

April 27, 2010

MEMORANDUM TO: Doug Weaver, Deputy Director
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

FROM: Chris Staab, Project Manager */RA/*
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

SUBJECT: SUMMARY OF APRIL 23, 2010, TELECONFERENCE WITH
DOE/NNSA, REGARDING A PROPOSED REVISION TO
CERTIFICATE OF COMPLIANCE 0361 FOR MODEL NO. PAT-1
TRANSPORTATION PACKAGE

Background and Summary. On April 23, 2010, SFST held a videoconference with the Department of Energy (DOE), the National Nuclear Security Administration (NNSA), and Sandia National Laboratories (Sandia) to clarify structural requests for additional information (RAIs) with regard to the PAT-1 transportation application. Sandia presented detailed computer modeling analysis, input/output files, and demonstrated a comprehensive understanding of staff's RAIs. DOE/NNSA committed to providing a date for responding to the RAIs by April 30, 2010.

The PAT-1 is currently certified for air transportation of 2 kg of powdered Plutonium Oxide. The applicant is seeking to certify the PAT-1 for air transport of a smaller quantity of plutonium metals. No regulatory decisions were made at the meeting. The list of meeting attendees is Enclosure 1. An agenda and presentation slides are Enclosure 2.

Applicant Discussion.

- Overview. The applicant provided an overview of: 1) the Safety Analysis Report (SAR) Addendum structural analysis goals, 2) overpack modeling, 3) tearing parameter, 4) preprocessor, 5) input file generation, 6) postprocessor, 7) sample air transport accident simulations, and 8) sample dynamic crush simulations.
- SAR Addendum Analysis Goals. The PAT-1 package has been certified by the NRC since 1978 for air transport of 2 kg powdered Plutonium Oxide. The SAR addendum proposes to add solid metal to the contents list. The addendum demonstrates that solid metal contents do not affect the TB-1 containment boundary in normal and accident conditions. The integrity of a thin eutectic barrier is shown to be maintained using a component test-generated strain locus and an empirically-based analytical failure criterion called a tearing parameter. The analyses show that staying below the critical tearing parameter avoids the initiation of a ductile tear in the eutectic barrier.

- Requirements and Acceptance Criteria. The PAT-1 already meets all regulatory criteria except dynamic crush for the same mass TB-1 contents, except Plutonium Oxide. The overpack remains the same and the TB-1 containment boundary provides containment throughout Normal and Hypothetical Accident Conditions (NCT and HAC). The T-Ampoule is a eutectic barrier only and maintains integrity and is not a containment boundary. TB-1 containment vessel must meet the containment requirements of 10 CFR 71.64, special requirements for plutonium air shipments, which are shown through previous certification tests and current Finite Element Analysis demonstrating no plasticity in copper seal region. The TB-1 containment vessel must meet thru-wall stress limits for NCT and HAC. NCT limits are already met through previous certification testing. HAC dynamic crush is a new requirement since the original SAR. Thru-thickness stress limits are demonstrated through Finite Element Analysis. T-Ampoule maintains integrity using component test-generated strain locus and an empirically-based analytical failure criterion called tearing parameter – and staying below critical tearing parameter.
- Materials to be Shipped. Electro-refined Plutonium bulk material in machined hollow cylinder form. Plutonium metal samples of varying age – samples are typically disc, strip, or cylinder form. Pu-Be composite samples machined into disc forms.
- Finite Element Analysis Model Conservatisms. Always assume contents in most damage-inducing location/orientation. Ignores Tantalum foil slight energy absorber. Plutonium and Beryllium assumed infinitely plastic. Plutonium cylinders in sample containers are bounding. Electro-refined cylinders assume strongest dimensions. Ductile crack propagation is not modeled in the T-Ampoule, instead assumes failure at ductile crack initiation.

Staff Comments.

- Staff encouraged the applicant to provide SAR revision language as part of the response to Requests for Additional Information (RAI).
- Staff requested the applicant provide a date for responding to the RAI and also requested the applicant provide an updated need date for issuing the revised Certificate of Compliance by April 30, 2010.

Enclosures: 1. Attendees
2. Agenda and Presentation Materials

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Distribution: NRC Attendees BWhite WWheatley
 Filename: T:/CMS/PAT-1/2010 Video Conference Summary.doc
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NAME	CStaab		MDeBose		EBenner	
DATE	04/27/2010		04/27/2010		04/27/2010	

TELECONFERENCE PARTICIPANTS

Conducted by the Nuclear Regulatory Commission, DOE-NNSA, and Sandia National
Laboratories to Discuss a Proposed PAT-1 Certification Revision
April 23, 2010

Chris Staab	NRC/SFST
Jason Piotter	NRC/SFST
Jim Tollison	SAIC, Consultant for Paul Mann, NNSA
Richard Yoshimura	SNL
Lili Akin	SNL
Dave Harding	SNL
David Miller	SNL
Doug Ammerman	SNL
Susan Pickering	SNL