

**U.S. DEPARTMENT OF ENERGY  
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT**

**NUCLEAR WASTE TECHNICAL REVIEW BOARD  
FULL BOARD MEETING**

**SUBJECT: SOURCE TERM FOR THE SANDIA  
NATIONAL LABORATORIES (SNL)  
TOTAL SYSTEM PERFORMANCE  
ASSESSMENT**

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**PLAZA SUITE HOTEL • LAS VEGAS, NEVADA  
OCTOBER 14 - 16, 1992**

# **Source-Term Sensitivity Studies Done in TSPA-91**

- **Human-intrusion analysis used both standard source term and modified ("detailed") one**
  - **Other analyses used only standard source**
- **Detailed source term--inventory changes due to reactor operations**
  - **Reactor type (PWR, BWR)**
  - **Fuel burnup**
  - **Decay since discharge**

# **Characteristics of Source Terms**

- **Standard--Taken from SCP, "abstracted" for TSPA-91**
- **Detailed--Developed from Characteristics Data Base**

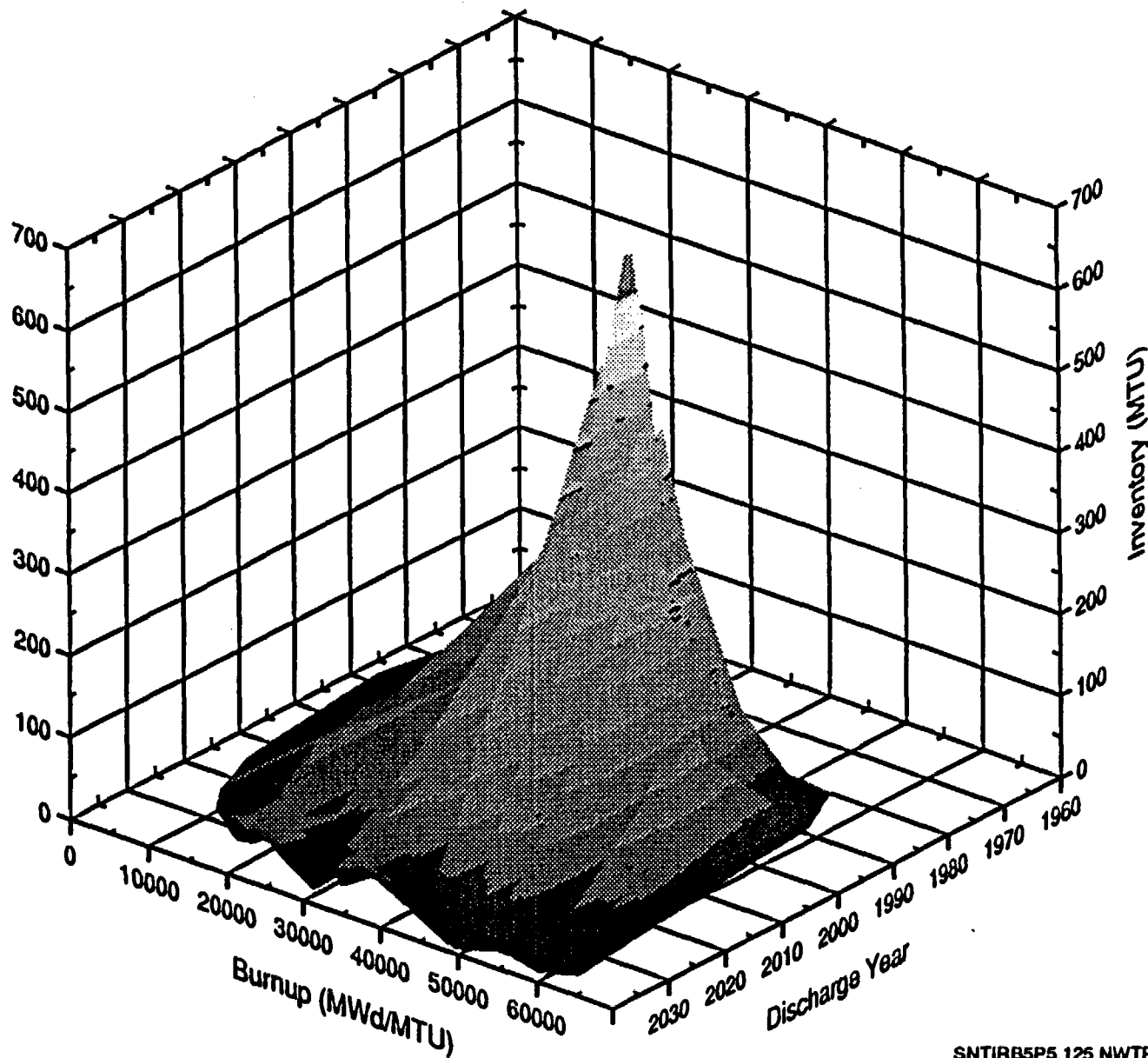
## **Standard--Taken from SCP, "Abstracted" for TSPA-91**

- **60% spent PWR fuel; 40% spent BWR fuel**
- **Fuel burnup:**
  - **PWR: 33,000 MWd/MTU**
  - **BWR: 27,500 MWd/MTU**
- **10-year decay**

# **Detailed--Developed from Characteristics Data Base**

- **PWR spent-fuel inventories as a function of burnup and decay**
- **Detailed source term used in TSPA-91**

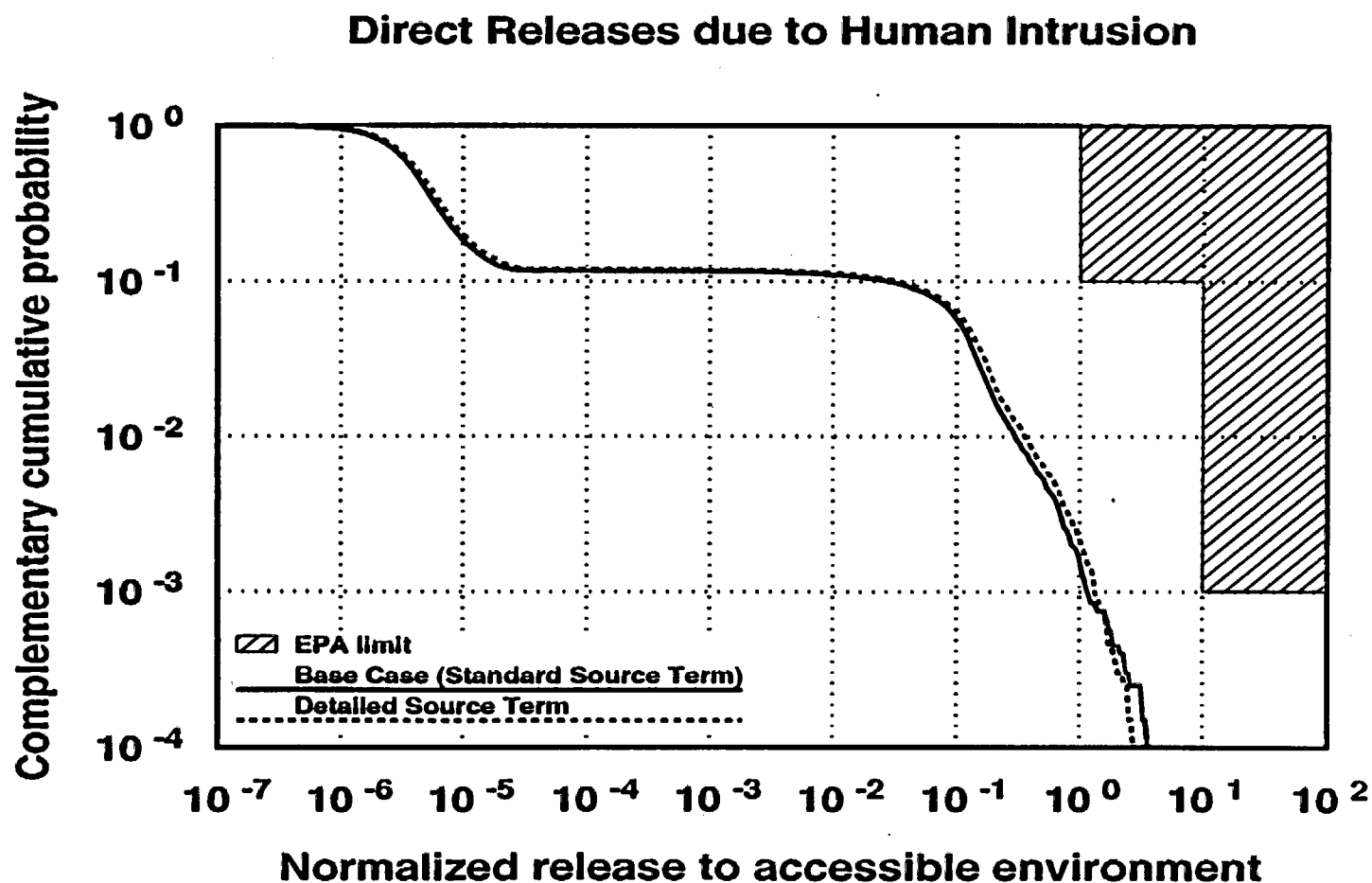
# PWR Spent-Fuel Inventories as a Function of Burnup and Decay



# **Detailed Source Term used in TSPA-91**

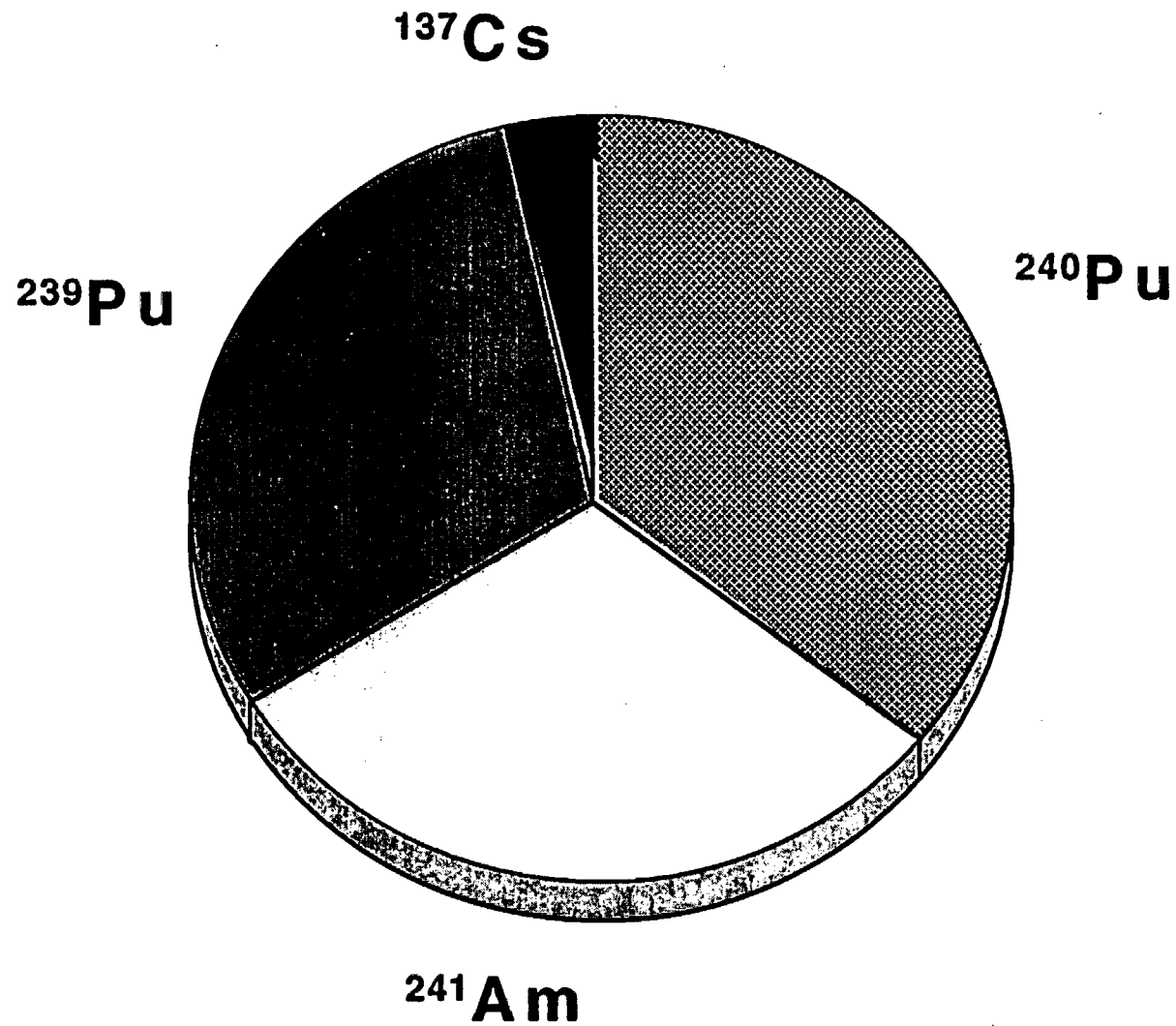
- **Investigate consequences for disruptive events**
  - **Surface release for human-intrusion drilling**
- **Repository active until approximately 2040**
  - **Repository loaded with oldest fuel first**
- **Inventories grouped by decay times**
  - **10-year increments to 2040**
  - **Weighted-average burnups for each decay group**
  - **Detailed source term weighted by reactor type, burnup, decay**

# Comparison of Standard and Detailed Source Terms

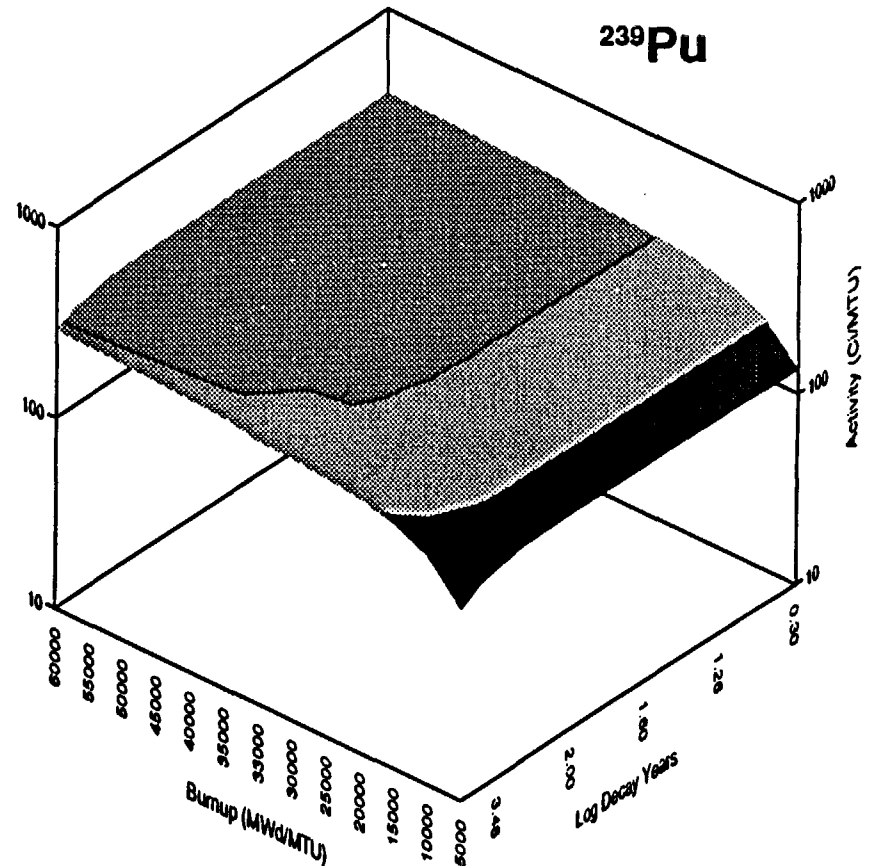
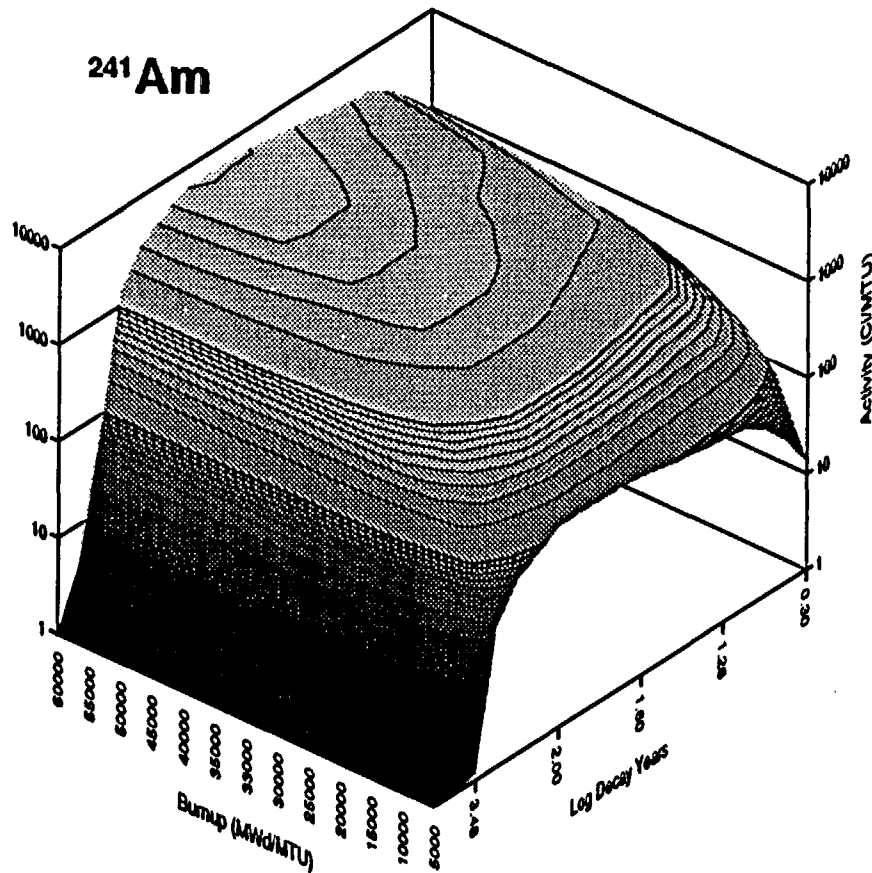




# Most Important Direct Releases



# Inventories of Important Radionuclides



# Conclusions

- **Detailed source term may not be necessary for initial TSPAs**
  - **Burnup and decay values affect releases from individual radionuclides**

# Conclusions

(Continued)

## Future work for TSPA-93

- Releases from individual isotopes
- Use new Quantities Data Base
  - More enrichment values used for calculating burnup

