



SRNL
SAVANNAH RIVER NATIONAL LABORATORY

Used Nuclear Fuel Management International Activities

Natraj Iyer

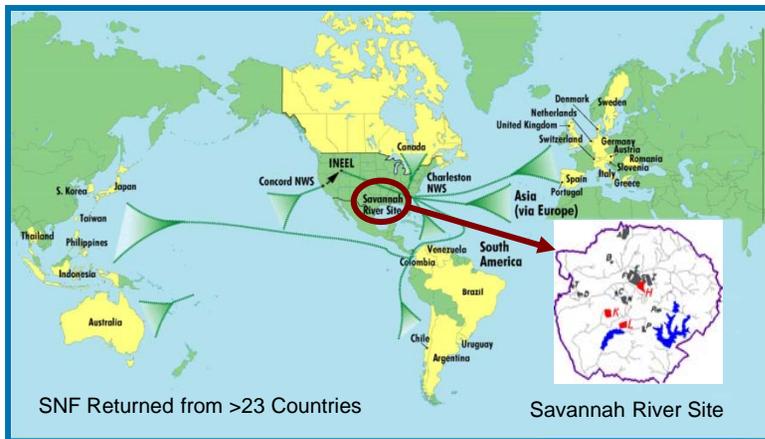
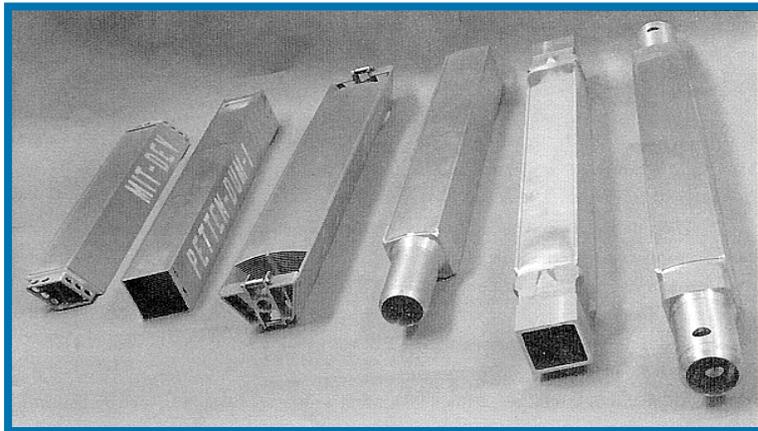
Savannah River National Laboratory

September 15, 2010



Workshop on DOE UNF and HLW, Washington, DC - Sept. 13-15, 2010

Research Reactor (RR) Used Fuel Management International Activities



- Support of EM and NNSA's GTRI Programs
 - Fuel Returns/Shipment
 - On-Site Interim Storage
 - Special Support for Degraded Fuel Management
- IAEA Initiatives in RR Used fuel Management
 - Wet Storage Practices
 - Dry Storage Practices
 - Monitoring Protocols

Research Reactor Used (Spent) Nuclear Fuel Technology Leadership through the IAEA



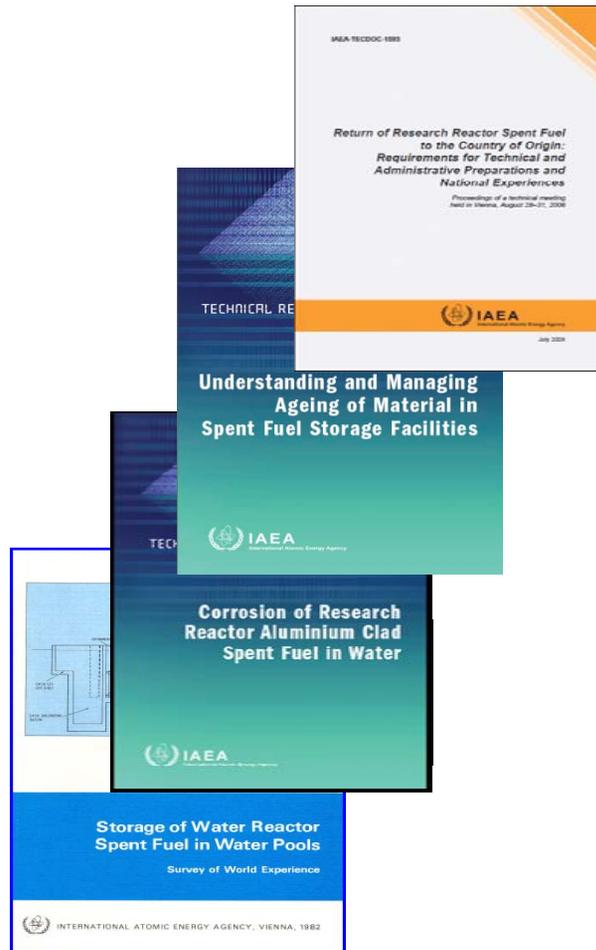
Extensive Activities through IAEA Initiatives in SNF Management of Research Reactor SNF

Under Leadership of Pablo Adelfang, Manager, Research Reactor Group (Cross Cutting)

Focus:

- Guidelines for Interim Wet and Dry Storage of SNF
- Used Fuel Performance in Storage
- Transportation and Lessons Learned
- Used Fuel and Facility Life Management
- Regional Workshops

Research Reactor Used (Spent) Nuclear Fuel Technology Leadership through the IAEA



>15 Reports Issued by the IAEA



The IAEA has been conducting activities on management of Used (Spent) Nuclear Fuel, from both, Nuclear Power Plants (NPP) and Research Reactors (RR) since the 70s

1981 – 1996 – IAEA Concentrated Efforts on Fuel from NPP and organized 3 Coordinated Research Projects (CRP)

1993 – Reviews included consideration of RR Used Fuel – corrosion and water chemistry control

1999 – Activities included consideration of Used Fuel Storage Facility Life Management

2002 – Corrosion of Aluminum RR Used Fuel (CRP)

2005 – IAEA Safety Standard for Storage of SNF Publication (2010)

2006 - Recommended Practices for Water Quality Management (2006)

2006 -2009 - Transportation and Lessons Learned from Fuel Take Back Programs

Research Reactor Used (Spent) Nuclear Fuel Technology Examples - International Cooperative Activities through IAEA



Corrosion Surveillance Rack Instituted in Member States through CRP

AI SNF Water Quality Parameters and Monitoring Frequency

PARAMETER	VALUE (LIMIT)	MONITORING FREQUENCY
pH	4.5 to 7	weekly
Conductivity	< 10 μ S/cm	weekly
Solids	< 5 mg/l	Every 6 months
Cu Concentration	< 0.1 mg/l	Every 6 months
Cl Concentration	< 0.1 mg/l	Every 6 months
Nitrate (NO_3^-), mg/l	< 10 mg/l	Every 6 months
Sulphate (SO_4^{2-}), mg/l	< 10 mg/l	Every 6 months
Fe	< 1.0 mg/l	Every 6 months
Al	< 1.0 mg/l	Every 6 months
Temperature	< 45°C	monthly
Radioactivity level (*)	*	weekly

Tangible cooperative activities on RR Used (Spent) Fuel Management were undertaken with > 10 Member States through the IAEA RR Group.

Examples Include:

- Water Quality Management Guidance to RR Operators
- Corrosion Surveillance Program Instituted in Member States SNF Storage Pools
- RR SNF Corrosion Database
- Dry Canister (Cask) Design and Qualification
- Workshops in SNF Management in Latin America and Eastern Europe
- Management of Degraded SNF (Isolation of SNF)

“Good Practices for Management and Storage of RRSNF”

An IAEA Technical Meeting and Publication Initiative

2009 -Present – Good Practices for Management of RR Spent Nuclear Fuel (Long Term Storage)



*IAEA Technical Meeting on RRSNF Management
October 2009*

IAEA Technical Meeting (TM) in Thurso, Scotland in October 2009 on “Good Practice for the Management and Storage of RRSNF”

- Best Practice and Lessons Learned in RRSNF Management
- >20 Countries Participated in the Technical Meeting
- Several Countries Contributed Inputs Post-meeting
- TM Minutes including Slide Presentations Disseminated
- TM Proceedings to be Issued in late CY2010

Consultancy Group Assigned to Develop a Publication -
“[Guidelines for Wet and Dry Storage of RR Spent Nuclear Fuel](#)”

- Focused on:
 - Interim (Medium to Long Term) Storage and
 - Life Management/Extension of Storage System
- Working Group Participants from ~10 Countries
- Scope and Table of Contents for Document Issued

- [Inputs Welcome and Solicited from All](#)

Summary

- Research Reactor Spent (Used) Fuel face some of the same challenges as NPP Used Fuel with Uncertainty in Final Disposition Path
- Extended Wet and Dry Storage are needed for continued safe storage of RR UNF Until Disposition paths are identified
- The inventory of RR UNF is small in many countries precluding significant investment in developing technical basis for continued safe storage
- The IAEA and the developed countries play a critical role in the development of the technical bases and guidelines for continued safe storage
- Opportunities exist for sharing of resources and lessons learned in the development of the wet and dry storage technical bases.