# *Planned Facilities – Spent Fuel*

- 14 new ISFSIs planned
- Private Fuel Storage, an “away-from-reactor” ISFSI
- Yucca Mountain license application is in preparation

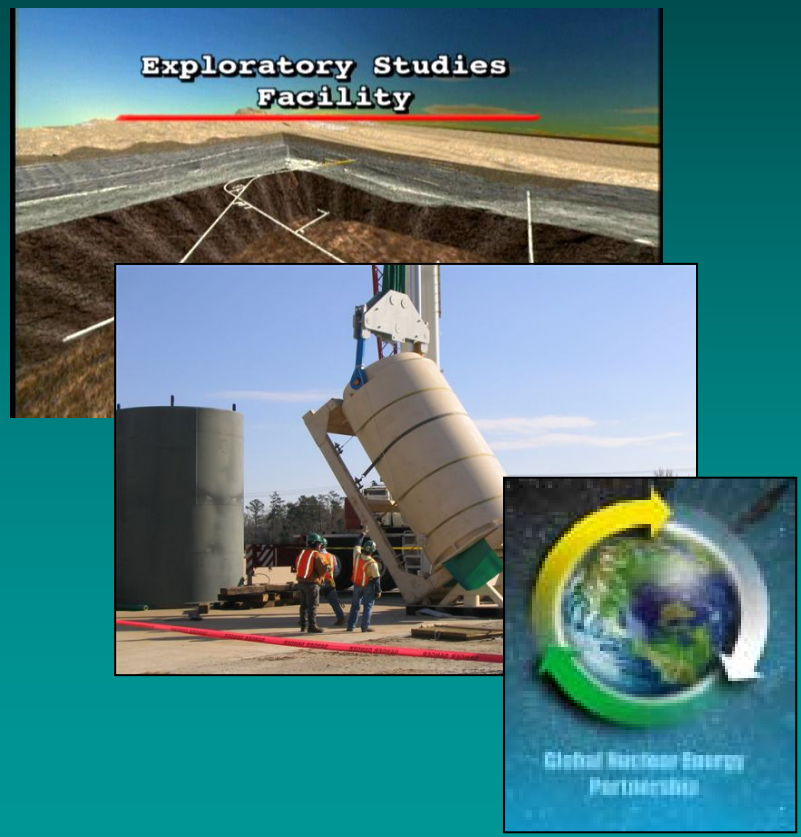
# *Yucca Mountain*

## *The Making of an Underground Laboratory*

**Play Video**

# *Summary – Spent Fuel*

- Deep geologic disposal is national responsibility
- Generators share cost
- Safe and secure storage, on or off site, until repository is available
- More ISFSIs are planned
- GNEP would reduce volume



# *Content of Presentation*

- How the U.S. satisfies provisions of the Joint Convention
- Liability considerations (responsibilities)
  - Radioactive Waste (Nuclear Fuel Cycle and Non-Power)
    - Long-term Management
    - Funding of Responsibilities
    - Current Practice
    - Planned Facilities
- Feedback from the last review meeting
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# *Radioactive Waste Origins*

- Nuclear Fuel Cycle
  - Uranium mines and mills
  - Uranium conversion and enrichment plants
  - Fuel fabrication (light-water & future MOX
  - Nuclear power plants
  - Reprocessing (past practice, GNEP)
- Non-Power
  - Defense-related activities
  - Government and university research reactors
  - Byproduct use in medicine, research, and industry
  - Decommissioning and site cleanup
  - Some TENORM

# *Long-term Management - Radioactive Waste*

Permanent disposal is national policy and almost all nuclear wastes are dispose of in the U.S.

| Sector | Facility Type | Waste Type | Number | Inventory |
|---|---|---|---|---|
| **Government** | Geologic Repository (WIPP) | TRU | **1** | **37,000 $m^3$** |
| | Closed Greater Confinement Disposal (boreholes) | TRU | **1** | **200 $m^3$** |
| | Near Surface Disposal | LLW | **18** | **5,800,000 $m^3$** |
| **Commercial** | Operating Near Surface Disposal | LLW (Class A, B, C) | **3** | **2,660,000 $m^3$** |
| | | 11e.(2) | **1** | **1,010,000 $m^3$** |
| | Closed Near Surface Disposal | LLW | **4** | **438,000 $m^3$** |
| **Government & Commercial** | Title I UMTRCA Disposal | Residual Radioactive Material (tailings) | **20** | **163,000,000 Metric Tons** |
| **Commercial** | Title II UMTRCA Disposal | 11e.(2) | **39** | |
| **Government** | Other Closed Disposal Cells | Residual Radioactive Material (tailings) | **2** | **3,120,000 $m^3$** |

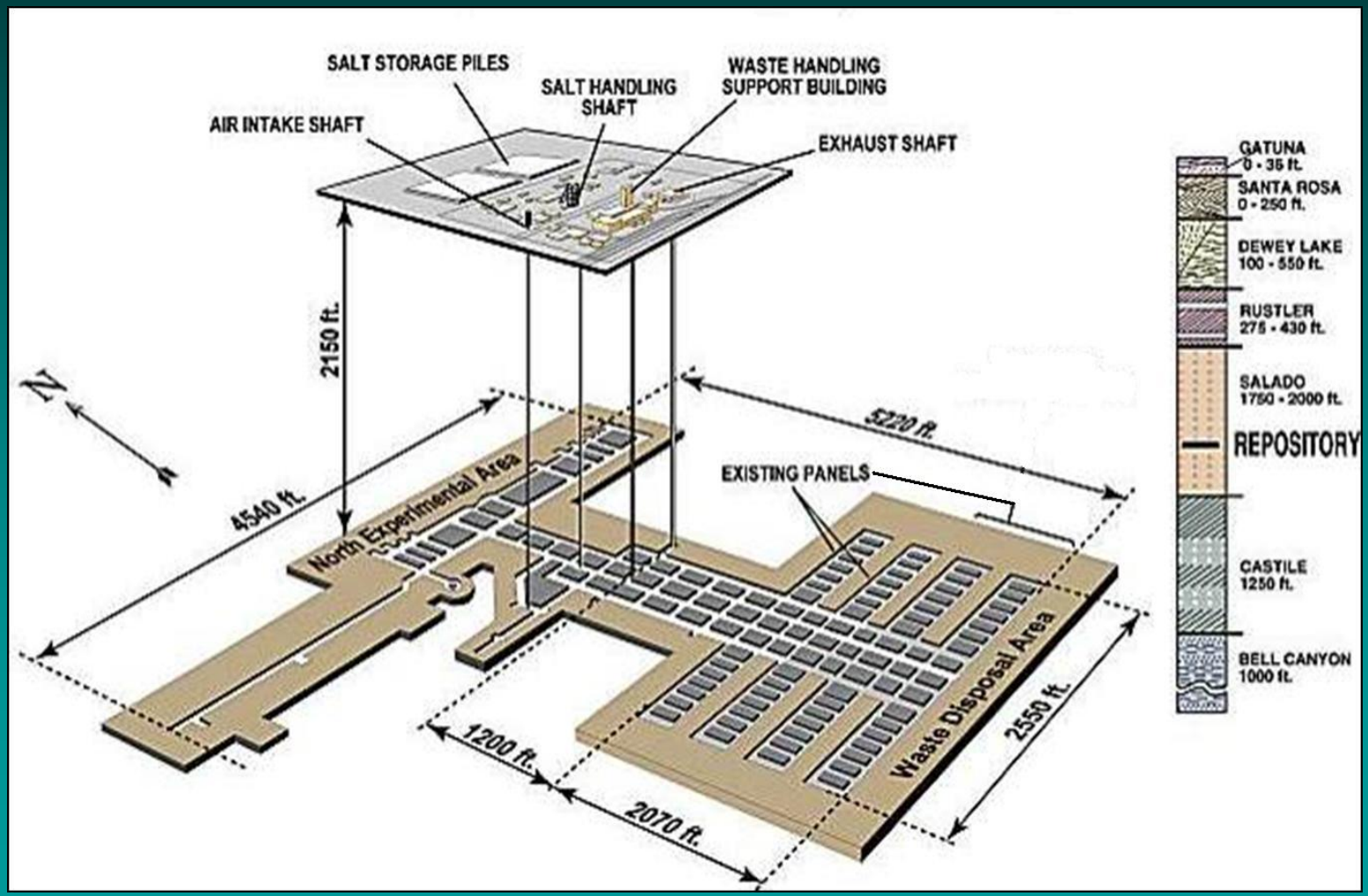
# *Funding Responsibilities – Radioactive Wastes*

- Generators pay for treatment and disposal
- Generators contribute to decommissioning costs
- Graded approach for financial assurance
- Government pays for treatment and disposal of its waste

# *Current Practice - Radioactive Waste*

- HLW
- TRU waste
- Low-level radioactive waste
- Uranium mill tailings

# Waste Isolation Pilot Plant Layout



# *Construction of LLW Disposal Facility at DOE's Hanford Site*

# Commercial LLW and MLLW Disposal Facility

# *Gas Hills Mill Tailings Impoundment*

# *Planned Facilities - Radioactive Waste*

- Low-level waste & 11e.(2) disposal facilities (Waste Control Specialists—in licensing)
- Integrated Disposal Facility—Hanford site
- Treatment facilities for defense HLW at Hanford Site, Idaho National Laboratory, and Savannah River Site

# *Summary - Radioactive Waste*

- Permanent disposal is our policy
- Treatment & disposal of TRU waste and LLW is routine and safe

# *Content of Presentation*

- How the U.S. satisfies provisions of the Joint Convention
- Liability considerations (responsibilities)
  - Decommissioning & Remediation
    - Long-term Management
    - Funding of Liabilities (Responsibilities)
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# *Long-term Management Decommissioning & Remediation*

- DOE
  - 1337 Nuclear/radioactive facilities, 299 completed by October, 2006
- NRC
  - 17 Power and early demonstration reactors
  - 14 Research  test reactors
  - 38 Materials sites
  - 35 Uranium recovery sites
  - 3 Fuel cycle sites (partial decommissioning)

# *Funding Responsibilities Decommissioning & Remediation*

- Decommissioning financial assurance requirements included in NRC regulations
- Amount - based on site-specific estimate (reactors, waste brokers and large irradiators) or NRC-derived estimates (based on radionuclide activity at the site)
- Reserved for Decommissioning Activities – funds maintained outside of the licensee's control and available when needed
- NRC can direct payments if necessary

# *DOE Responsibilities Decommissioning and Remediation*

- DOE deactivates, decommissions, and remediates its own facilities
- Most activities are DOE-regulated, a few are NRC-licensed
- Cleanup agreements may include EPA or State oversight
- DOE plans Long-term for decommissioning, but is funded by annual appropriation

# *Current DOE Practice - Decommissioning and Remediation*

- Strategies and schedules vary by, facility, location, and extent of contamination
- Facility decommissioning linked to site risk-based end state, and stakeholder input
- DOE plans sometimes subject to external approvals—EPA, States, NRC
- DOE generally retains Long-term stewardship responsibility

# *Current NRC Practice Decommissioning and Remediation*

- Dose-Based regulation and ALARA (optimization)
- Regulations include criteria for unrestricted and restricted use
- Regulations provide for stakeholder involvement
- Remediation plans, and financial assurance mechanisms required
- NRC reviews radiological surveys or demonstration that the site meets the criteria prior to termination

# *Planned Facilities - Decommissioning & Remediation*

- Termination/Completion of 13 materials sites and 9 power reactors
- Significant Reviews – 3 License Termination Plans; 11 Decommissioning Plans
- NRC expects to terminate 26 commercial facilities over the next 3 years:
  - 16 complex materials facilities
  - 3 power reactors
  - 1 research and test reactor
  - 6 uranium recovery facilities

# *Summary - Decommissioning & Remediation*

- Many commercial and Federal facilities have been successfully decommissioned
- Decommissioning Program has matured and improved
- Improvements continue to be identified and implemented
- Technical and policy challenges remain

# *Content of Presentation*

- How the U.S. satisfies provisions of the Joint Convention
- Liability consideration (responsibilities)
  - Disused Sealed Sources
    - Long-term Management
    - Funding of Liabilities (Responsibilities)
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    - Planned Facilities
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# *Long-term Management - Disused Sealed Sources*

- Increased controls for risk-significant sealed sources
- U.S. supports use of IAEA Code of Conduct and RS-G-1.9, “Categorization of Radioactive Sources”
- Category 1 and 2 sources have additional storage security controls
- National Source Tracking System
- Storage requirements apply whether source is held for eventual use or eventual disposal

# *Long-term Management - Control & Recovery is a National Priority*

- Risk and threat reduction for potentially dispersible radiological materials
- Managed by DOE
- Working nationwide with Conference of Radiation Control Program Directors
- Sources recovered
  - 12,000 through 2005
  - 24,000 by 2011

# *Funding Responsibilities – Disused Sealed Sources*

- Funding for disposal is provided by the licensee
- Disposal may be part of a decommissioning program with dedicated funding
- Special cases such as bankruptcy, may involve Federal intervention

# *Current Practice - Disused Sealed Sources*

- Disposal or return by licensee
- Conference of Radiation Control Program Directors can assist with disposal or transfer
- DOE recovers sources as part of its Radiological Threat Reduction Program
- NRC/DOE Memorandum of Understanding
- DOE stores recovered sources, including Greater Than Class C (GTCC) LLW
- Sources not GTCC waste disposed of as LLW

# *Planned Facilities - Disused Sealed Sources*

- Disposal facility for GTCC waste
- LLW disposal facility in Texas for Class B/C sources

# *Summary - Disused Sealed Sources*

- Long-term planning coordinated through interagency task force
- Program blends responsibility between private- and government-funded disposition
- Current practice includes return, reuse, storage and disposal
- DOE taking steps for GTCC source disposal

# *Content of Presentation*

- How the U.S. satisfies provisions of the Joint Convention
- Liability consideration (responsibilities)
- Feedback from the last review meeting
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- Summary

# *Feedback from 1st Joint Convention Review Meeting*

- A high quality, successful program to safely manage and dispose of spent fuel and radioactive waste
- Report and presentation were informative, comprehensive, transparent
- Commended for reporting effort and practices; e.g., public participation programs
- Fulfilled the Joint Convention

# *Feedback from 1st Joint Convention Review Meeting (cont.)*

- Several suggestions for National Report improvement
  - Expansion of discussion of inspection and enforcement
  - Handling of decommissioning liabilities
  - Include inventories of:
    - spent fuel at operating reactors, and
    - waste from mining of fuel cycle resource ore

# *Feedback from 1st Joint Convention Review Meeting (cont.)*

- National report should focus on implementation
- U.S. should extend its foreign research reactor fuel take-back program

# *Content of Presentation*

- How the U.S. satisfies provisions of the Joint Convention
- Liability consideration (responsibilities)
- Feedback from the last review meeting
- What's new since the last report
  - GNEP
- Safety and operational trends
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# *Global Nuclear Energy Partnership*

- A comprehensive strategy to:
  - Increase U.S. and global energy security
  - Encourage clean development around the world & improve the environment
  - Reduce the risk of nuclear proliferation

# *GNEP Benefits*

- Reduced dependence on fossil fuels
- Abundant energy without carbon emissions or greenhouse gases
- **Recycled fuel minimizes waste and proliferation risk**
- Treats spent fuel as a resource, maximizing energy recovery
- Safe and secure nuclear power for developing nations
- **Single geologic repository (Yucca Mountain) fills need through this century**

# *Key GNEP Program Elements*

- Expand use of nuclear power
- **Minimize nuclear waste**
- **Demonstrate advance recycle technology**
- Demonstrate Advanced Burner Reactors
- Establish reliable fuel services
- Demonstrate small, exportable reactors
- Enhanced nuclear safeguards technology

# *More Information on GNEP*

- U.S. presentation during lunch break for all contracting parties on 22 May 2006
- U.S. official website:
  - http://www.gnep.energy.gov/