November 16, 1992

SHIPPING PACKAGE ASSEMBLY/DISASSEMBLY

Generic Model 1500 Type B Shipping Package
Loading Procedure

1. Purpose

To provide container users with the recommended procedure for loading the Model 1500 Type B shipping container and the preparation of the package assembly for shipment.

2. Scope

This procedure establishes the guidelines to be followed for the handling activities associated with the GE-VNC supplied shipping package. **VARIANCES TO THESE GUIDELINES ARE PERMISSIBLE PROVIDED THEY ARE IN COMPLIANCE WITH THE APPLICABLE REQUIREMENTS OF THE SHIPPING PACKAGE CERTIFICATE OF COMPLIANCE, THE RECEIVING FACILITY LICENSES, AND DOT/NRC REGULATIONS.** Internal facility operating procedures should be followed for the "routine" transfers, movements, decontamination, radiation controls, etc. of the shipping package.

The procedure is applicable to the Model 1500 Type B shipping container.

3. Special Requirements

a. A copy of this procedure should accompany or precede the first shipping package sent to a user for receiving and shipping radioactive materials.

b. The silicone rubber lid gaskets must be replaced within the 12-month period preceding each shipment. Prior to each shipment the silicone rubber lid gaskets must be inspected. The silicone rubber gasket must be replaced if inspection shows any defects. Cavity drain line must be sealed with appropriate sealant applied to threads to pipe plug.

c. The packaging shall be bubble tested within the 12-month period preceding each shipment, and after each third use. The bubble test shall be performed by filling the cask cavity to approximately 1/4-inch depth with water, reducing the cavity pressure to no more than 2.5 psia and holding for at least 5 minutes. Acceptance is indicated by no continuous generation of bubbles.

4. Special Notes

a. The protective jacket and the exterior of the shipping cask are free of smearable radioactive contamination when shipped. The package should be return shipped in the same contamination-free condition.

b. NO MODIFICATION, REPLACEMENT, REPAIR, OR REWORK TO THE SHIPPING PACKAGE (PROTECTIVE JACKET AND CASK) SHALL BE MADE WITHOUT WRITTEN PERMISSION FROM (GE-VNC) IRRADIATION PROCESSING OPERATION, PLEASANTON, CALIFORNIA.

c. All package components (except product and non-returnable product container) must be returned unless otherwise specified by GE-VNC.

d. The cask cavity shall be leak checked per the requirements of the Certificate of Compliance.

e. A "Model 1500 Shielded Container" diagram, VAL 72XX, is attached and should be used to locate items referenced in the text of this procedure.

f. Do NOT attempt to lift the cask by the eye (Item 1) on the cask lid. The eye is for lifting the cask lid only. The cask lid weight is stamped in the lid.

g. ONLY THE TIEDOWN EYES (ITEM 3) ON THE SIDE OF THE FIRESHIELD ARE APPROVED TO SECURE THE PACKAGE ASSEMBLY TO THE TRANSPORT VEHICLE. TWO ADDITIONAL CHAINS TO SECURE FIRESHIELD PALLET TO VEHICLE ARE RECOMMENDED. OTHER TIEDOWN ROPING, CABLING, OR CHAINING ARRANGEMENT, USING THE TIEDOWN EYES (ITEM 3) MAY BE USED PROVIDING THE SHIPPER PERFORMS AN ENGINEERING ANALYSIS AND EVALUATION.

h. Do NOT lift the protective jacket and cask package assembly by the top rectangular holes (Item 2) on protective jacket. These are only for moving the protective jacket after it has been unbolted from the base (pallet).

i. The lugs (Item 3) located on the side of the protective jacket are for tie-downs during transport and may be used to lift the entire protective jacket/cask package assembly.

j. The lifting eyes (rectangular holes) on the protective jacket must be secured with the anti-tie-down covers (Item 4) to prevent use as a tie-down system during transport. THE PROTECTIVE JACKET LIFTING EYES ARE NOT APPROVED TO SECURE PACKAGE ASSEMBLY TO TRANSPORT VEHICLE.

5. Protective Jacket Disassembly

   a. Use appropriate capacity material handling equipment to place complete package assembly in an area free of radioactive contamination. Package gross weight is on the protective jacket nameplate. (Item 5 on attached diagram).

   b. Monitor the exterior container surface for radioactive contamination and dose rate with appropriate radiation detection instruments. Notify the Area Supervisor, Regulatory Compliance, or other designated personnel if the container surface is contaminated or the dose rate is higher than indicated on the shipping papers.

   c. Verify security seal number with shipping documents. Remove the security seal (Item 6 on attached diagram).

   d. Unscrew and remove the bolts (Item 7 on attached diagram) from the base of the protective jacket. Use care not to damage or lose the bolts. **ALL THE BOLTS WILL BE REQUIRED FOR REASSEMBLY.**

   e. Carefully lift the protective jacket off the cask, either by using the rectangular holes (Item 2) on top of the jacket or by using the lug tie-down ears (Item 3) and appropriately rated slings. The protective jacket must be lifted straight up to prevent damage to cask.

   f. Place the protective jacket in a noncontaminated area or cover to protect from radioactive contamination.

   g. Monitor the cask dose rate with an appropriate radiation detection instrument.

   h. Smear the cask surface to check for radioactive contamination. If contamination is detected, notify Area Supervisor and follow appropriate internal procedures for contamination control and decontamination activities.

   i. Lift the cask off protective jacket base using the ears (Item 8) on each side of the cask. **DO NOT LIFT CASK USING EYE IN THE CASK LID. THE CASK LID EYE IS AUTHORIZED FOR LIFTING THE LID ONLY.** Transport the cask to the shielded work area. The cask weight is on the cask nameplate. Do NOT overload the material transport equipment.

6. Loading Casks - Dry Remote Operation

a. Use appropriate material handling equipment and position the cask on stable foundation in a shielded remote handling facility. Follow appropriate internal procedures for dose rate monitoring and respiratory protection requirements.

b. Perform required cavity leak check prior to loading cask. Leak tests shall be as designated in the cask Certificate of Compliance.

c. If materials to be loaded into the cask are free of radioactive contamination - sealed source container; special form containment, etc.:

1) Before removal of the cask lid, be sure that all remote handling tools to be used are as free of contamination as the item(s) being loaded.

2) Remove the cask lid bolts (Item 9). Place the bolts in a convenient location so they are not lost, damaged, or contaminated. **ALL THE BOLTS WILL BE REQUIRED FOR REASSEMBLY.**

3) Use an appropriately rated lifting device to remotely remove the cask lid. The cask lid weight is stamped on the lid.

4) Smear the cask cavity for radioactive contamination. Clean to the required levels per appropriate internal procedures.

5) Check the cask drain line. Remove previous thread sealant and apply Teflon tape or other thread sealant to the drain plug threads. Replace the drain plug and tighten.

6) Visually check the gasket and cask and lid sealing surfaces for cuts, nicks, tears, ragged edges or other defects that could adversely affect the sealing ability of the gasket. The gasket shall be replaced if any defects are indicated.

7) Visually inspect the cask lid bolts for obvious damage. **IF ANY COMPONENT OF THE SHIPPING PACKAGE REQUIRES REPAIR OR REPLACEMENT, NOTIFY GE-VNC.**

8) Properly position the gasket.

9) Remotely transfer the materials into the cask cavity. A lifting eye or bail should be on the container or material.

10) Replace the cask lid and bolts. Tighten the lid bolts to 120 ± 10 ft-lbs torque in a criss-cross pattern.

d. If materials to be loaded into the cask are Normal Form materials:
   1) Remove the cask lid bolts (Item 9). Place bolts in a convenient location so they are not lost, damaged, or contaminated. **ALL THE BOLTS WILL BE REQUIRED FOR REASSEMBLY.**
   2) Use an appropriately rated lifting device to carefully remove the cask lid. The cask lid weight is stamped on the lid.
   3) Smear the cask cavity for radioactive contamination. Decontaminate to the required levels per appropriate internal procedures.
   4) Check the cask drain line. Remove previous thread sealant and apply Teflon tape or other thread sealant to the drain plug threads. Replace the drain plug and tighten.
   5) Visually check the gasket and cask and lid sealing surfaces for cuts, nicks, tears, jagged edges or other defects that could adversely affect the sealing ability of the gasket. The gasket shall be replaced if any defects are indicated.
   6) Visually inspect the cask lid bolts for obvious damage. **IF ANY COMPONENT OF THE SHIPPING PACKAGE REQUIRES REPAIR OR REPLACEMENT, NOTIFY GE-VNC.**
   7) Properly position the gasket.
   8) Remotely transfer materials into the cask cavity. A lifting bail or eye should be on the material or transfer container.
   9) Replace the cask lid and bolts. Tighten the lid bolts to 120 $\pm$ 10 ft-lbs torque in a criss-cross pattern.

7. <u>Loading Casks - Wet Operation</u>
   a. Use appropriate material handling equipment and position the cask on stable foundation. Follow appropriate internal procedures for dose rate monitoring and respiratory protection requirements.
   b. Perform required cavity leak check prior to loading cask. Leak tests shall be as designated in the cask Certificate of Compliance.
   c. Use shackle bolts mounted through holes (Item 11) in cask lifting ears for crane hook attachment points. Use an overhead crane for raising and lowering the cask.
   d. The cask weight is on the cask nameplate - do not exceed capacity of material handling equipment.

e. Attach the crane hook or appropriate length sling to eye in cask lid for underwater lid removal. The cask lid weight is stamped on the lid. Use appropriately rated material handling equipment.

f. Prepare the cask for lowering into the pool. Remove the lid bolts and drain plug (Item 10). **CAUTION: DO NOT MOVE THE CASK ANY MORE THAN NECESSARY WITH LID BOLTS REMOVED.**

g. Place the bolts and drain plug in convenient location so they won't be lost, contaminated, or damaged. **ALL BOLTS AND DRAIN PLUG WILL BE REQUIRED FOR REASSEMBLY.**

h. Visually inspect the gasket and the cask and lid sealing surfaces for cuts, nicks, tears, jagged edges, or other defects that could adversely affect the sealing ability of the gasket. The gasket shall be replaced if any defects are indicated.

i. Visually inspect the cask lid bolts and drain plug for obvious damage. **IF ANY COMPONENT OF THE SHIPPING PACKAGE REQUIRES REPAIR OR REPLACEMENT, NOTIFY GE-VNC.**

j. Slowly lower the cask into water to sufficient depth to insure safe radiation operating conditions for cask loading personnel. The cask should be lowered slowly to permit the cask cavity to fill with water slowly to prevent large air bubbles escaping from cavity and to prevent dislodging the cask gasket.

k. If materials to be loaded into the cask are free of contamination - sealed source container, etc.

   1) Before loading cask, be sure that all remote pool tools are as free of contamination as item(s) being loaded.

   2) Slowly raise the cask lid. Monitor dose rate to working personnel. If cask cavity isn't completely full of water, air bubbles may escape when the lid is removed. Respiratory protection is recommended.

   3) Transfer the materials into the cask using the lifting eye or bail on the container or material. Use care to not dislodge cavity gasket.

   4) Remotely check the position the cask gasket and carefully replace the cask lid.

5) Slowly remove the cask from the water. Drain all the water from cask cavity over the pool or transfer cask to decon area to drain cavity.
6) Water may drain slowly from cask cavity due to the cask lid seal. The cask lid may have to be raised slightly for venting to allow all water to drain from the cask cavity. Raise cask lid carefully and monitor radiation dose rate. The cask lid should be raised only enough to vent cask cavity.
7) Assure the cask cavity is empty of water using a vacuum drying technique described in Attachment I, Vacuum Drying Procedure.
8) Tighten the lid bolts to 120 $\pm$ 10 ft-lbs torque in a criss-cross pattern.
9) Dry the cask exterior.
10) Move the cask to stable foundation.
11) Check the cask drain line. Remove previous thread sealant and apply Teflon tape or other thread sealant to the drain plug threads. Replace the drain plug and tighten.

1. If materials to be loaded into cask are Normal Form materials:
   1) Slowly raise the cask lid. Monitor dose rate to working personnel. If cask cavity isn't completely full of water, air bubbles may escape when lid is removed. Respiratory protection is recommended.
   2) Transfer the material into the cask using the lifting eye or bail on the material or the container. Use care not to dislodge cavity gasket.
   3) Remotely check the position the cask gasket and carefully replace the cask lid.
   4) Slowly remove the cask from the water. Drain all the water from the cask cavity over the pool or transfer cask to decon area to drain cavity.
   5) Water may drain slowly from cask cavity due to the cask lid seal. The cask lid may have to be raised slightly for venting to allow all the water to drain from the cask cavity. Raise cask lid carefully and monitor radiation dose rate. The cask lid should be raised only enough to vent cask cavity.

6) Assure the cask cavity is empty of water using a vacuum drying technique described in Attachment I, Vacuum Drying Procedure.
7) Tighten the lid bolts to 120 ± 10 ft-lbs torque in a criss-cross pattern.
8) Dry the cask exterior.
9) Move the cask to a stable foundation.
10) Check the cask drain line. Remove previous thread sealant and apply Teflon tape or other thread sealant to the drain plug threads. Replace the drain plug and tighten.

8. Reassembly and Return Shipment

a. Decontaminate cask exterior and survey for smearable radioactive contamination. Cask exterior should be <100 cpm beta/gamma per ft^2 and <200 dpm alpha per ft^2 or must comply with DOT regulations.
b. Remove any old labels from cask exterior and apply a "FULL" label. Labeling the cask is an optional step.
c. Visually inspect the cask ears for bending, cracked welds, or other defects. **NOTIFY GE-VNC IF ANY ABNORMAL CONDITION IS DETECTED.**
d. Return the full cask to the protective jacket storage area.
e. Remove any old labels from protective jacket exterior.
f. Visually inspect protective jacket for damage. **NOTIFY GE-VNC IF ANY DAMAGE REQUIRING REPAIR IS DETECTED.**
   1) Check protective skirt for damage.
   2) Check fireshield bolts for thread damage, galling, etc.
   3) Check fireshield nuts for damage.
   4) Visually check absorber angles on separator plate for weld integrity, damage, etc.
   5) Visually check absorber tubes inside fireshield for damage.
g. Align the cask on jacket base so that protective jacket will align with the cask lifting ears and mate with base bolt holes.
h. Position protective jacket on jacket base and secure all jacket bolts to 900 ± 100 ft-lbs torque in a criss-cross pattern.
i. Secure the anti-tiedown covers on protective jacket lifting eyes. Assure the printing on the anti-tiedown covers is legible.

j. Attach a security seal (Item 6) through a protective jacket bolt. Verify the seal number is recorded on the shipping paperwork.

k. Survey the assembled package for radiation levels and smearable contamination. Release the package per applicable DOT/NRC regulations.

l. Attach appropriate shipping labels. Place required DOT labels on the protective jacket.

m. **ASSURE PACKAGE ASSEMBLY IS SECURED TO TRANSPORT VEHICLE USING THE APPROVED TIEDOWN EYES (ITEM 3). TWO ADDITIONAL CHAINS TO SECURE FIRESHIELD PALLET TO VEHICLE ARE RECOMMENDED. OTHER TIEDOWN ROPING, CABLING, OR CHAINING ARRANGEMENT, USING THE TIEDOWN EYES (ITEM 3) MAY BE USED, PROVIDING THE SHIPPER PERFORMS AN ENGINEERING ANALYSIS AND EVALUATION.**

n. Promptly return the shipping package to:

General Electric Company
Vallecitos Nuclear Center
6705 Vallecitos Road/Highway 84
P.O. Box 460
Pleasanton, California 94566

MODEL 1500 SHIELDED CONTAINER

FIGURE WITHHELD UNDER 10 CFR 2.390

ATTACHMENT I

VACUUM DRYING PROCEDURE

1. Equipment

   a. Vacuum pump
   b. Vacuum gage
   c. Cask drain plug adaptor
   d. Vacuum lines
   e. Absolute filter
   f. Appropriate size wrenches

2. Procedure

   a. Tighten lid bolts to 120 ± 10 ft-lbs torque in a criss-cross pattern.
   b. Install special drain plug adaptor.
   c. Attach vacuum pump line to drain plug.
   d. Direct discharge line to a ventilation duct and away from personnel working areas.
   e. Verify all fittings are tight.
   f. Turn on vacuum pump.
   g. Evacuate cask cavity until 1 torr pressure is obtained. Cask cavity will be dry at this pressure.
   h. Shut off vacuum pump.
   i. Vent system to atmosphere.
   j. Remove and store all equipment.

PRESHIPMENT INSPECTION AND MAINTENANCE SUMMARY
ENERGY ABSORBING ANGLES
ENERGY ABSORBING TUBES
SEPARATOR PLATE

1. SCOPE

This document provides the general requirements for the in-service and annual inspections for the angles, tubes, and separator plate of the metal protective jacket assembly.

2. IN-SERVICE INSPECTION

2.1 The absorber angles and tubes must all be in place and serviceable.

2.2 Inspection of the visible angles on top of the Separator Plate prior to each shipment shall be used to infer the condition of the angles below the plate. If the top angles are found to be damaged, the plate shall be removed to inspect the lower angles. If the top angles are acceptable, inspection of the lower set of angles is not required.

2.3 Angles, tubes, and plate shall be visually inspected for wear, crushing, or deformation prior to package assembly.

2.4 All angles, tubes, and plate shall be inspected at least once per year or at assembly for shipment, whichever comes later.

3. DOCUMENTATION

3.1 Preshipment and annual inspections shall be documented.

3.2 Maintenance, repair, and replacement activities shall be documented.

PRESHIPMENT INSPECTION AND MAINTENANCE SUMMARY
CASK LIFTING EARS

1. SCOPE

This document provides the general requirements for the in-service inspections of cask lifting ears.

2. IN-SERVICE INSPECTION

Prior to each usage, the lifting ears will receive a visual inspection to assure no significant physical/mechanical damage has been sustained from previous handling, such as cracked welds.

3. DOCUMENTATION

3.1 Preshipment inspections shall be documented.

3.2 Maintenance, repair, and replacement activities shall be documented.

PRESHIPMENT INSPECTION AND MAINTENANCE SUMMARY
DRAIN PLUG

1. SCOPE

This document provides the general requirements for the in-service and annual inspections for the cask drain plug.

2. IN-SERVICE INSPECTION

2.1 Drain plugs shall be visually inspected for damage whenever they are installed.

2.2 Plugs showing no obvious wear, corrosion or damage on the thread diameter are acceptable for reuse.

3. DOCUMENTATION

3.1 Preshipment and annual inspections shall be documented.

3.2 Maintenance and replacement activities shall be documented.

INSPECTION AND MAINTENANCE SUMMARY
CASK SEAL GASKETS

1. SCOPE

This document provides the general requirements for the in-service and annual inspections for the cask seal gaskets.

2. IN-SERVICE INSPECTION

2.1 Each cask seal gasket shall be examined visually for defects prior to each shipment.

2.2 A new cask seal gasket will be installed every 12 months.

2.3 The gasket shall provide a cask lid to body seal of greater than 0.001 atm-cc/sec.

3. DOCUMENTATION

3.1 Preshipment and annual inspections shall be documented.

3.2 Repair and replacement activities shall be documented.

PRESHIPMENT INSPECTION AND MAINTENANCE SUMMARY
HIGH STRENGTH EAR BOLTS
LID BOLTS

1. SCOPE

This document provides the general requirements for the in-service and annual inspections for the cask lid bolts.

2. IN-SERVICE INSPECTION

2.1 Bolts shall be visually inspected for proper identification and obvious damage during each assembly.

2.2 Bolts with evidence of obvious wear or damage to the bolt shank or to the threads; corrosion; or improper identification shall be replaced.

3. DOCUMENTATION

3.1 Preshipment and annual inspections shall be documented.

3.2 Maintenance, repair, and replacement activities shall be documented.

PRESHIPMENT INSPECTION AND MAINTENANCE SUMMARY
JACKET BASE NUT
JACKET HEX BOLTS

1. SCOPE

This document provides the general requirements for the in-service and annual inspections for the base nut and bolts.

2. IN-SERVICE INSPECTION

2.1 In-service inspection shall be performed during each assembly and consist of insertion of an appropriate jacket bolt, by hand, into the base nut. Bolts or nuts with minor damage shall have their threads chased with an appropriate tap. Any lubricants are acceptable.

2.2 Nuts and bolts shall be visually inspected at least once per year or at assembly for shipment, whichever comes later.

3. DOCUMENTATION

3.1 Preshipment and annual inspections shall be documented.

3.2 Maintenance, repair, and replacement activities shall be documented.