

WM-030

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OPERATING PROCEDURE FOR TYPE A SERIES 50 CASKS

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NUS PROCESS SERVICES								

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1.0 PURPOSE

The purpose of this procedure is to provide operating instructions for all NUSPSC Type A, Series 50 radioactive materials shipping casks.

2.0 APPLICABILITY

This procedure is applicable to all NUSPSC Type A Series 50 shipping casks (Certificate of Compliance USA/9145/A). This procedure may be used in its entirety as is or incorporated into the policies and procedures of a registered user.

3.0 DEFINITIONS

- 3.1 NUSPSC - NUS Process Services Corporation
- 3.2 U.S. NRC - United States Nuclear Regulatory Commission
- 3.3 C of C - Certificate of Compliance issued by the U.S. NRC
- 3.4 Primary lid gasket - Seal placed between the top of the cask body and the underside of primary lid perimeter.
- 3.5 Secondary lid gasket - Seal placed between the top of the working opening of the primary lid and the underside of secondary lid.
- 3.6 Ratchet binder - Mechanical turnbuckle used in securing the primary lid to the cask body.

4.0 REFERENCES

- 4.1 Code of Federal Regulations, 10CFR71.12.C (3)
- 4.2 Code of Federal Regulations, 49CFR173.471
- 4.3 U.S. NRC Certificate of Compliance for USA/9145/A

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- 4.4 NUS Corportion Drawing No. 5025-M-2010, "NUS Type A Transportation Casks - Series 50 Cask General Arrangements"
- 4.5 Code of Federal Regulations, 49CFR, Parts 100-177
- 4.6 NUSPSC Procedure WM-031, "Maintenance and Inspection Procedure for Type A, Series 50 Casks"
- 4.7 NUSPSC Procedure WM-011, "Soap Bubble Leak Test of NUSPSC Type A Shipping Cask"
- 4.8 NUSPSC Procedure QA-001, "Procedure Preparation and Control"
- 4.9 NUSPSC Procedure QA-011, "Procedure for Storage and Retrieval of Quality Assurance Records"
- 4.10 NUSPSC Quality Assurance Manual
- 4.11 Code of Federal Regulations, 10 CFR 71.47 and 71.87
- 4.12 Code of Federal Regulations, 10 CFR 20.205

5.0 RESPONSIBILITIES

- 5.1 All users of a cask shall ensure that the following minimum requirements have been completed prior to use or operation of the cask.
 - 5.1.1 A Certificate of Compliance (C of C) for each cask and all the documents referenced by the C of C which relate to the use and maintenance of the cask are on file.
 - 5.1.2 User has registered as a user of this certified cask with the U.S. NRC in accordance with References 4.1 and 4.2.
 - 5.1.3 The cask has been inspected under a quality assurance program to verify its compliance with the terms and conditions of the issued C of C (Reference 4.3)

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5.2 All users of a cask shall comply with the following minimum requirements when using a cask.

5.2.1 The cask is loaded and closed in accordance with this procedure or a procedure which includes all provisions of this procedure.

5.2.2 The cask is loaded in accordance with the requirements and restrictions stated in C of C (Reference 4.3).

5.2.3 The shipment meets all of the applicable requirements established by the Department of Transportation, U.S. Nuclear Regulatory Commission, burial site disposal criteria and burial site licenses.

6.0 INSPECTIONS AND SURVEYS

Attachment A to this procedure can be used as a checklist in performing the following requirements:

6.1 Receipt Inspection

6.1.1 Perform radiation and external contamination surveys on both the shipping cask and the transport vehicle. Report loose and fixed contamination levels in excess of the limits stated in Reference 4.5 to the Transportation Department, NUS Process Services Corporation.

6.1.2 Inspect the tiedown lugs and shackles on cask and trailer for cracks and wear.

6.1.3 Inspect the tiedown cables for damage such as broken wires, crimped cables or frayed cables.

6.1.4 Inspect the tiedown cable ratchet binders/turn-buckles for damage.

6.1.5 Ensure that primary lid and secondary lid lifting lug covers are present.

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6.1.6 Ensure that secondary lid hold-down nuts are present.

6.2 Preshipment Inspection

Items covered under Section 6.2 may also appear in Section 8.0 of this procedure and Reference 4.6.

Redundant inspections of these items is not required. In addition, inspections of items not operated by the user, such as inspection of the secondary lid gasket when the secondary lid has not been removed, are not required. Perform the following appropriate steps:

- 6.2.1 Inspect the secondary lid gasket for cracks, nicks and tears which would affect proper sealing. Ensure the gasket has been replaced within the last twelve months.
- 6.2.2 Inspect the primary lid gasket for cracks, nicks and tears which would affect proper sealing. Ensure the gasket has been replaced within the past twelve months.
- 6.2.3 Ensure the cask ratchet binders are in proper working order and tightened.
- 6.2.4 Inspect the ratchet binder handle hold-down straps.
- 6.2.5 Ensure the cask to trailer tiedown cables are tight.
- 6.2.6 Inspect the secondary lid hold-down studs for excessive wear or cross threading.
- 6.2.7 Inspect the secondary lid hold-down nuts for wear or damage caused by cross-threading or over torquing.
- 6.2.8 Secondary lid alignment pins should engage secondary lid. Torque down secondary lid per Section 8.6.

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- 6.2.9 Ensure lock wires are installed through two secondary lid hold-down studs.
- 6.2.10 Ensure primary lid and secondary lid lift lug covers are installed.
- 6.2.11 Ensure the primary lid vent plug is properly sealed and installed.
- 6.2.12 Inspect primary lid alignment marks for flaking or fading paint.
- 6.2.13. Primary lid alignment pins should engage primary lid.
- 6.2.14 Inspect trailer tiedown points for cracking. Tighten ratchet binders.
- 6.2.15 Ensure that a leak test has been performed on the cask within the last twelve months (Reference 4.7).
- 6.2.16 Conduct radiation and contamination surveys to ensure cask meets the requirements of References 4.5 and 4.11.

7.0 CASK MOVEMENT

7.1 Removal from Trailer

If it is necessary to remove cask from trailer proceed as follows:

- 7.1.1 If cask is equipped with raincover, and it has not been removed, remove the raincover from the cask.
- 7.1.2 Loosen ratchet binders/turnbuckles as necessary to remove pins from shackles at cask end of tiedown system.
- 7.1.3 Remove pins from shackles.
- 7.1.4 Loosen cask shear blocks or retention ring as necessary.

CAUTION: CASKS ARE EQUIPPED TO BE LIFTED BY FOUR (4) LIFT LUGS ON THE CASK BODY. PRIMARY LID LIFT LUGS ARE NOT CAPABLE OF SUPPORTING THE WEIGHT OF THE CASK.

- 7.1.5 Using suitable rigging, lift cask off trailer and place cask in proper position for loading. Refer to Table 1 for empty and loaded cask weights.

7.2 Installation on Trailer

CAUTION: CASKS ARE EQUIPPED TO BE LIFTED BY FOUR (4) LIFT LUGS ON THE CASK BODY. PRIMARY LID LIFT LUGS ARE NOT CAPABLE OF SUPPORTING THE WEIGHT OF THE CASK.

- 7.2.1 Using suitable rigging, lift cask and place in proper position within the shear blocks or retaining rings provided on the trailer. See Figure 1 for proper orientation. Refer to Table 1 for empty and loaded cask weights.

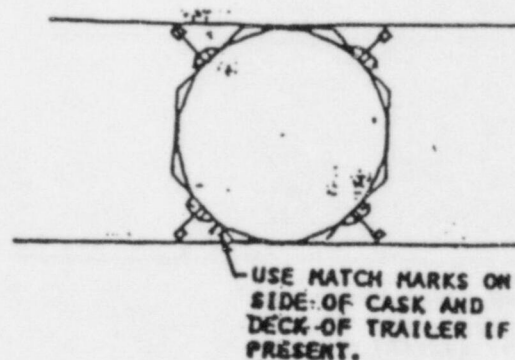


Figure 1

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- 7.2.2 Inspect tiedown lugs and shackles on cask and trailer for cracks and wear which would affect their strength.
- 7.2.3 Inspect tiedown cables to ensure they are not loose, or damaged (crimped, frayed, etc.).
- 7.2.4 Inspect tiedown ratchets/turnbuckles to ensure they are in proper working condition.
- 7.2.5 Install shackles through the end of the tiedown cables and attach to cask tiedown lugs by screwing pin through shackle and hole in lug.
- 7.2.6 Tighten ratchet binders/turnbuckles as necessary to secure cask on trailer.

8.0 CASK OPERATION AND LOADING

Refer to Table 2 for primary lid and secondary lid weights.

8.1 Primary Lid Removal

Remove the primary lid as follows:

- 8.1.1 If cask is equipped with a raincover, and it has not been removed, remove the raincover from the cask.
- 8.1.2 Release the ratchet binder handles from its storage position.
- 8.1.3 Engage the flip block to the sprocket wheel in the direction necessary to loosen the ratchet binder (See Figure 2).
- 8.1.4 Loosen the ratchet binder by pulling the handle in the appropriate direction.
- 8.1.5 Remove the ball-lock pin by depressing the top of the pin and pulling the pin through the hole in the threadless bolt (See Figure 3).

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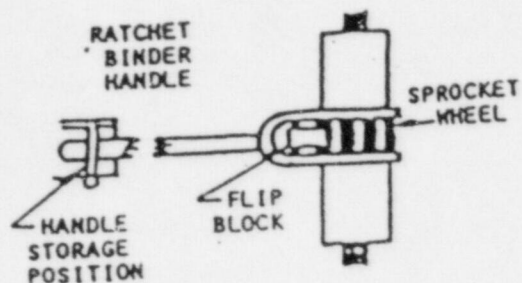


Figure 2.

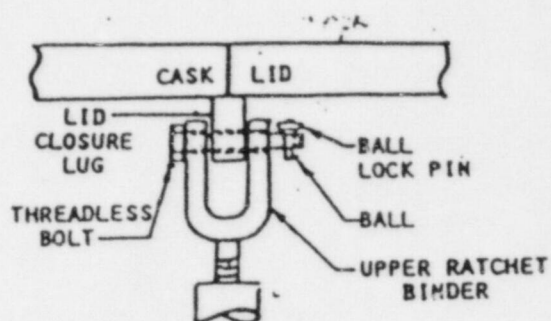


Figure 3.

- 8.1.7 Remove the three (3) cask lid lifting lug covers.

CAUTION: WHENEVER THE CASK LID IS MOVED ON OR OFF THE CASK, TREAT THE UNDERSIDE OF THE LID AS A CONTAMINATED SURFACE UNTIL A CONTAMINATION SURVEY CAN BE MADE TO VERIFY ITS STATUS.

- 8.1.8 Remove the cask lid using three (3) lifting lugs on the cask lid to accommodate suitable rigging.
- 8.1.9 Inspect the interior of the cask for free standing water. All water must be removed prior to loading and shipping.
- 8.1.10 Inspect the interior of the cask for obstructions which could affect loading or proper placement of drum pallets and liners.

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8.2 Secondary Lid Removal

Remove the secondary lid as follows:

- 8.2.1 If the cask is equipped with a rain cover, and it has not been removed, remove the rain cover from the cask.
- 8.2.2 Clip and remove the two lock wires which are installed through two (2) of the hold-down studs.
- 8.2.3 Using an open end wrench, box end wrench, manual socket wrench or socket and power driven impact wrench, only, remove all eight (8) hold-down nuts.

CAUTION: DO NOT USE ADJUSTABLE WRENCHES OR PIPE WRENCHES WHEN REMOVING HOLD-DOWN NUTS.

- 8.2.4 Remove the secondary lid lift lug cover.

CAUTION: WHENEVER THE SECONDARY CASK LID IS MOVED ON OR OFF THE CASK, TREAT THE UNDERSIDE OF THE LID AS A CONTAMINATED SURFACE UNTIL A SURVEY CAN BE MADE.

- 8.2.5 Attach a single point sling or other appropriate lifting device to the secondary lid lift lug. Remove the secondary lid and set it aside.

CAUTION: ENSURE THE SECONDARY LID IS LIFTED HIGH ENOUGH SO THAT THE LOWER SURFACE OF THE LID IS ABOVE THE TOP OF THE SECONDARY LID ALIGNMENT PINS (PINS ARE OPTIONAL) BEFORE THE LID IS MOVED HORIZONTALLY.

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8.3 Loading an Empty Liner Into the Cask

- 8.3.1 Using the slings provided, place liner in the cask.
- 8.3.2 Install shims/shoring between liner and cask as necessary to secure in position.

8.4 Loading a Prefilled Liner into the Cask

- 8.4.1 Ensure lid and all plugs or caps are installed on the liner.
- 8.4.2 Using the lifting slings provided, place the liner into the cask.
- 8.4.3 Install shims/shoring between liner and cask as necessary to secure in position, if necessary.

8.5 Loading Pallets into the Cask

Pallets may be loaded prior to placement into the cask or loaded after the empty pallet is placed into the cask. However, caution should be exercised in order to avoid damaging the drum pallet lifting slings, which will be used for the cask model being loaded.

- 8.5.1 Remove the pallet(s) from the cask, exercising caution in handling of the pallet due to potential contamination. Prior to loading containers on the pallet(s) inspect the slings on each pallet for damage or conditions which could affect safety.

NOTE: Empty pallets weigh approximately 350 lbs. each.

- 8.5.2 If a second pallet is used, place the top pallet into the cask either empty or preloaded. If two pallets are used, ensure the lower pallet slings are accessible for retrieving pallet when off-loading.

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8.6 Installing Secondary Lid

- 8.6.1 Inspect the secondary lid gaskets for cuts, nicks or other damage which may affect the sealing capabilities.
- 8.6.2 Inspect the secondary lid alignment pins (pins are optional) for excessive wear or damage.
- 8.6.3 Replace, if necessary (Reference 4.6) using the one (1) lifting lug on the secondary lid to attach suitable rigging, lift and place into the opening on the primary lid. Use alignment pins (pins are optional) to assure proper lid alignment. Be careful not to damage the gasket during installation.
- 8.6.4 Coat all threaded surfaces with anti-seize compound.
- 8.6.5 Install and hand tighten all hold-down nuts.
- 8.6.6 Tighten the secondary lid hold-down nuts using the following steps:
 - 8.6.6.1 Number hold-down nuts 1 through 8 clockwise.
 - 8.6.6.2 Torque all hold-down nuts to twenty (20) foot-pounds using the following tightening sequence: 1, 5, 3, 7, 2, 6, 4, 8.
 - 8.6.6.3 Torque all fasteners to sixty (60) foot-pounds using the following tightening sequence: 2, 6, 4, 8, 3, 7, 1, 5.
 - 8.6.6.4 Torque all hold-down nuts to one hundred (100) foot-pounds using the following tightening sequence: 3, 7, 1, 5, 4, 8, 2, 6,.
 - 8.6.6.5 Check tight all hold-down nuts to one hundred (100) foot-pounds using the (+5-0 ft-lbs).

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following sequence. 4, 5, 6, 7, 8,
1, 2, 3.

- 8.6.7 Install the secondary lid lift lug cover.
- 8.6.8 Install two (2) lock wires through two (2) of the holes provided in the secondary lid studs.

8.7 Primary Lid Installation

- 8.7.1 Inspect the primary lid gasket for cuts, nicks or other damage which may affect the sealing capabilities. Replace if necessary (Reference 4.6).

CAUTION: WHENEVER THE CASK LID IS MOVED ON OR OFF THE CASK, TREAT THE UNDERSIDE OF THE LID AS A CONTAMINATED SURFACE UNTIL A CONTAMINATION SURVEY CAN BE MADE TO VERIFY ITS STATUS.

- 8.7.2 Using the three (3) lifting lugs on the cask lid to accommodate suitable rigging, lift the cask lid and place it on the cask. Conduct a visual inspection to ensure that the painted lid alignment marker on the cask lid lines up with the painted marker on the cask body. The primary lid alignment pins should engage the primary lid. Adjust the lid position as necessary to accomplish proper alignment.
- 8.7.3 Install the threadless bolt through the upper ratchet binder connector and the lid closure lug (See Figure 3).
- 8.7.4 Install the ball-lock pin by pressing down on the top of the pin and inserting the pin through the hole in the threadless bolt.

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CAUTION: RATCHET BINDER HANDLE ROTATION CAN BECOME TIGHT WHEN LOOSENING OR TIGHTENING A RATCHET BINDER. THEREFORE, VISUAL INSPECTION IS NECESSARY TO ENSURE THAT THE ENDS OF THE RATCHET BINDER ARE MOVING TOGETHER WHEN THE HANDLE IS ROTATED TO TIGHTEN THE PRIMARY LID.

- 8.7.5 Tighten the ratchet binder by engaging the flip block to the sprocket wheel and rotate the ratchet binder handle in the direction necessary to tighten the ratchet binder.
- 8.7.6 Disengage the flip block and rotate and secure the handle to its storage position (See Figure 2).
- 8.7.7 Install the three (3) primary cask lid lifting lug covers.
- 8.7.8 If provided, install the cask rain cover.

9.0 UNLOADING THE CASK

Each licensee receiving a shipping cask with greater than Type A quantities must comply with the provisions of reference 4.12. Remove the container(s) from inside the cask as follows:

- 9.1 If the cask is equipped with a rain cover, remove the raincover from the cask.
- 9.2 Disconnect and remove the primary lid as per Section 8.1.
- 9.3 Remove contents from inside cask, being careful not to damage inside of the cask lining.
- 9.4 Perform survey of interior of cask and cask pallets if used. Contamination should not exceed limits of Reference 4.2.
- 9.5 Install pallets, if removed.

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- 9.6 Reinstall cask primary lid as per Section 8.7.
- 9.7 Ensure all lifting lug covers are accounted for and installed properly.
- 9.8 If the cask is equipped with a raincover, reinstall and attach tiedowns.
- 9.9 Prepare the empty cask for transport as per Reference 4.5.

Attachment A. Cask Inspection Form

Cask Model No.: _____ Serial No.: _____

Description of Inspection

	Receipt		Pre-Shipment	
	Para	Initials	Para	Initials
1. Radiation/Contamination Survey	6.1.1		6.2.16	
2. Tiedown Lugs and Shackles	6.1.2		6.2.15	
3. Tiedown Cables	6.1.3		6.2.5	
4. Tiedown Cable Ratchet Binders	6.1.4		6.2.15	
5. Lift Lug Covers	6.1.5		6.2.11	
6. Secondary Lid Hold-down Nuts	6.1.6		6.2.7*	
7. Secondary Lid Gasket			6.2.1*	
8. Primary Lid Gasket			6.2.2*	
9. Cask Ratchet Binders			6.2.3*	
10. Ratchet Binder Handle Straps			6.2.4*	
11. Secondary Lid Hold-down			6.2.6*	
12. Secondary Lid Guide Pins			6.2.8*	
13. Torque Down Shield Plug			6.2.9	
14. Secondary Lid Lock Wires			6.2.10	
15. Lid Vent Plug			6.2.12	
16. Primary Lid Guide Pins			6.2.13	
17. Lid Match Marks			6.2.14	

* Also Included in Reference 4.6.

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Table 1. Casks Weights (lbs.).

<u>Cask Model</u>	<u>Empty Weight (lbs.)</u>	<u>Maximum Gross Weight (lbs.)</u>
NUS-50-125	8,965	13,165
NUS-50-225	15,125	19,325
NUS-50-275	17,850	22,050
NUS-50-375	24,615	28,815

Table 2. Cask Lid Weights (lbs.).

<u>Cask Model</u>	<u>Primary Lid Weight With Secondary Lid Installed</u>	<u>Secondary Lid Weight (lbs.)</u>
NUS-50-125	953	525
NUS-50-225	2020	917
NUS-50-275	2250	1050
NUS-14-375	3354	1376

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