Used Fuel Disposition Campaign

FY13 Focus for the Used Fuel Disposition Campaign

Storage & Transportation

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Used
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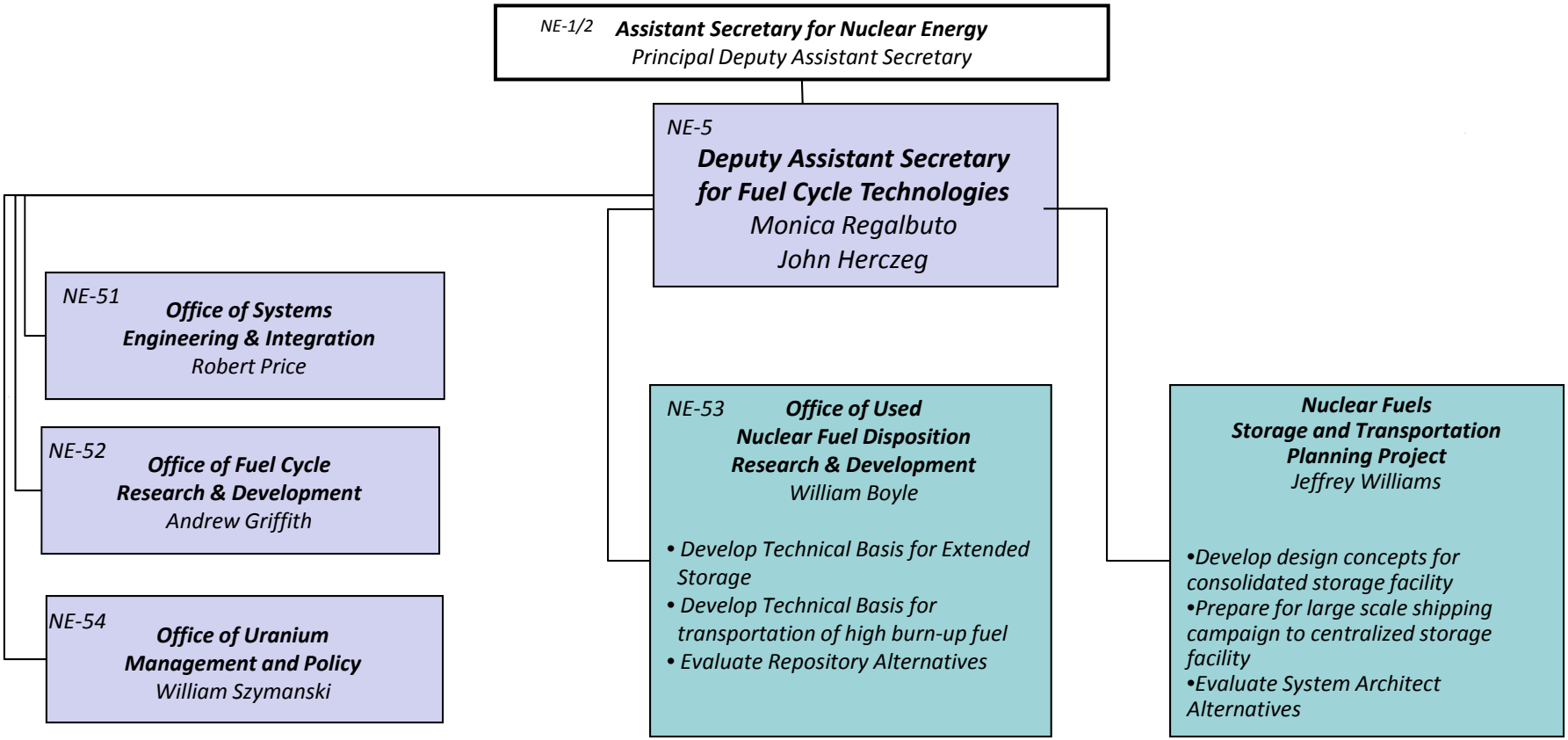
Used Fuel Disposition

NE-5 Organization



R&D Focus ⟷ ***Focus on BRC Recommendations***

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UFD Storage &Transportation R&D Focus

The UFD Campaign conducts work using Control Accounts (CAs) that are related to specific technical or programmatic areas. For the FY13 S&T program, there are 5 Control Accounts:

- **Experiments**
- **Engineering Analysis**
- **Transportation**
- **Field Demonstration**
- **Security**

<u>Objectives</u>:

1. **Develop the technical bases to demonstrate used fuel integrity for extended storage periods**
2. **Develop the technical bases for fuel retrievability and transportation after long term storage**
3. **Develop the technical basis for transportation of high burnup fuel**

<u>Focus</u>:

1. **Experimental and analytical R&D**
2. **Collaborating with industry to integrate the R&D work with the confirmatory the storage demonstration project**

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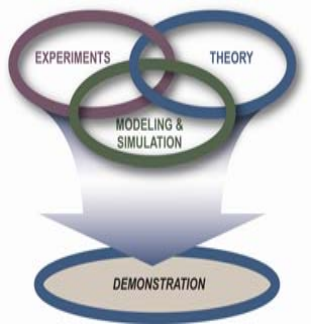
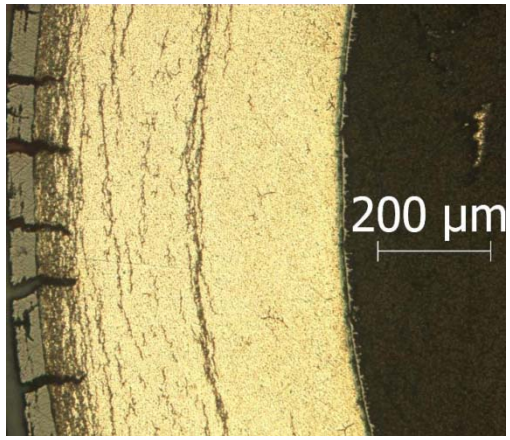
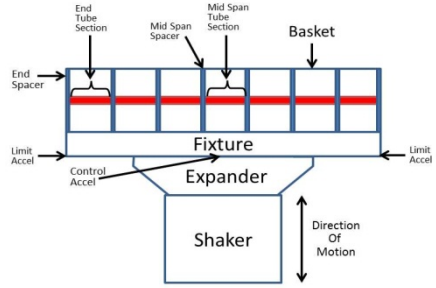
FY13 Major Thrusts

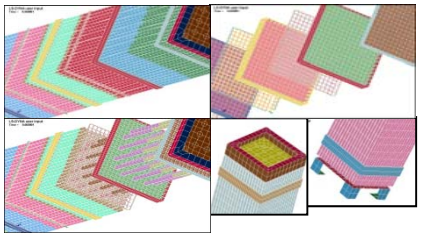


Science based, Engineering driven

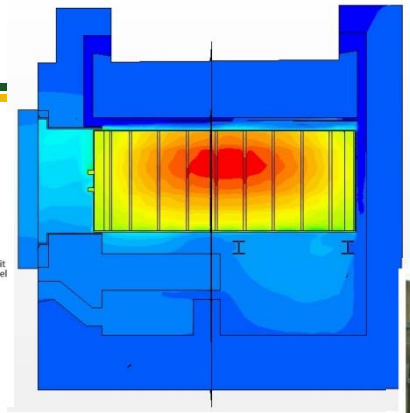


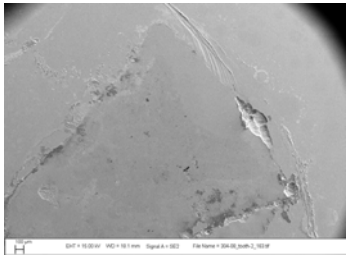
UFD Telecon, April 12, 2012
Billone, Liu; Argonne





UFD Telecon, April 12, 2012
Wagner, Adkins; ORNL





UFD Telecon, April 12, 2012
304 SS 100µg/cm^2 corrosion test
Bryan, Enos; SNL

'Jones 2010.ppt',
Calvert Cliffs Dry Fuel Storage
and Industry Lessons Learned

Experiments
- Complete PWR ring compression tests: DBTT
- Hydride doping

Analysis
- Hydride re-orientation

Transportation
- Shaker table test

Analysis
- Stress profiles

Experiments
- Canister corrosion
- Stress corrosion cracking

Analysis
- Thermal profiles

Experiments
- Site inspections

Field Demo
- Industry collaborations

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FY13 Major Thrusts:
R&D informed by earlier technical gap analyses

Hanson, et al.; FCRD-USED-2012-000109, PNNL-21360, Used Fuel Storage and Transportation Data Gap Prioritization (Draft); April 30, 2012

Gap	Priority	Gap	Priority
Thermal Profiles	1	Neutron poisons – Thermal aging	7
Stress Profiles	1	Moderator Exclusion	8
Monitoring – External	2	Cladding – Delayed Hydride Cracking	9
Welded canister – Atmospheric corrosion	2	Examination of the fuel at the INL	10
Fuel Transfer Options	3	Cladding – Creep	11
Monitoring – Internal	4	Fuel Assembly Hardware – SCC	11
Welded canister – Aqueous corrosion	5	Neutron poisons – Embrittlement	11
Bolted casks – Fatigue of seals & bolts	5	Cladding – Annealing of radiation damage	12
Bolted casks – Atmospheric corrosion	5	Cladding – Oxidation	13
Bolted casks – Aqueous corrosion	5	Neutron poisons – Creep	13
Drying Issues	6	Neutron poisons – Corrosion	13
Burnup Credit	7	Overpack – Freeze-thaw	14
Cladding – Hydride reorientation	7	Overpack – Corrosion of embedded steel	14

Imminent need
Immediate to facilitate demonstration early start
Near-term High or Very High
Long-term High
Near-term Medium or Medium High
Long-term Medium

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Conclusions

- The FY13 ST R&D work is closely tied to the earlier technical data gap analysis work that identifies and prioritizes the technical gaps that need to be addressed to satisfy the ST objectives

- The R&D work is closely coupled with industry efforts to field a confirmatory storage demonstration project

- The R&D work is aligned with the Blue Ribbon Committee recommendations