

December 13, 2002

MEMORANDUM TO: Farouk Eltawila, Director, DSARE:RES

THRU: Jack E. Rosenthal, Chief, SMSAB:DSARE:RES *original signed by J. Rosenthal*

FROM: Jason H. Schaperow, Project Manager, SMSAB:DSARE:RES

SUBJECT: RADIOLOGICAL SOURCE TERMS FOR HIGH BURNUP AND MOX  
FUELS

In coordination with NRR accident analysis and project management staff, SMSAB held a series of expert panel meetings over the last year to evaluate the applicability of the Alternative Source Term (NUREG-1465) for operating reactors using high burnup and MOX fuels. The Alternative Source Term differs from the earlier TID-14844 source term in that it has more realistic physical and chemical forms and a more realistic release rate of fission products. To take advantage of the safety and cost benefits, licensees are voluntarily implementing the Alternative Source Term in accordance with 10 CFR 50.67, "Accident Source Term."

Panel members were selected based on their expertise in severe accident and source term analysis and to provide a broad range of views including national laboratory, industry, and foreign government. The panel members' evaluations are documented in the attached report. Panel members identified no new phenomena associated with source terms for high burnup and MOX fuels. Based on the panel's report, SMSAB concludes that the Alternative Source Term is generally applicable for high burnup fuel. However, the experts identified an issue that is independent of burnup; recent fission-product release tests performed in France indicate the potential for a larger tellurium release than in the Alternative Source Term. Various options are being considered to resolve this issue. Based on the panel's report, SMSAB also concludes that the Alternative Source Term is generally applicable for releases of volatile isotopes from MOX fuel. However, some panel members declined to provide views on the applicability of the Alternative Source Term for releases of low-volatile isotopes from MOX fuel, because of a lack of test data. Finally, the panel's report provides prioritized recommendations for source term research.

SMSAB believes that the panel's work provides significant insight into the assessment of source terms for high burnup and MOX fuels. This insight is already being used in the radiological consequence assessments for the ongoing analysis of nuclear power plant vulnerabilities.

Attachment: "Accident Source Terms for Light-Water Nuclear Power Plants: High Burnup and Mixed Oxide Fuels," ERI/NRC 02-202, November 2002.

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