71-9329

Department of Energy
Washington, DC 20585

MAR 23 2010

Attn: Document Control Desk
Eric Benner
Chief Licensing Branch
Division of Spent Fuel Storage and Transportation,
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

The Department of Energy (DOE) herby submits Revision 4 of the Safety Analysis Report (SAR) in support of a request to amend the Certificate of Compliance for the S300 AF-96 package. Attachment A of this letter describes in detail the nature of the changes made to the SAR. This letter with attachments and 7 copies of these documents are being delivered to Michele Sampson at NRC shortly after this letter is signed. Included with this letter and the 7 copies are the following documents:

- One complete paper copy for Document Control Desk and 7 complete paper copies for the NRC reviewers of Revision 4 of the Safety Analysis Report, including the binders. Changes from prior Revision 3 are marked with a change bar in the margin. All pages are provided and are marked as Revision 4, regardless of whether a change was made. Old binders do not require updating.
- One electronic copy of Revision 4 of the SAR is provided in PDF format for the Document Control Desk and one additional copy is provided for the NRC review team.

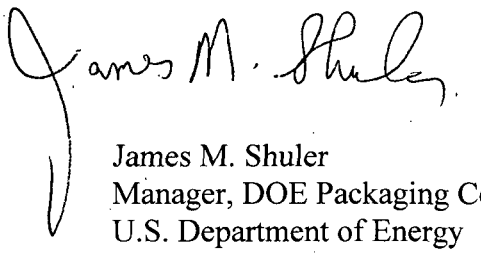
The electronic copy of the SAR is provided on a CD in an envelope labeled, "S300 Package Docket 71 9329 Rev. 4 Electronic Copy of Documents". The contents of the CD consist of the file "S300 SAR Complete Rev 4.pdf".

NM 5501

The DOE Packaging Certification Program (PCP) has only performed a logistical review to assure that the documentation is complete. DOE PCP has not done a technical review of this submittal.

If you have any questions on this submittal please contact Justin M. Griffin of Los Alamos National Laboratory at (505) 606-0362 or me at (301) 903-5513.

Sincerely,



James M. Shuler
Manager, DOE Packaging Certification Program
U.S. Department of Energy
Office of Packaging and Transportation
EM-45, CLOV-2047
1000 Independence Ave., SW
Washington, DC 20585

cc:
Steve O'Connor EM-45
Michele Sampson, NRC
Justin Griffin, LANL

Los Alamos
NATIONAL LABORATORY
EST. 1943

N-3: International Threat Reduction
Off-Site Source Recovery Project (OSRP)
PO Box 1663, MS: J552
Los Alamos, New Mexico 87545
505-606-0362/Fax 505-665-7913

Date: March 15, 2010
Refer To: N3-2010-124

Dr. James M. Shuler
Manager, Packaging Certification Program
U.S. Department of Energy
Office of Safety Management and Operations, EM-45
1000 Independence Ave, SW
Washington, DC 20585

Subject: REQUEST TO AMEND THE CERTIFICATE OF COMPLIANCE FOR THE S300 PACKAGE, DOCKET No. 71-9329

Dear Dr. Shuler:

The Off-Site Source Recovery project at Los Alamos National Laboratory hereby submits Revision 4 of the Safety Analysis Report (SAR) in support of a request to amend the Certificate of Compliance for the S300 AF-96 package. Included with this letter are the following documents:

- Attachment A - describes in detail the nature of the changes made to the SAR.
- Ten complete paper copies of Revision 4 of the Safety Analysis Report, including binders. Changes from prior Revision 3 are marked with a change bar in the margin. All pages are provided and are marked as Revision 4, regardless of whether a change was made. Since this supersedes the earlier revision in its entirety, old S300 SAR binders do not require updating.

  Please note that one copy should be sent to the NRC Document Control Desk, and seven copies should be provided directly to Michele Sampson at NRC. The other two copies are for your use.
- Three CD-ROM disks, each containing an electronic copy of Revision 4 of the SAR are provided in PDF format in an envelope labeled, "S300 Package Docket 71 9329 Rev. 4 Electronic Copy of Documents". One CD should be submitted to the NRC Document Control Desk, one to Michele Sampson, and the third copy is provided for your use.

In accordance with pertinent DOE orders, please submit this request on our behalf to NRC's Office of Nuclear Material Safety and Safeguards for review. We would also appreciate the opportunity to review a draft version of the certificate prior to NRC approval.

Thank you for your continued assistance and cooperation in helping OSRP continue its threat reduction mission. If you have any questions, please contact me at 505-606-0362.

Best Regards,

Justin M. Griffin, P.E.

Encl: As noted

ATTACHMENT A
Docket No. 71-9329, Model No. S300 Package
Change Summary for Safety Analysis Report, Revision 4

1. The contents of the package have been revised to add non-neutron producing plutonium material (i.e., "general plutonium material"), and to specify contents limits for air transport. The new contents descriptions are detailed in Table 1-2 and Table 1-3. This refinement of the contents required designating the sealed neutron sources as Contents No. 1, and the general plutonium material as Contents No. 2. Each of these two contents has a different CSI. The air transport contents limits are based on the air transport criticality analysis.

   Because of its small size, the contents of the Special Form Capsule (SFC) Model III are limited solely by physical capacity under all conditions (160g). The contents of the Model II SFC are limited as follows:

   - Contents no. 1 (neutron sources), non-exclusive use, the 206g limit is based on dose rate (Table 1-2).
   - Contents no. 1 (neutron sources), exclusive use, the 350g limit is based on the CSI of 0.3 (Table 1-2).
   - Contents no. 2 (general plutonium material), non-exclusive and exclusive use, the 300g limit is based on the CSI of 4.0 (Table 1-2).
   - Contents nos. 1 or 2, air transport, the 206g limit is based on the air transport criticality analysis (Table 1-3).

   These points are discussed in further detail below.

2. As part of the revison of the shielding analysis (also see below), the isotopic composition of the plutonium used in source production that was included in Revision 3 of the SAR was refined. In Revision 4, based on a detailed analysis of the historical data, the radioisotope composition representative of most plutonium source material used in source production has been established as shown in Table 1-1. Nevertheless, the table of content percentages in Item 5.b.(2) of the current CoC remains valid.

3. Revision 4 adds more target materials for neutron generation besides beryllium. After examining the neutron production of other target materials, however, it was determined that beryllium is still the governing case for α-n reaction neutron production. The neutron production comparison is detailed in the SAR, and beryllium is used as the bounding case in shielding analyses.

4. In prior revisions of the SAR, the plutonium was assumed to be infinitely dilute in beryllium. To avoid overconservatism inherent in this assumption, Revison 4 of the SAR uses the actual Pu:Be atom ratio of 1:13, which somewhat reduces the source strength to its realistic value. In addition, the polyethylene drum liner, which had been conservatively neglected in prior revisons, has now been explicitly acknowledged. These two changes have almost exactly offset the increase in source strength which resulted from including plutonium isotopes having shorter half lives than Pu-239. The net effect is that the mass limit of 206g of plutonium for non-exclusive use transport (shown in earlier S300 applications) does not change.

5. As noted above, a new category of contents has been added (Content No. 2), called "general plutonium material", (i.e., Pu material configurations that do not have an α-n reaction, and do not contribute to the dose rate). Such items as alpha reference standards (e.g., check sources), foils (e.g., threshold detectors), and other similar source configurations

containing plutonium are included in this category. The criticality analysis in Revision 4 of the SAR has been revised to include this new category.

While revising the criticality analysis, the neutron source (Content No. 1) was made more generic by conservatively neglecting the tantalum and stainless steel source cladding. This change was made because tantalum acts as a strong neutron absorber, and an equivalent mass of tantalum could no longer be guaranteed to be present for additional sources desired for transport for threat reduction purposes.

6. Revision 4 adds justification for air transport of plutonium outside U.S. airspace. The S300 meets the requirements for air transport of fissile material under 10 CFR 71.55(f) and IAEA TS-R-1 §680 (2009 Edition) by the conservative assumption that all of the fissile and moderating material in the package is arranged in the most reactive configuration. This analysis is shown in Section 6.9.4 of the SAR. However, since the S300 contains plutonium and does not meet the requirements of 10 CFR 71.64, authorization is not sought for transport in any U.S. airspace. The purpose of authorization outside U.S. airspace is to facilitate foreign competent authority approvals for air transport as needed for threat reduction operations. Therefore, Condition 6. of the current CoC should be modified as deemed appropriate.

7. Revision 4 removes the designation of the special form capsule certificate revision number. The special form capsules used in the S300 are certified by DOT for both the capsule configuration and contents. Occasionally, the capsule certifications are revised for reasons that do not impact plutonium content or configurations specified by the S300 SAR and package certificate. Since the current S300 Certificate of Compliance (Revision 2) includes each special form capsule's certificate revision numbers in Paragraph 5.b.(1)(a) and (b), a revision to the S300 packaging CoC and CoCA is required each time the special form capsule certifications are updated. This creates unecessary work for both the applicant and the certifying authorities. The S300 certification applies content limits for plutonium that are more restrictive than the content limits for either the Model II or Model III special form capsule certificates.

   Therefore, use of the proper special form capsule configuration can instead be controlled by the applicable drawing (and drawing revision number) of each special form capsule. Consequently, in Revision 4 of the SAR, the special form capsules are identified by the current drawing number, drawing revision number, and IAEA special form certificate number (without the certificate revision number). This will be sufficent to ensure that only a DOT certified capsule is used in the S300, and avoids the problem of needing to request a package amendment when the special form certificates are revised for reasons that do not impact content or configurations specified by the S300 SAR and Type AF certificate.

   The applicant requests therefore that the special form capsule drawing number, drawing revision, and DOT certificate number, without reference to the capsule certificate revision number, appear in Revision 3 of the S300 packaging CoC.

8. Revision 4 removes the requirement for a fixed stainless steel nameplate (drawing 60999-SAR, Rev. 0, sheet 1, general note no. 2). Since the S300 drum is also frequently used as a DOT 7A Type A container for transport of non-fissile radioactive material for threat reduction purposes, the package has been identified and marked according to it's actual use (Type A vs. Type AF) by durable pre-printed labels in accordance with DOT marking requirements. Thus, the drawing notation has been corrected to simply state, "Prior to use, package shall be marked in accordance with 10 CFR 71.85(c)."