the development of the NMM program to meet the envisioned NTS mission. Planning requires annual evaluations of current and projected mission needs; material characterization/identification; material packaging, storage, and disposition. NMM will explore the availability and capabilities of NTS resources to identify potential storage locations to support DOE program initiatives.

Plans for the NTS

The NTS will continue to meet the evolving requirements and the Nuclear Test Readiness mission, to carry out a possible underground test within 24 months.

The NTS will continue to advance towards dynamic experiments/tests with Special Nuclear Material (SNM); advanced radiography; flight and environmental tests; and assembly/disassembly operations. The NTS will support target area operations, diagnostic fielding and calibration experiments, and participate in the consolidation efforts of SNM.

New, potential roles have been identified and has described the NTS as a place to serve complex consolidations of Category I/II special nuclear material (SNM); serve as a backup location for weapon assembly and disassembly operations; serve as the consolidated plutonium center for the nuclear weapons complex; and to serve as the primary nuclear weapons complex site for large-scale hydrodynamic testing.

In addition, as a complex consolidation resource, the NTS could be called on to support nonproliferation programs and initiatives of DOE and other agencies. As an example, the Senate Defense Authorization Report for FY 2009 states that the committee believes that the Device Assembly Facility (DAF) is under-utilized and recommends that 12 million dollars be added towards additional studies to expand the DAF mission. NNSA is considering the DAF for use as backup for weapon disassembly operations to supplement the capabilities of Pantex.

Potentials for Consideration:

The NTS has the potential to provide multiple, isolated, large scaled construction and development sites. There is the ability within the NTS to support the custom design and construction of experimental systems ranging from small electronics or remote sensing packages to fielding complex laboratories. The NTS has the space to construct multiple facilities for underground nuclear storage. The NTS is an ideal location for solar power and for mountain-top wind-turbine energy sources. The NTS should be considered for its potential to accommodate a nuclear material reprocessing plant and be the solution to one of DOE's major initiatives.

Conclusion:

The U.S. DOE, NNSA Strategic Action Plan outlines the strategy for continuing to meet America's nuclear security goals, meeting the overall mission challenges of DOE and NNSA as well as giving focus to local missions. The mission of the NNSA/NSO NMM Program is to ensure that nuclear material inventories are accurately assessed and reported, future material needs are adequately planned, and that existing NTS inventories are efficiently utilized, staged, or dispositioned. The NTS itself has unique characteristics to serve and benefit the nation as innovative solutions to the complex problems are identified. The NNSA/NSO is striving for the NTS to be acknowledged as an ideal location towards mission expansion and growth.

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Nuclear Materials Management Nevada Site Office (NSO)

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Abstract

- NSO NMM Program ensures that inventories are accurately assessed, planned, utilized, staged, reported, and dispositioned.
- The Nevada Test Site (NTS) is an ideal location for mission expansion and growth providing large scale, isolated locations for multiple construction & development sites
- The NTS is a solution site for material reprocessing, underground storage, and alternate energy sources.

The Nevada Test Site

- United States single, unique capability to support nuclear testing and major experiments involving SNM or highly hazardous materials
- Supports Stockpile Stewardship & National Security Missions
- Supports the National Labs while conducting complex operational activities to support national security initiatives
- NSTec manages the resources, facilities, and infrastructures within the NTS.

Mission

- Defense Programs largest supporter of NTS infrastructure
- Consolidated, effective, nationally shared, major science assets are located at the NTS:
 - DAF, U1a, JASPER, BEEF, & CEF
- DAF operations include modifications and staging of SNM and other nuclear components
- NTS activities may include maintenance, repair, and disassembly of damaged nuclear weapons.

Mission (cont)

- NTS has drawn on the experience of others to establish state-of-the-art practices in WMD and Radiological Nuclear incident responses.
- The NTS Counter Terrorism Operations Support (CTOS) Center develops and provides venues for improving the national capability in detection, prevention, protection, response, and recovery from a terrorist act.

Consolidation

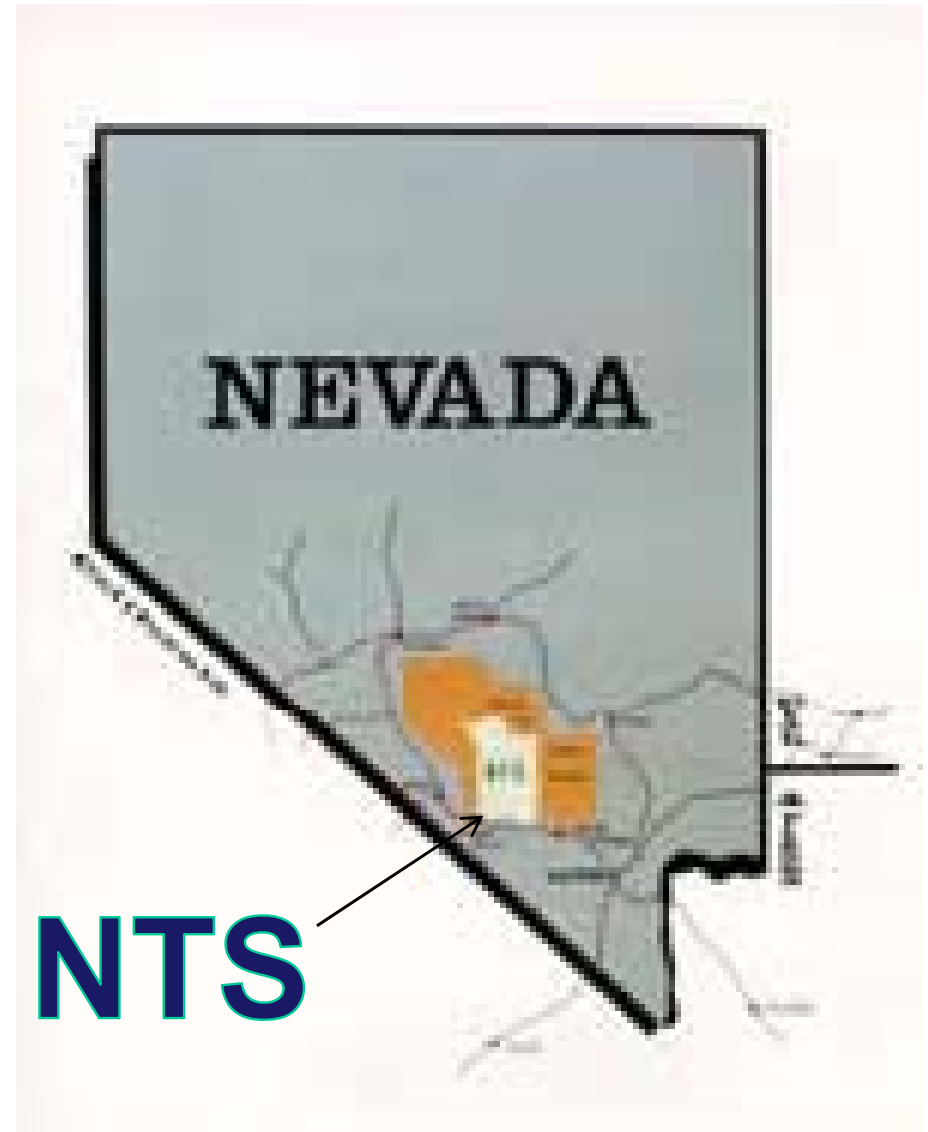
- NNSA's consolidation efforts are designed to reduce facility and security costs by combining nuclear material inventories to fewer sites throughout the complex.
- Sites will be specifically assigned certain types of SNM inventories
 - Test Site being considered for Pu
 - DAF being considered for HEU
 - Example: *LANL CEF project to DAF*

NTS Modernization

- To accomplish complex-wide objectives and achieve future goals, NSO is in the process to design, modernize, and improve the facilities
- This strategic plan requires Site-wide coordination and support to transition, renovate, and/or dispose of facilities.

NTS is a Safe and Secure Place

- SIZE
- Remoteness
- Lack of encroachment
- Controlled access



Selected Group / Well Trained Staff

- NSO maintains strong competencies in nuclear materials management, nuclear operations, and nuclear safety.
- Mutual cooperation, partnership, and teamwork form the foundation of NSO's operational philosophy in the development of science and technology leading to many successful programs for NSO.

NMM Program

- Life-Cycle Management
 - Site specific, material specific, and complex-wide planning
 - Annual evaluations of current/projected needs
 - Resource analysis (storage locations)
- Networking, Communications, and Coordination

Plans for the NTS

- Continue to meet the evolving test readiness posture (24 months)
- Dynamic tests/experiments with SNM
- Advancements in radiography testing
- Flight and environmental tests
- Assembly/Disassembly operations
- Target area operations
- Diagnostic fielding and calibration experiments
- Participant in SNM consolidation efforts

Plans for the NTS (cont)

- Serve as consolidation Site for SNM Cat I & II materials
- Backup location for disassembly
- Plutonium Consolidation Site
- Site for large scale Hydrodynamic Testing

Expanded role requires a more comprehensive nuclear materials management program

Plans for the NTS (cont)

- Device Assembly Facility
- Senate Authorization Report
 - Additional \$12 Million
 - Studies/Concepts:
 - Expand the Mission
 - Future Development
- Dismantling (Pantex Relief)
- Disposition

NTS Potentials

- NTS has the potential to provide multiple, isolated, large scale construction and development sites
- Can support custom designed experimental systems ranging from small remote packages to complex labs
- Space for underground storage facilities
- Alternate energy (Solar power / Wind turbines)
- Ideal location and can accommodate a Nuclear Material Reprocessing Plant

Underground Storage

Shaft



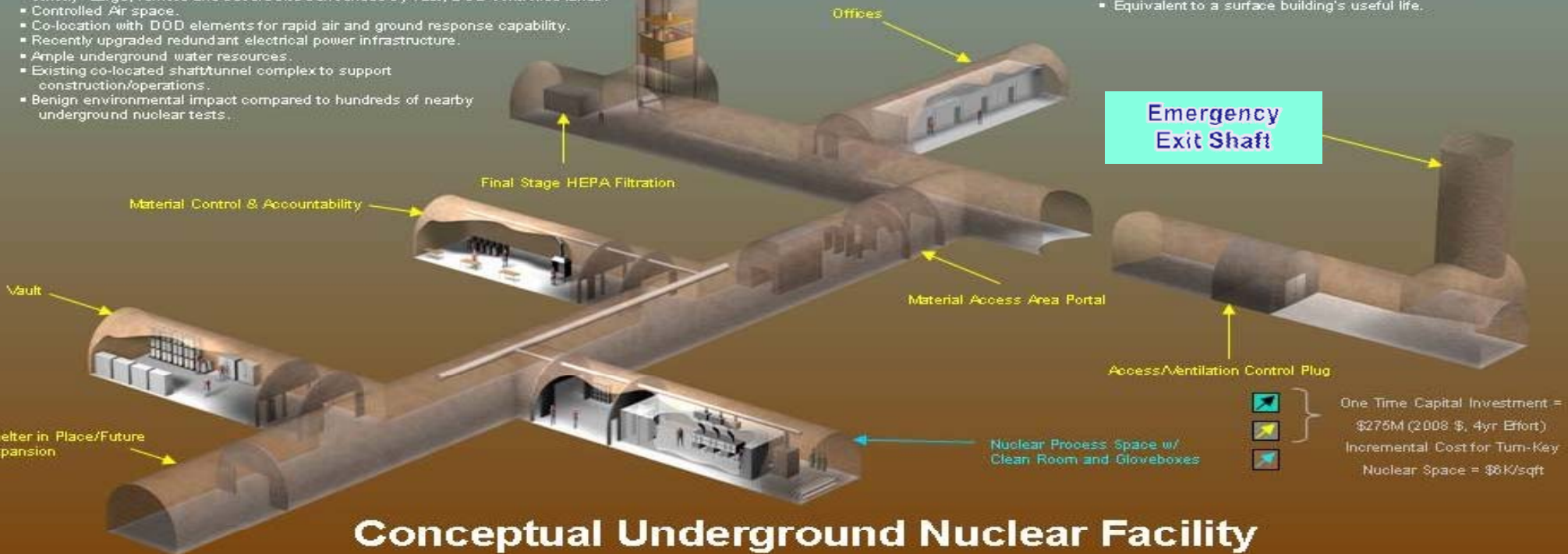
Benefits of an Underground Nuclear Facility at NTS

- Extensive knowledge of vertical shaft and tunnel construction/maintenance.
- Decades of experience constructing underground experimental laboratories.
- Strictly Large, remote and secure site surrounded by vast, DOD controlled lands.
- Controlled Air space.
- Co-location with DOD elements for rapid air and ground response capability.
- Recently upgraded redundant electrical power infrastructure.
- Ample underground water resources.
- Existing co-located shaft/tunnel complex to support construction/operations.
- Benign environmental impact compared to hundreds of nearby underground nuclear tests.

Advantages of an Underground Nuclear Facility

- Passive denial to material by literal defense in depth.
- Cost advantage over surface concrete/rebar construction by excavating nuclear space.
- Use of standard tunneling and ground support technology.
- Almost unlimited underground expansion with essentially unchanging surface security posture.
- Ability to seal off contaminated space with out significant loss.
- Resistant to aircraft and missile threats.
- Significantly reduced earthquake threat over surface facilities.
- Surrounding earth simplifies environmental controls.
- Equivalent to a surface building's useful life.

Emergency Exit Shaft



One Time Capital Investment = \$275M (2008 \$, 4yr Effort)
 Incremental Cost for Turn-Key Nuclear Space = \$8K/sqft

Conceptual Underground Nuclear Facility

Conclusion:

- NSO NMM Program ensures that inventories are accurately assessed, planned, utilized, staged, reported, and dispositioned.
- The Nevada Test Site (NTS) is an ideal location for mission expansion and growth providing large scale, isolated locations for multiple construction & development sites
- The NTS is a solution site for material reprocessing, underground storage, and alternate energy sources.

The NTS is positioned as a solution to meet the nuclear material challenges of today and to accept the opportunities of the future.