



# **Briefing on Management of Low-Level Waste, High-Level Waste, and Spent Nuclear Fuel**

**September 18, 2014**

**Office of Nuclear Material Safety and  
Safeguards (NMSS)**

**Office of Federal and State Materials  
and Environmental Programs (FSME)**

# Agenda

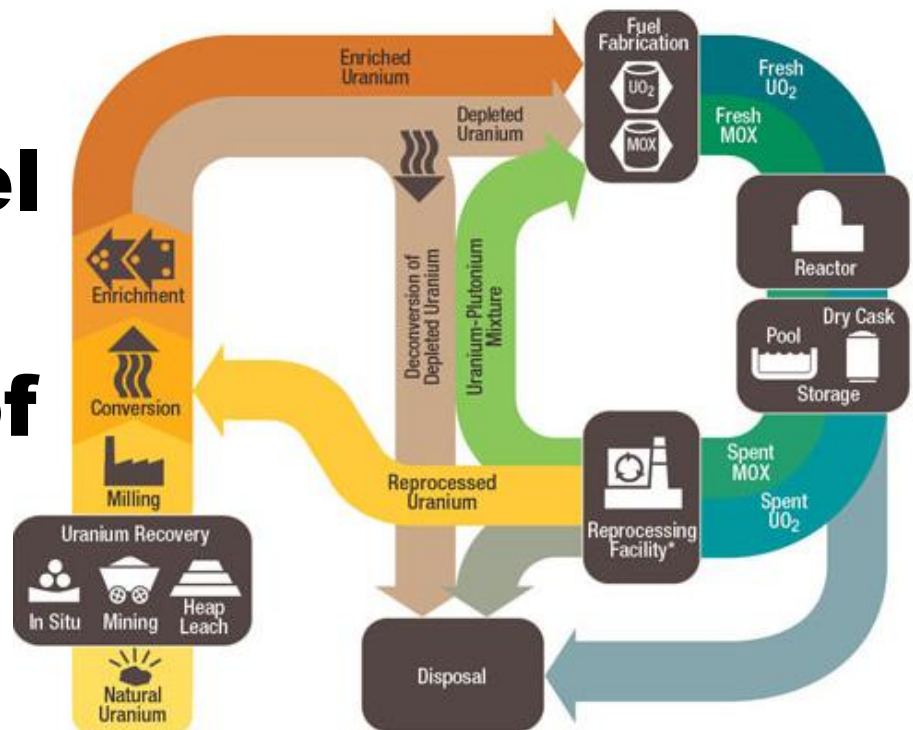
- **Introduction**
- **Overview**
- **Low-Level Waste Management and Disposal**
- **Spent Fuel and High-Level Waste Management**
- **Questions**

# **Nuclear Waste and Spent Fuel Management Overview**

**Catherine Haney, Director  
Office of Nuclear Material  
Safety and Safeguards (NMSS)**

# NRC is integrating its activities across the nuclear fuel cycle

- **Consideration of different fuel types**
- **Management of spent fuel in wet and dry storage**

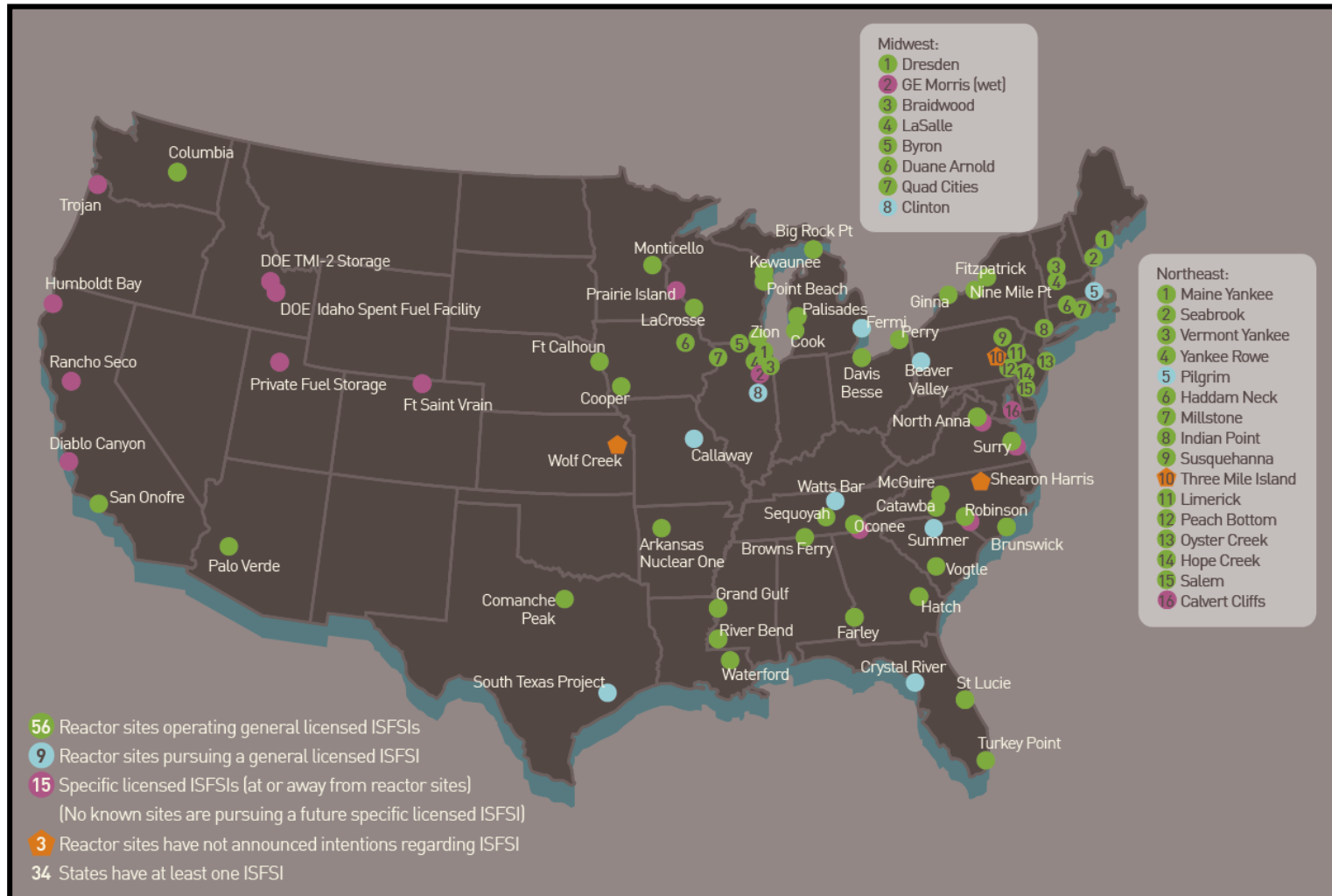


\* Reprocessing of spent nuclear fuel including MOX is not practiced in the U.S.  
Note: The NRC has no regulatory role in mining uranium.

# **Staff is mindful of the strategy for high level waste and spent fuel**

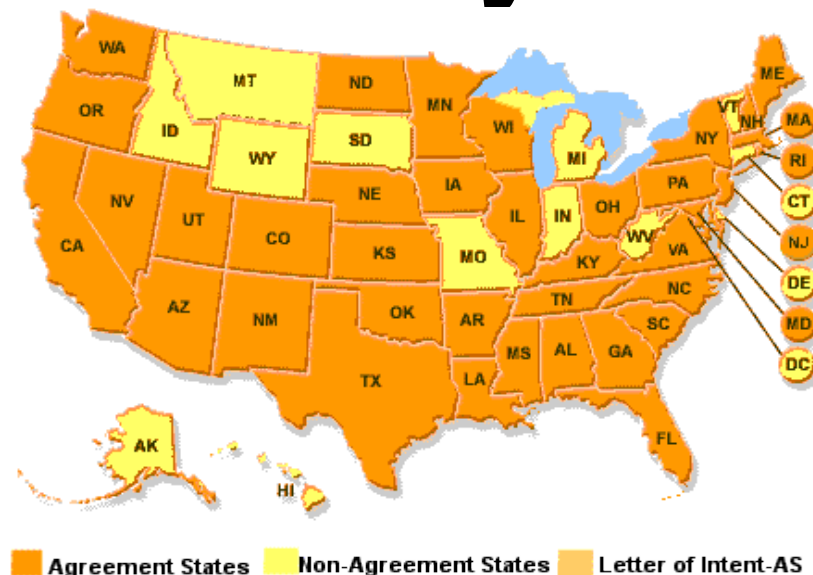
- **Possible changes that may affect NRC's Regulatory Framework**
- **Awareness of international programs for all waste types**
- **Agency role in implementing National Policy**

# NRC has a successful regulatory framework for current and future spent fuel inventories



# NRC has a successful regulatory infrastructure for Low-Level Waste

- **Used by Agreement States to ensure protection of public health and safety**



# **Low-Level Waste Management and Disposal**

**Larry Camper, Director**

**Division of Waste Management and  
Environmental Protection, FSME**

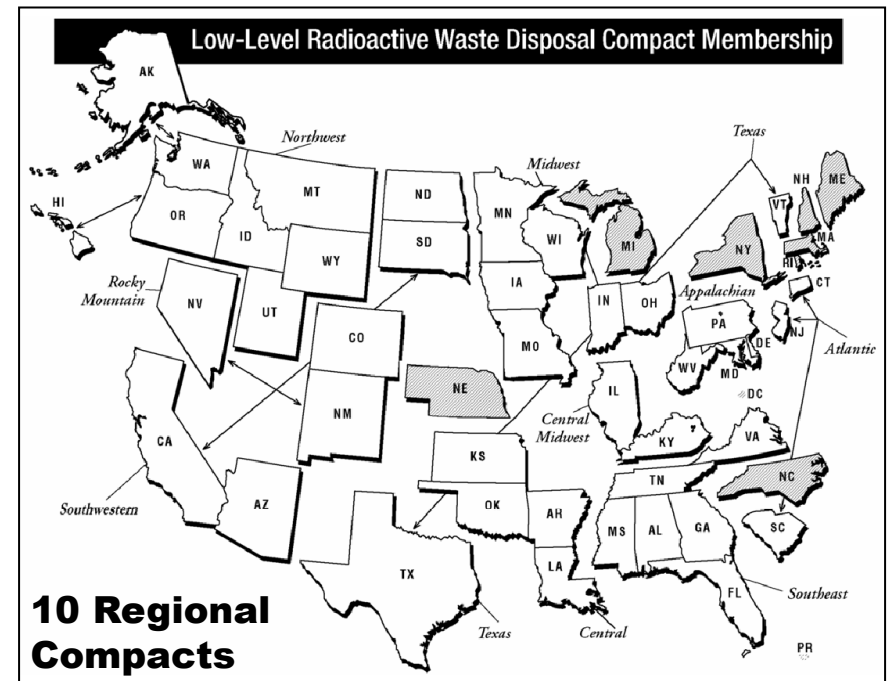


# Topics

- **Legislative and regulatory structure for commercial Low-Level Waste (LLW) disposal**
- **Current activities in NRC LLW Program**
- **Staff communication with the Commission**

# Comprehensive legislative and regulatory structure exists

- **Statutory History**
- **NRC Regulatory Oversight**
  - **10 CFR Part 20**
  - **10 CFR Part 51**
  - **10 CFR Part 61**

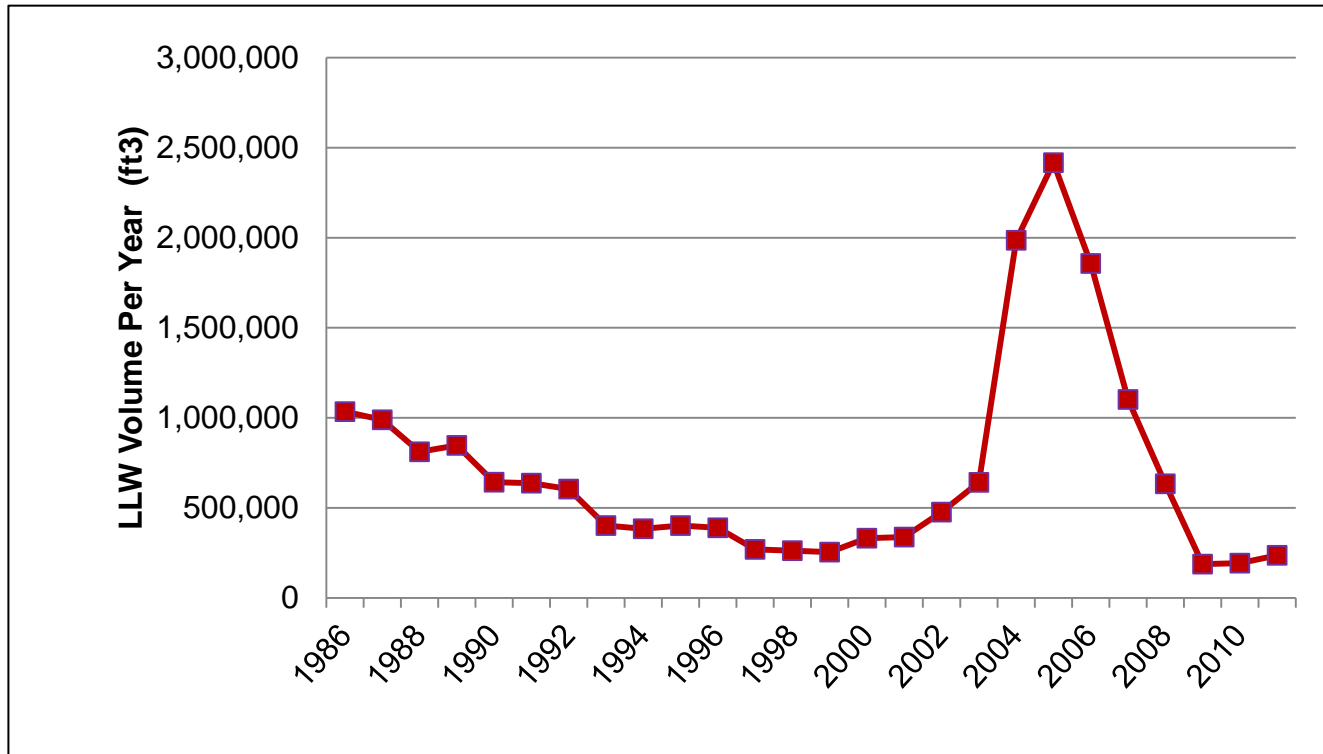


# **Disposal facilities exist in the U.S. and internationally**

- **Role of the Compact System**
- **4 Agreement States Disposal Facilities**
- **4 Inactive/Closed Disposal Facilities**
- **International Experience and Interface**

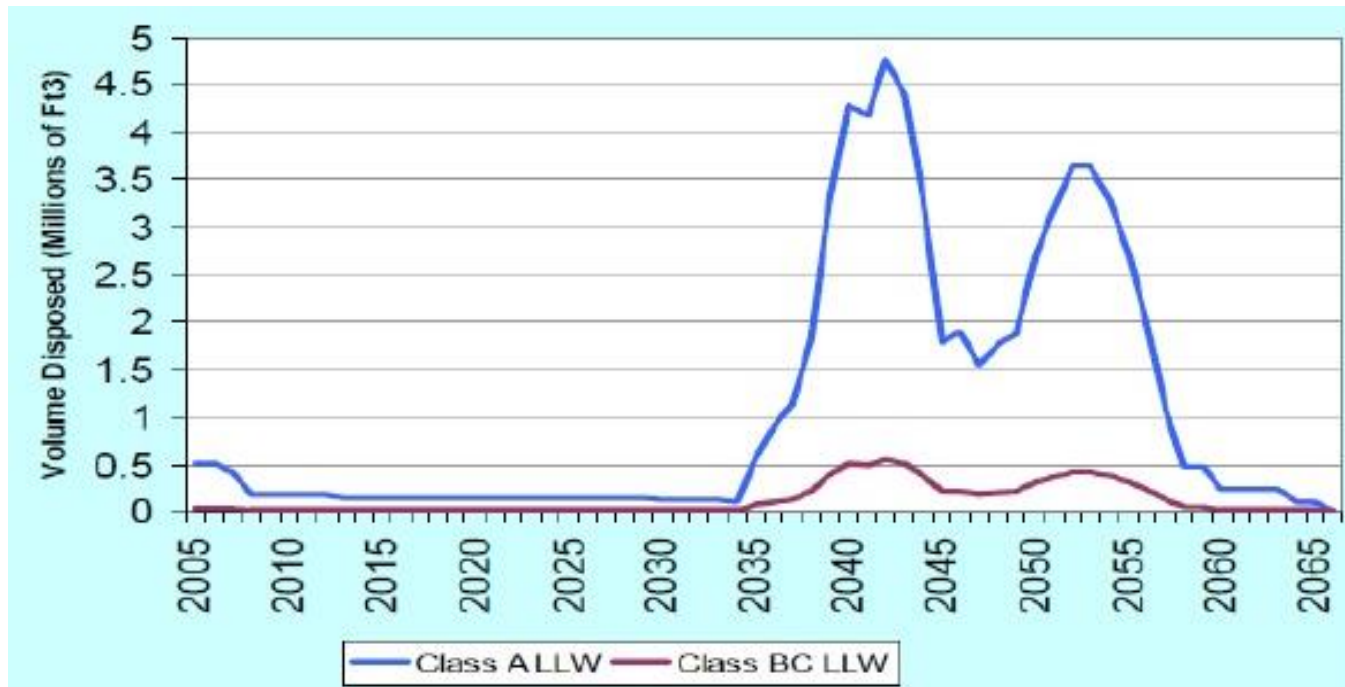
# Sufficient Disposal Capacity Now

**Figure 1: Volume of Waste Disposal for Utility Generator**  
(Source: MIMS, December 2011)



# Projected Growth in Disposal

**Figure 2: Disposable LLW/Year by Waste Class**  
(Source: EPRI, December 2006)



# Comparison of Waste Management Systems

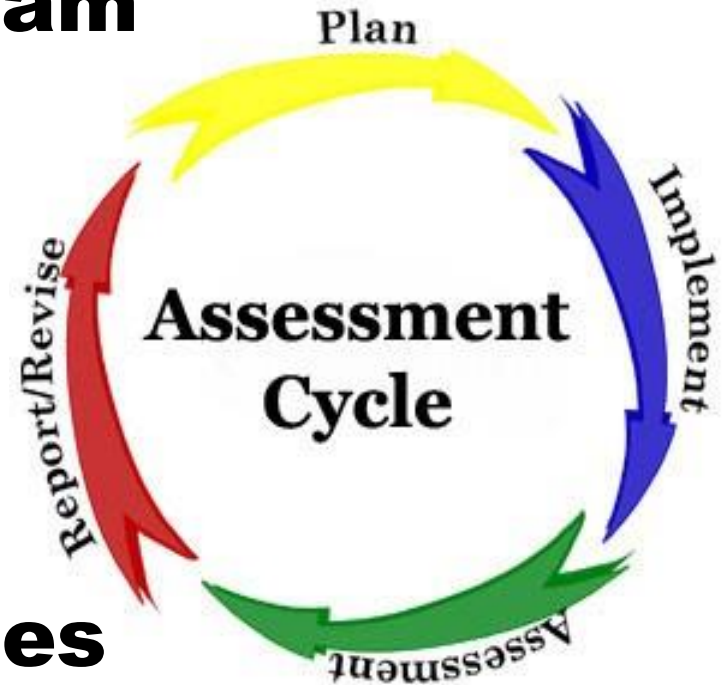
<b>International Atomic Energy Agency Waste Categories</b>	<b>U.S. Waste Categories</b>
<b>High Level Waste</b>	<b>High Level Waste</b>
<b>Intermediate Level Waste</b>	<b>Greater-than-Class C LLW</b>
<b>Low Level Waste (LLW)</b>	<b>Class A, Class B and C LLW</b>
<b>Very Low Level Waste</b>	<b>Class A</b>
<b>Very Short Lived Waste</b>	<b>Material held for decay storage</b>
<b>Exempt Waste</b>	<b>Liquids/Air: Effluent releases Solids: Case-by-case analysis</b>

# **Key actions enhance program effectiveness**

- **Proposed 10 CFR Part 61 Rulemaking**
- **Authorization for Disposal per 10 CFR 20.2002**
- **Management of LLW for Disposal**
- **Concentration Averaging and Encapsulation Branch Technical Position**

# Continuous improvement through Programmatic Assessment

- **LLW regulatory program assessment in 2007**
- **Update LLW Programmatic Assessment**
- **Revisions focused on national circumstances**
- **Extensive stakeholders engagement**





# **Greater-than-Class C (GTCC) Waste**

- **Responsibilities outlined in LLRWPAA**
- **NRC authority for licensing GTCC waste disposal facility**
- **Engaging DOE to clarify responsibility**
- **Specification of technical requirements**
- **10 CFR 61 on GTCC disposal**

# **Current and Future Communication with the Commission**

- **Proposed 10 CFR Part 61**
- **Waste Classification Scheme Revision**
- **Programmatic Assessment Findings**
- **GTCC waste**
- **Joint Convention National Report**
- **Concentration Averaging and  
Encapsulation Branch Technical  
Position**

# **Spent Fuel and High-Level Waste Management**

**Mark Lombard, Director  
Division of Spent Fuel Storage  
and Transportation, NMSS**

# **Topics**

- **Transport and storage framework**
- **Self-assessment and enhancements**
- **Internal and external communication**
- **Collaboration licensees**
- **Ongoing public outreach**

# Currently reviewing dry storage renewals

- **Prairie Island**
- **Calvert Cliffs**
- **VSC-24**



# **Updating regulatory framework to support renewals**

- **Self-assessment indicated enhancements for sustainable framework**
- **Lessons learned from reactor license renewals**

# **Updating regulatory framework to support renewals (cont'd)**

- **Industry developing guidance**
- **Collaborative efforts with DOE, vendors, licensees and public**
- **Update of NUREG 1927**

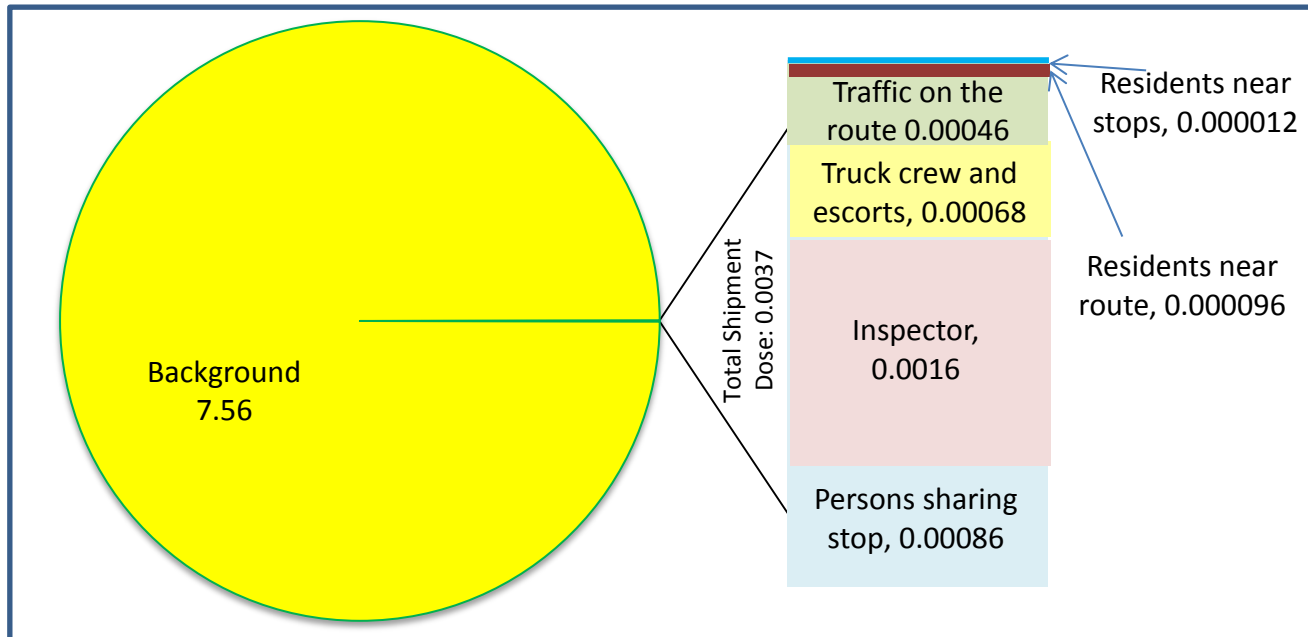
# **Radioactive material is being transported safely**

- **Type B packages**
  - **Medical and other uses**
  - **Expired Type B packages phased out**



# Radioactive material is being transported safely (cont'd)

- **NUREG 2125, “Spent Fuel Transportation Risk Assessment”**

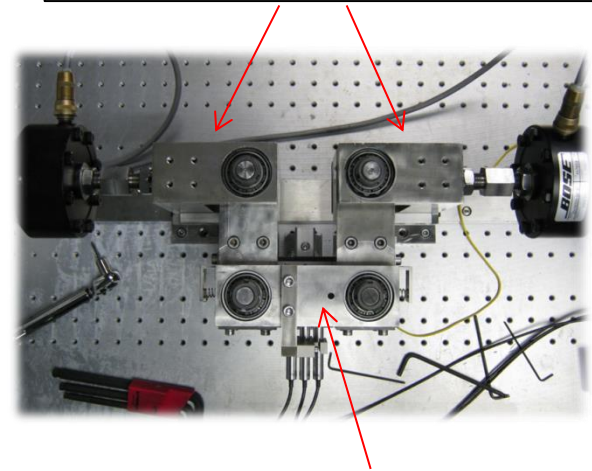


Doses from Background and from a Truck Shipment of Spent Nuclear Fuel (Person-SV)

# Long-term storage and transportation of a range of fuel cladding types is safe

- **Approved systems maintain safety and security margins**
- **Many of these involve high burnup fuel and shorter cooling times**
  - **MP-197**
- **Research activities confirm NRC position**

Push-pull force applied to U-frame results in bending moment on the fuel sample



Location of fuel sample

# **Extended storage and transportation program is moving forward**



- **Issued Technical Information Needs Report**
- **Conducting research based on identified needs and priorities**

# **Readiness to Review Interim Consolidated Storage Facility Applications**

- **10 CFR 72 is adequate for storage and packaging operations**
- **Monitoring implementation of DOE's "Strategy for the Management and Disposal of Used Nuclear and High-Level Radioactive Waste"**

# QUESTIONS

# Acronyms

- **CFR – Code of Federal Regulations**
- **CoC – Certificate of Compliance**
- **DOE – Department of Energy**
- **EPRI – Electric Power Research Institute**
- **GTCC – Greater-than-Class C**
- **ISFSI – Independent Spent Fuel Storage Installation**
- **Amendments Act of 1980**
- **LLW - Low Level Waste**
- **MIMS - Manifest Information Management System**
- **VLLW – Very Low Level Waste**