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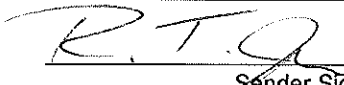
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FCRD	SYSTEM:		
<input type="checkbox"/>	FUEL	Advance Fuels	
<input type="checkbox"/>	MPACT	Materials Protection, Accounting, and Control for Transmutation	
<input type="checkbox"/>	RES	Fuel Resources	
<input type="checkbox"/>	SAFE	Regulatory and Safety Crosscut	
<input checked="" type="checkbox"/>	SWF	Separations and Waste Forms	
<input type="checkbox"/>	SYSA	System Analysis	
<input type="checkbox"/>	SYSE	System Engineering	
<input type="checkbox"/>	TIO	Technical Integration	
<input type="checkbox"/>	TRANS	Transmutation Technology	
<input type="checkbox"/>	UFD	Used Fuel Disposition	
<input type="checkbox"/>			
<input type="checkbox"/>	NEAMS	Nuclear Energy Advanced Modeling and Simulation	
<input type="checkbox"/>	ODEV	Options Development	
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March 29, 2012

To: Ken Sorenson

From: Robert T. Jubin

Subject: Completion of the ORNL Fuel Cycle Research and Development (FCR&D) Level 4 Milestone – ST T&E Capability Development-ORNL FT-12OR080204, MS# M4FT-12OR0802041, “Mid-Year Status Report,” due 3/30/2012

This letter documents the completion of the FCR&D Level 4 milestone for the ST T&E Capability Development - ORNL work package (FT-12OR080204), “Mid-Year Status Report” (M4FT-12OR0802041), due March 30, 2012. A letter report describing the activities of ORNL personnel on the T&E Capability Development Teams efforts is attached to this memo.

If you have any questions, please contact me at (865) 574-4934, Rob Howard at (865) 241-5750 or John Wagner at (865) 241-3570.

cc: C. V. Bates (INL)
R. L. Howard
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Letter report of the ORNL activities supporting Storage and Transportation Testing and Evaluation Capabilities Development task within the DOE-NE Fuel Cycle Technologies' Used Fuel Disposition Campaign

The objectives of this task are to field near-term tests that address the issues needed to support the development of the technical justification for extended storage and subsequent transportation. In order to expedite deployment of these tests, it is expected that collaboration with industry will be conducted to maximize efficiencies in obtaining material, storage and transportation components, and siting facilities for the field tests. The focus of this field testing assessment will be on testing that requires platforms outside a National Laboratory or hot cell.

This task will use the Used Fuel Disposition Campaign *Gap Analysis to Support Extended Storage of Used Nuclear Fuel FCRD-USED-2011-000136* to identify issues that can be addressed and deployed in the near-term. In addition, alignment with the recommendations contained in the *Blue Ribbon Commission on America's Nuclear Future – Report to the Secretary of Energy* report (January 2012) will also be considered as the work progresses.

This task will consist of a multi-year, multi-lab effort, investigating a range of issues pertaining to data collection to support development of the technical basis for extended storage and subsequent transportation. Major task elements that are being addressed in FY2012 are:

- Collaborate with industry to assess actual atmospheric environments associated with storage facilities sited on, or near the coast.
- Collaborate with industry to field SS test coupons and to develop inspection techniques to gather data on realistic corrosion rates of SS canisters in marine environments in actual storage conditions.
- Collaborate with industry to assess the feasibility of siting a storage cask on an existing commercial independent spent fuel storage installation (ISFSI) site (or alternative site), with high burn-up fuel, to begin the T-subzero clock on long term storage.
- Continue to assess Nuclear Regulatory Commission (NRC) Request for Additional Information (RAIs) on licensee submittals.
- Conduct assessment of deployment of a consolidated storage facility, as recommended by the BRC.

Oak Ridge National Laboratory (ORNL) efforts are focused on supporting the regulatory analysis associated with fielding a storage platform at an existing commercial ISFSI site. This includes working closely with other DOE national laboratories to assess and consult with on issues such as: regulatory feasibility of container penetrations for monitoring; compatibility with 10CFR72.48 restrictions; potential for future transport of the storage cask; as well as others as necessary. ORNL will also provide support to the Electric Power Research Institute (EPRI)/ Extended Storage and Collaboration Program (ESCP) committee activities and to Savannah River National Laboratory (SRNL) on the development of functional requirements for

consolidated storage. ORNL will also explore the availability of relevant data on comparable materials in long term service that could compliment the planned coupon tests.

10CFR72.48 specifically focuses on changes, tests and experiments involving spent fuel storage casks or fuel storage facilities. The review of this regulation has identified a number of points that must be considered as part of the experimental design process. Captured below are several of the key requirements of this regulation:

(c)(1) A licensee or certificate holder may make changes in the facility or spent fuel storage cask design as described in the Final Safety Analysis Report (FSAR) (as updated), make changes in the procedures as described in the FSAR (as updated), and conduct tests or experiments not described in the FSAR (as updated), without obtaining either:

- (i) A license amendment pursuant to § 72.56 (for specific licensees) or*
- (ii) A CoC amendment submitted by the certificate holder pursuant to § 72.244 (for general licensees and certificate holders) if:*
 - (A) A change to the technical specifications incorporated in the specific license is not required; or*
 - (B) A change in the terms, conditions, or specifications incorporated in the CoC is not required; and*
 - (C) The change, test, or experiment does not meet any of the criteria in paragraph (c)(2) of this section.*

(c)(2) A specific licensee shall obtain a license amendment pursuant to § 72.56, a certificate holder shall obtain a CoC amendment pursuant to § 72.244, and a general licensee shall request that the certificate holder obtain a CoC amendment pursuant to § 72.244, prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:

- (i) Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSAR (as updated);*
- (ii) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a system, structure, or component (SSC) important to safety previously evaluated in the FSAR (as updated);*
- (iii) Result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR (as updated);*
- (iv) Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the FSAR (as updated);*
- (v) Create a possibility for an accident of a different type than any previously evaluated in the FSAR (as updated);*
- (vi) Create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the FSAR (as updated);*
- (vii) Result in a design basis limit for a fission product barrier as described in the FSAR (as updated) being exceeded or altered; or*
- (viii) Result in a departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety analyses.*

(d)(2) The licensee and certificate holder shall submit, as specified in § 72.4, a report containing a brief description of any changes, tests, and experiments, including a summary of the evaluation of each. A report shall be submitted at intervals not to exceed 24 months.

(d)(6)(ii) A specific licensee using a spent fuel storage cask design, approved pursuant to subpart L of this part, shall provide a copy of the record for any changes to a spent fuel storage cask design to the applicable certificate holder within 60 days of implementing the change.

Ideally the FSAR for the systems being considered will be broad enough to allow any required modifications and planned testing to fall under § 72.48(c)(1) otherwise a license amendment under the requirements of § 72.56 will be required. Before this can be determined, the specific tests and systems modification must be understood and the FSAR for the specific systems under consideration must be reviewed.

ORNL staff attended the ESCP meeting at the EPRI offices in Charlotte, NC on December 6-8, 2011, which is being coordinated by EPRI. ESCP consists of a group of organizations representing the nuclear industry, federal government, national laboratories, and suppliers of used fuel dry storage systems—to investigate aging effects and mitigation options for the extended storage and transportation of used/spent nuclear fuel and high level waste (HLW). The program intent is to coordinate efforts in developing the technical bases to ensure safe, extended used fuel storage (greater than 60 years) and future transportability. The primary focus of the December 2011 meeting was to review recently completed gap analyses conducted by EPRI, the Department of Energy, US Nuclear Regulatory Commission, and US Nuclear Waste Technical Review Board. It was noted that the DOE, EPRI, and NRC all identified gaps related to the condition of the welded canisters as a high priority. While DOE identified gaps related to the condition of the used fuel at the time of transport as a high priority, both EPRI and the NRC generally ranked these issues as a medium priority. In addition to reviewing the various gap analyses and research priorities, preliminary plans and approaches for coordinating efforts related to in situ inspection of storage canisters for signs of corrosion and data collection on marine environments was also discussed.