



March 6, 2017  
ES/NRC 17-002  
Docket No. 71-9168

ATTN: Document Control Desk  
Director, Division of Spent Fuel Management  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**Subject: Request for Authorization to Ship Eight 10-160B Shield Inserts**

Reference: 10-160B Package, Certificate No. USA/9204/B(U)-96, Docket No. 71-9204

EnergySolutions requests a one-time authorization for eight 10-160B shipments of Shield Inserts that deviate from the approved Safety Analysis Report (SAR) drawings. The removable Shield Inserts are part of the certified 10-160B packaging and are used to ship radioisotope sources within the 10-160B cask cavity.

#### Background

On October 4, 2016, Idaho National Laboratories (INL) submitted a notification to NRC pursuant to 10 CFR 71.95 for 10-160B shipments made with nonconforming Shield Inserts. EnergySolutions and Atkins (formerly EnergySolutions) delivered the subject Shield Insert units to INL. The Shield Inserts were not in conformance with the NRC Certificate of Compliance (CoC) in two areas. There were no events or system failures associated with the nonconformances.

- First, contrary to Note 18 of the approved SAR drawing, the Shield Insert fasteners were not U.S. manufactured. The fasteners were otherwise fully compliant since they were dedicated during fabrication of the inserts to assure that they met the quality specifications. There were no fastener failures of any kind noted during service.
- Second, contrary to Note 4 of the approved SAR drawing, the stenciled package gross weight was 7,600 pounds, not 8,000 pounds as specified on the drawing. The stenciled weights were bounded by the SAR weights, and gross weights of the loaded Shield Insert units were all less than 7,600 pounds. There were no failures related to this issue during handling or shipment of any of the inserts.

INL has executed corrective actions to tag out the affected units (fifteen in total) to prevent shipping in the nonconforming state. Seven of the units are not currently loaded, and will be made compliant prior to shipping them in the future. Eight of the units, however, are currently in dry storage awaiting final shipment for disposal. They are identified in Attachment 1. Seven of the eight loaded units were wet-loaded, and then shipped to dry storage as Type B shipments. These seven shipments were addressed in the 71.95 notification.

In order to remedy the loaded units, it would be necessary to replace the fasteners and modify the stenciling. This would require unloading, modifying the stenciling, reloading, installing compliant fasteners, and recertifying the waste in each Shield Inserts per INL's requirements. The options for performing these steps include returning to the pool (which would require a Type B shipment), or performing the actions in the dry condition which would result in significant unnecessary radiation exposure to operating personnel (approximately 25 man-rem for all eight units). Attachment 2 shows the basis for the exposure estimate. EnergySolutions submits that the operating personnel radiation exposure necessary to remedy the Shield Inserts is unwarranted, given the limited significance of the nonconforming attributes. Attachment 3 is a certification by EnergySolutions QA stating that the fasteners on the eight subject Shield Inserts meet the material properties requirements in the approved drawings, i.e., the non-U.S. fasteners meet the same requirements as U.S. fasteners.

### Request

EnergySolutions requests that NRC grant authorization for one-time shipments of the eight subject Shield Insert units identified in Attachment 1. All shipments are from the current dry storage location at Southwest Research Institute, San Antonio, TX to the permanent disposal site at Nevada Nuclear Security Site (NNSS) in Mercury, NV where the Shield Inserts and their contents will be permanently dispositioned. The shipments will commence as early as April, 2017 and are planned to be completed by approximately September, 2017.

This authorization request only applies to the eight currently loaded Shield Inserts identified in Attachment 1. All seven unloaded Shield Inserts will be brought into compliance prior to release for Type B shipment as follows. EnergySolutions will procure compliant fasteners and stencils. The fasteners, stencils and instructions will be provided to LANS and the Registered User of the liners/cask (INL). Once the noncompliant fasteners have been replaced and the stenciling has been corrected to read "Gross Weight – 8,000 lbs", EnergySolutions QA will recertify each Shield Insert unit to document resolution. These recertifications will provide INL the basis for releasing the Shield Inserts for Type B shipments.

EnergySolutions will include a revision to Notes 4 and 18 of the approved SAR drawing with the next proposed amendment to the CoC.

Should you or any member of your staff have questions, please contact the undersigned at (860) 481-462-9707.

Sincerely,



Gerry van Noordennen  
Vice President Regulatory Affairs

Attachments:

- (1) Subject Loaded 10-160B Shield Insert Liners (1 page)
- (2) Exposure Estimate (1 page)
- (3) *EnergySolutions* Certification for the Subject Non-U.S. Fasteners (1 page)

cc: Mr. Pierre Saverot, Senior Project Manager, Division of Spent Fuel Management

**Attachment 1**  
**Subject Loaded 10-160B Shield Insert Liners**

	<b>Insert Type</b>	<b>Liner S/N</b>	<b>Isotope</b>	<b>Activity (Ci)</b>
1.	Insert A	1537-004-01	Co-60	2,460.47
2.	Insert A	1877-004-01	Co-60	2,460.47
3.	Insert A	1877-004-03	Co-60	6,635.14
4.	Insert A	1877-004-04	Co-60	6,178.38
5.	Insert A	1877-004-05	Co-60	5,581.10
6.	Insert A	1877-004-06	Co-60	2,627.03
7.	Insert A	1877-004-07	Co-60	4,686.49
8.	Insert B	1537-0001-03	Co-60	2,080.00

**Attachment 2**  
**Exposure Estimate**

Exposure rates are based on operational experience: general area background of 350 mrem/hr, and an estimated average of 700 mrem/hr on contact. Confirmatory estimates using MicroShield™ point source models give contact exposure rates ranging from 600-1,900 mrem/hr for the Ci contents listed in Attachment 1.

Estimates do not include work preparation activities (e.g., staging ladders scaffolding, safety equipment, etc.) or health physics, safety, and supervisory personnel.

<b>Task</b>	<b>Personnel</b>	<b>Field (mrem/hr)</b>	<b>Time in Field (hours)</b>	<b>Task Exposure (mrem)</b>
Remove and replace fasteners	2 technicians	350	0.5	350
Modify stenciling, 3 places	2 technicians	700	1.5	2,100
Waste certification	1 observer	350	2.0	700
Total for one Shield Insert				3,150
Total for 8 Shield Inserts				25,200

**Attachment 3****EnergySolutions Certification for the Subject Non-U.S. Fasteners**

A review of the documentation packages has been performed by EnergySolutions Quality Assurance personnel to confirm that the non-U.S. manufactured 10-160B Shield Insert fasteners for the subject eight units meet all the remaining requirements in the approved SAR drawings. All fasteners for the subject eight units were manufactured by Jinn Her Enterprises, Co. Ltd. Taiwan which provided a Certificate of Inspection certifying the fasteners meet the requirements of SAE J-429 and providing the actual inspection results. All the fasteners were from the same manufacturer and lot/heat (see table below). The fasteners were independently tested by Petersen, an EnergySolutions approved supplier, in accordance with an approved dedication plan. The testing verified that the chemical properties, mechanical properties, and hardness met the requirements of SAE J-429. Six fasteners out of a lot of sixty were tested and found to meet the requirements of SAE J-429. None of the sampled fasteners failed to meet requirements.

Manufacturer	Manufacturer Lot Number	Supplier Co/C with Lot Number and MTR	Petersen Material Code with Lot Number	Mfg Chemical & Physical Test Results	Petersen Chemical & Physical Test Results	Bolt Head Mark per SCI List
Jinn Her Enterprises, Co. Ltd Taiwan	B296412P1	B296412P1	1L2K B296412P1	IAW SAE J-429 Gr 5	IAW SAE J-429 Gr 5	OK (JH)

Based on the above information the fasteners installed in the eight subject inserts meet the requirements of the approved SAR drawings with the only exception being that they were not manufactured in the U.S.

Signed:

**Richard Byars**

Digitally signed by Richard Byars  
 DN: o=energysolutions, email=rbyars@energysolutions.com, cn=Richard Byars  
 Date: 2017.03.06 07:20:08 -05'00'

Richard Byars  
 Director, QA, LP&S

Date