Date: _____

Page 1 of 3 pages.
(Including this cover sheet)

SFPO-0001

Association of American Railroads
Operations and Maintenance Department
Office of Executive Director of Environmental Affairs

FACSIMILE COVER SHEET

*If you have difficulty receiving this, please call: 202-639-2339.

ACTION REQUIRED

TO:

Jozette Booth, DOE, 202-586-1047
Rick Boyle, DOT, 202-366-3753
Rich Brancato, DOE, 301-903-7613
Earl Easton, NRC, 301-415-8555
Dick Hannon, DOT, 202-366-7435
Charles Haughney, USNRC
Bill Lake, DCE, 202-586-2340
Cleary Lee, USNRC
Ellen Ott, DOE, 202-586-6977
Markus Popa, DOE, 202-586-1047
Ed Pritchard, DOT
Stacey Rosenberg, NRC
Susan Shankman, USNRC
Dwight Shelor, DOE, 202-586-1047

FROM: Robert E. Fronczak, P.E.

(Name)

202-639-2839 / 202-639-2465
(Phone No. / Fax No.)

COMMENTS: _____

m-3-4

NMOD

The AAR has asked TranSys Research Ltd. of Kingston, Ontario to undertake a review of the present AAR recommended practices with respect to rail transport of spent nuclear fuel. Their objective in initiating this work was to determine how Nuclear Regulatory Commission (NRC) certification standards for Spent Nuclear Fuel (SNF) transportation casks relate to the railroads, to see if changes could be made to the recommended practices without increasing the risk associated with a rail accident involving SNF.

We have a number of questions concerning damage thresholds and consequences. Since the interest is in determining damage levels of some hazard, our questions involve damage scenarios well beyond the damage levels experienced in the required NRC regulatory testing. Consequently, you may not have the explicit answers from a test-experience perspective. Nonetheless, NRC personnel may have knowledge of analytic work or of test results from other non-regulatory testing. We have a copy of Lawrence Livermore National Laboratory's (LLNL's) modal study and most of the questions are related to their representative rail cask. If answers relate to a different type of cask design, please identify it and provide details of the geometric and structural properties.

1. Higher 'g' forces could accompany changes to AAR's recommended practice. Can you describe the consequences of progressively higher g forces on the cask/SNF?
   As examples, are the occurrence threshold and hazard consequences of the following damages known for the representative cask (and/or any other cask):
   a. bolt failure leading to steel end-cap release;
   b. incremental threshold levels of permanent lead slump;
   c. rupture of the inner steel wall from lead bulging.

2. In relation to events such as those described above, has the NRC defined an acceptable frequency of occurrence for either 'g' force exposure or the related consequences at discrete thresholds?

3. A change to the recommended practice could also increase the rate of application of the impact load. Has analysis or testing been done to relate shock-load magnitudes to static and/or longer duration forces?

4. As speeds increase the possibility of an incident with multiple forces on the cask occuring increases, all of which could be mitigated by other car/train/operations- design actions if necessary. Could you comment on any particular types of combination events that should be identified for either frequency of occurrence evaluation or mitigating measures? By way of example, please relate the expected hazards and/or the NRC's defined acceptable frequency of occurrence for the following multiple-damage scenarios:

   a. a punctured cask (6" diameter hole) on dry land with 5% fuel rods damaged;

b. punctured cask (6" diameter hole) on dry land with 30% fuel rods damaged;
c. a cask on dry land with steel end-cap bolt failure and 100% fuel rod damage;
d. cask with seal leakage submerged in water;
e. a punctured cask (6" diameter hole) with 5% fuel rod damage and submerged in water.

5. Have analyses or tests been performed to relate the damage consequences of impact loads to damages expected from dynamic crush loads for rail casks?

6. Have analyses or tests been performed to relate the damage consequences of flat surface impacts with those from non-flat surface impacts?

7. Have analyses or tests been performed to relate the damage consequences of engulfing flames with those from jetting type flames concentrated near seal locations?

8. Where the answer to any of the above questions is yes, please provide the references, executive summaries and cask designs involved.

9. Could you indicate the types of materials, related structural properties and typical geometry- and design- specifications for the following components in
   a. LLNL's representative rail cask;
   b. basket assembly holding the fuel bundles;
   c. bolts for steel end caps;
   d. fasteners for impact limiters.

10. We note that the NRC requires license applicants to submit analyses of worst case orientations for drop tests in regulatory testing. The LLNL modal study involved finite element and other analyses of sensitivities of cask damage to orientation. Is the level of analyses and related documentation typical of the type NRC would receive with potential license submissions? Would NRC accept the LLNL sensitivity analyses if it were submitted in support of determining the worst case orientation for the drop tests?

AAR would like to factor the response to these questions into their comments to the "Draft RFP for the Acquisition of Waste Acceptance and Transportation Services for the Office of Civilian Radioactive Waste Management" (Draft RFP # DE-RP01-97RW00320), so we would like to receive as complete a response as possible by February 28th. Please furnish response to:

Mr. Gordon English
TranSys Research Ltd.
682 Milford Drive
Kingston, Ontario K7M 6B4
CANADA
Phone: 613-389-5632 Fax: 613-389-5499