



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 3, 2014

MEMORANDUM TO: Anthony Hsia, Deputy Director  
Division of Spent Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

FROM: Huda Akhavannik, Project Manager */RA/*  
Spent Fuel Licensing Branch  
Division of Spent Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

SUBJECT: SUMMARY OF OCTOBER 6, 2014, MEETING WITH THE U.S.  
DEPARTMENT OF ENERGY, REGARDING THE HIGH BURN-  
UP DRY STORAGE CASK RESEARCH AND DEVELOPMENT  
PROJECT

Background

On October 6, 2014, a meeting was held in Rockville, Maryland, at the request of the U.S. Department of Energy (DOE) to discuss technical considerations related to their high burn-up dry storage cask research and development project. This was a Category 1 meeting open to the public and was noticed on September 19, 2014 [ML14274A558].

The list of meeting attendees, including those participating via telephone, is provided as Enclosure 1.

Discussion

The primary purpose of the meeting was to discuss technical considerations related to the high burn-up dry storage cask research and development project. This project is taking place at North Anna Nuclear Generating Station's (North Anna) Independent Spent Fuel Storage Installation (ISFSI) using a future amendment to their site specific license for the Model No. TN-32 dry storage cask. As part of this project, the Model No. TN-32 dry storage cask will contain high burn-up fuel (HBF) and will be used to confirm the integrity of HBF in dry storage. The DOE specifically discussed gas sampling, the frequency of gas sampling, assembly selection, and the thermocouple locations.

The DOE stated that gas sampling would be done in the internal of the cask. It would be used to detect any fuel assemblies that are not intact, water, hydrogen, oxygen, cavity pressure, or any fission products. In addition to the gas samplings, "grab samples" of some HBF rods will later be taken to a national laboratory for additional testing. The DOE stated that the sampling frequency will be once after a year in storage, once after three years in storage, and once prior to transport. Staff made a comment that the sampling frequency should not be limited to those

specific time frames but should be flexible based on results obtained throughout the project. The DOE agreed and stated that this would be an ideal sampling frequency scenario. The sampling frequency is limited by the site dose budget in that the dose the site workers receive, along with the dose received as part of other site activities beyond this project, must be below the annual limit.

In the assembly selection, the DOE attempted to arrange the assemblies in a manner that would increase the temperature of the fuel cladding as close as possible to the limit prescribed in Interim Staff Guidance (ISG) - 11, Revision No. 3, "Cladding Considerations for the Transportation and Storage of Spent Fuel." The recommended limit in this guidance document is 400°C during normal conditions of storage. However, despite creating a "blanket" of hotter HBF assemblies around older and colder HBF assemblies, the best estimate highest cladding temperature was in the range of 340°C. The DOE stated that the cask has very efficient cooling mechanisms thus making it difficult to increase the cladding temperature.

North Anna is a unique site in that it contains many different types of fuel cladding. The fuel claddings to be used in the project are: Zircoloy-4, low-tin Zircoloy-4, M5, and Zirlo. Of each of these fuel assemblies, a few rods will be taken as "sister rods" to establish a baseline for comparison at each sampling. The assemblies to be used in this project are expected to be intact based on their performance in the reactor.

To be able to estimate cladding temperature, thermocouples will be placed in strategic areas where phenomenon, such as meeting the ductile-to-brittle transition temperature, measuring the hottest pins, or hydride cracking, would be expected to occur. The thermocouples would be distributed axially throughout the inside of the cask. Staff suggested that placing some thermocouples on the outside of the cask could also provide beneficial data to which the DOE agreed. The staff and DOE also discussed the type of thermocouple to be used. As this is a long-term project and does not require fast response temperature measurements, the thermocouples to be used are the same as those used in the reactor and so are very stable and sturdy with a slow response time.

The DOE indicated that they are working on a revised test plan to share with staff and expect the ISFSI site specific amendment request to be submitted in July 2015. Staff indicated that recent guidance provided in ISG-24, "The Use of a Demonstration Program as Confirmation of Integrity for Continued Storage of High Burnup Fuel Beyond 20 Years," should be reviewed as part of updating the test plan to be sure both are consistent with each other. The DOE stated that they would do so in their test plan revision.

Members of the public also participated in the meeting and questioned that given that North Anna is on a fault line, how did this site receive approval to perform this project without the consent of Virginians. Staff responded that North Anna has not yet received approval but is able to submit an amendment request to their site specific license. The NRC would review the request to ensure there is adequate protection of public health and safety and the environment.

TAC No. LA0135

Enclosure: Meeting Attendees

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SFST r/f NRC Attendees

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**ADAMS Accession No.: ML14308A035**

<b>OFC:</b>	SFST	E	SFST		SFST		
<b>NAME:</b>	HAkhavannik	MDeBose			MSampson		
<b>DATE:</b>	10/10/14	10/14/14			11/3/14		

**C = COVER E = COVER & ENCLOSURE N = NO COPY OFFICIAL RECORD COPY**

Meeting Attendees  
GNF-A and NRC Meeting  
July 9, 2014, 1:00 p.m. – 4:00 p.m.

NAME	AFFILIATION	PHONE NUMBER
John Greeves	JTG	301-452-3511
Steve Marschman	Idaho National Laboratory	208-526-2335
Huda Akhavannik	NRC/NMSS/SFM	301-287-9241
Nick DiNunzio	U.S. DOE	202-586-8953
Melissa Bates	U.S. DOE	208-526-4652
Corinne Macaluso	U.S. DOE	202-586-2837
Ken Sorenson	Sandia National Labs	505-844-0074
John Herczeg	U.S. DOE	202-586-8105
Ned Larson	U.S. DOE	202-295-2378
Samuel Durbin	Sandia National Labs	505-284-7850
Jorge Solis	NRC/NMSS/SFM	301-287-9094
Ghani Zigh	NRC/RES/DSA	301-251-7505
David Tang	NRC/NMSS/SFM	301-287-0678
Mark Lombard	NRC/NMSS/SFM	301-287-0673
Ricardo Torres	NRC/NMSS/SFM	301-287-0755
Zhian Li	NRC/NMSS/SFM	301-287-0676
John Larry Creasy	AREVA	434-832-2773
Al Csontos	NRC/NMSS/SFM	301-287-9199
Michele Sampson	NRC/NMSS/SFM	301-287-9077
Wendy Reed	NRC/NMSS/SFM	301-287-9115
Alexander Velazquez	NRC/NMSS/SFM	301-287-9079
Mike Case	NRC/RES	301-251-7618
Robert Einziger	NRC/NMSS/SFM	301-287-9217
Anthony Hsia	NRC/NMSS/SFM	301-287-9236
Emma Wong	NRC/NMSS/SFM	301-287-0649
John Scaglione	Oak Ridge National Laboratory	865-574-9284
Meraj Rahimi	NRC/NMSS/SFM	301-287-9233
Kris Cummings	Nuclear Energy Institute	202-739-8031
Keith Waldrop	Electric Power Research Institute	704-595-2887
Don McGee	AREVA Federal Services	704-907-2863
Steven Knickerbocker	AREVA TN	410-910-6898
Phil Lozmack	AREVA TN	269-252-8409
Christian Araguas	NRC/NMSS/SFM	301-287-9232
Paul Kallan	NRC/NMSS/SFM	301-287-9103
Terry Pickens	Xcel Energy	612-330-1906
Steven Dolley	Platts	
Paul Plante	3 Yankees	
Marvin Lewis	Member of the Public	
Norma Garcia Santos	NRC/NMSS/SFM	301-287-9218
David Martin	Member of the Public	
Erika Gray	Virginia Sierra Club	
Donna Gilmore	Member of the Public	
Steve Nesbit	Duke Energy	