December 31, 2007

MEMORANDUM TO: Roy P. Zimmerman, Director
Office of Nuclear Security and Incident Response

FROM: Brian W. Sheron, Director ***/RA/ F. Eltawila for***
Office of Nuclear Regulatory Research

SUBJECT: SPENT FUEL SABOTAGE CHARACTERIZATION ACTIVITIES IN RESPONSE TO USER NEED REQUEST NSIR-2005-001

In a memorandum to the Office of Nuclear Security and Incident Response (NSIR), dated May 17, 2007, the Office of Nuclear Regulatory Research (RES) updated the status of spent fuel sabotage testing activities related to User Need Request NSIR-2005-001. In particular, we indicated that, because of an unexpected lack of partner funding from the U.S. Department of Energy (DOE), Sandia National Laboratories (SNL) was suspending its testing to determine spent fuel dispersal characteristics attributable to the sabotage of a spent fuel cask. Consequently, we proposed a December 2007 update to NSIR's original user need request, to include the following tasks:

1. Formally transmit SNL's interim final experiment documentation (Task 1).
2. Address the plans for work (if any) that would be carried out as part of the modeling and analysis task identified in the original user need request (Task 2).

This memorandum satisfies the former commitment, with the enclosed pre-publication copy of SNL's interim final documentation. The RES staff previously provided a draft of this document to the cognizant staff in October 2007, followed by a final (pre-publication) copy in December 2007. This report summarizes all aspects of the spent fuel characterization program, including (a) surrogate testing completed to date, and (b) activities related to the international working group. Initiation of the final phase of testing (using actual spent fuel) is anticipated in the timeframe of Fiscal Year (FY) 2009 to FY 2010, depending on the availability of DOE funding. At that time, the NRC can initiate a new contracting action to facilitate involvement in that testing. Given the uncertainty of these events, RES recommends closing Task 1 of the user need request at this time.

Task 2 of the original user need request called for "modeling and analysis of the experimental results, sufficient to assess the potential significance of these findings relative to the previous security assessments." This task was written under the assumption that the testing program would be completed, as designed, resulting in experimental data for the spent fuel ratio (SFR).

CONTACT: Donald M. Helton, RES/DSA
(301) 415-7558

However, given the suspension of testing prior to Phase 4 (spent fuel), no SFR experimental data have been generated. Instead, the primary program outputs at this point are higher-fidelity surrogate [glass, depleted uranium oxide (DUO_2), cerium oxide (CeO_2)] release fractions, as well as insights regarding some of the relevant underlying phenomena. While these newer results are likely to have some impact on the previous security assessments, it is not clear whether they warrant a re-evaluation of those assessments before the SFR data have been generated.

RES has expertise in the area of fission product dispersion and consequence modeling, and is willing to pursue modeling and analysis activities along the lines described in Task 2 of NSIR's original user need request. Toward that end, RES representatives have met with cognizant staff in NSIR and the Office of Nuclear Materials Safety and Safeguards (NMSS). However, such activities cannot be initiated until a decision is reached regarding their utility for future regulatory decision-making in NSIR and NMSS. For that reason, we will await further direction on this issue, prior to continuing work in this area.

Enclosure:
1. "Spent Fuel Sabotage Test Program, Characterization of Aerosol Dispersal: Interim Final Report," SNL

However, given the suspension of testing prior to Phase 4 (spent fuel), no SFR experimental data have been generated. Instead, the primary program outputs at this point are higher-fidelity surrogate [glass, depleted uranium oxide (DUO_2), cerium oxide (CeO_2)] release fractions, as well as insights regarding some of the relevant underlying phenomena. While these newer results are likely to have some impact on the previous security assessments, it is not clear whether they warrant a re-evaluation of those assessments before the SFR data have been generated.

RES has expertise in the area of fission product dispersion and consequence modeling, and is willing to pursue modeling and analysis activities along the lines described in Task 2 of NSIR's original user need request. Toward that end, RES representatives have met with cognizant staff in NSIR and the Office of Nuclear Materials Safety and Safeguards (NMSS). However, such activities cannot be initiated until a decision is reached regarding their utility for future regulatory decision-making in NSIR and NMSS. For that reason, we will await further direction on this issue, prior to continuing work in this area.

Enclosure:
1. "Spent Fuel Sabotage Test Program, Characterization of Aerosol Dispersal: Interim Final Report," SNL

Distribution:

R. Croteau, RES	E. Dickson, RES	J. Mitchell, RES
J. Schaperow, RES	N. Siu, RES	S. Bagley, NSIR
T. Holohan, NSIR	M. Shaffer, NSIR	G. Bjorkman, NMSS
L. Campbell, NMSS	E. Thompson, NMSS	F. Young, OIP
DSA R/F	P. Cross-Prather	

Document Name: C:\Don\Spent Fuel\Spent Fuel Dispersal\UNR\Jan08-UNR.doc

ADAMS Package: ML073460190
Memo: ML073460127
Enclosure: ML073460184

To receive a copy of this document, indicate in the box: "C" = Copy w/o enclosures **"E"** = Copy w/enclosures **"N"** = No copy

OFFICE	RES/DSA/NARB	C	C:RES/DSA/NARB		C:RES/DSA/HEB		D:RES/DSA	
NAME	D. Helton:mb		J. Jolicoeur		S. Bush-Goddard		F. Eltawila	
DATE	12/12/07		12/17/07		12/17/07		12/20/07	
OFFICE	RES Tech Editor	N	D:RES					
NAME	P. Garrity		B. Sheron F. Eltawila for					
DATE	12/28/07		12/31/07					

OFFICIAL RECORD COPY