


NUS

PROCESS SERVICES

 A Halliburton Company

NO.

WM-014

REVISION

F

PAGE

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TITLE

OPERATING INSTRUCTIONS FOR LOADING
AND UNLOADING THE NUS 14-170 SERIES I
CASKS

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1.0 PURPOSE

The purpose of this procedure is to provide operating instructions for loading and unloading the NUS 14-170 Series 1 radioactive materials shipping casks. The NUS 14-170 Series 1 shipping casks include units with 29 inch and 16 inch secondary lids.

2.0 APPLICABILITY

This procedure shall be followed when loading or unloading an NUS 14-170 Series 1 shipping cask. This procedure may be used in its entirety as is or incorporated into the policies and procedures of a registered user.

3.0 DEFINITIONS

Shield plug and secondary lid are synonymous and maybe used in documents and references interchangeably.

4.0 REFERENCES

4.1 U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9151

4.2 QA-014 NUS Process Services Corporation Quality Assurance Program Plan

4.3 Code of Federal Regulations, Title 10 Part 71

4.4 Code of Federal Regulations, Title 49

4.5 NUS Process Services procedure WM-012 "NUS 14-170 Series I Maintenance"

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5.0 RESPONSIBILITIES

Registered users of the cask shall ensure the following.

- 5.1 A Certificate of Compliance (C of C) for this cask and all the documents referenced by the C of C which relate to the use and maintenance of the cask are on file.
- 5.2 User has registered as a user of this certified cask with the U.S. NRC in accordance with Reference 4.1.
- 5.3 The cask has been inspected under a quality assurance program to verify its compliance with the terms and conditions of the issued Certificate of Compliance.
- 5.4 The cask is loaded and closed in accordance with an appropriate written procedure.
- 5.5 The cask is loaded in accordance with the requirements and restrictions stated in the C of C.
- 5.6 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 PROCEDURE

6.1 Cask & Vehicle Receipt Inspection

- 6.1.1 Perform radiation and external contamination surveys on both the shipping cask and vehicle.
Loose and fixed contamination levels shall comply with the requirements of Reference 4.4. In the event these specified levels are exceeded, immediately notify the transportation department of NUS Process Services Corporation.

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- 6.1.2 Inspect tiedown lugs and shackles on cask and trailer for cracks and wear.
- 6.1.3 Inspect tiedown cables to ensure they are not loose or damaged (crimped, frayed, etc.). Tighten if necessary.
- 6.1.4 Inspect tiedown ratchets/turnbuckles to ensure they are in proper working conditions.
- 6.1.5 Ensure cask ratchet binders and binder accessories are in proper working condition.
- 6.1.6 Ensure that primary lid and secondary lid lifting lug covers are present.
- 6.1.7 Remove cask lid in accordance with steps 6.3.2.1 through 6.3.2.7.
- 6.1.8 Inspect primary lid gasket for cracks, nicks or tears which would affect proper sealing. If necessary, replace gasket in accordance with reference 4.5.
- 6.1.9 Inspect interior of cask for standing water. Water must be removed prior to shipment.
- 6.1.10 Inspect interior of cask for obstructions to loading.
- 6.1.11 Inspect interior of cask for defects which might affect the cask integrity.
- 6.1.12 Inspect the secondary lid holdown nuts to ensure they are all present and not damaged.

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6.1.13 Inspect the secondary lid gasket. Inspection is not required if secondary lid has not been removed and security seal is in place and intact.

6.1.13.1 Remove the secondary lid from the primary cask lid in accordance with steps 6.3.6.4 through 6.3.6.6.

6.1.13.2 Inspect the secondary lid holddown studs for damage.

6.1.13.3 Inspect the secondary lid gasket for cracks or tears which would affect proper sealing. If necessary, replace gasket in accordance with reference 4.5.

6.1.13.4 Install secondary lid in accordance with step 6.3.8 unless loading requires the secondary lid to be removed.

6.2 Removal of Cask from Trailer

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

6.2.1 If cask is equipped with raincover, and it has not been removed, remove the raincover from the cask.

6.2.2 Loosen ratchet binders/turnbuckles as necessary to remove pins from shackles at cask end of tiedown system.

6.2.3 Remove pins from shackles.

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6.2.4 Loosen cask shear blocks as necessary.

-CAUTION-

DO NOT USE CASK LID LIFTING LUGS TO LIFT CASK.

6.2.5 Using the four (4) cask lift lugs and suitable rigging lift cask off trailer and place cask in proper position for loading.

Empty cask weight with primary
lid and secondary lid in place: 36,888 lbs
Maximum loaded cask weight: 53,005 lbs

6.3 Loading Cask

Remove the primary full diameter cask lid as follows:

6.3.1 If cask is equipped with a raincover, and it has not been removed, remove the raincover from the cask.

6.3.2 Disconnect the cask lid from the cask as follows:

6.3.2.1 Release the ratchet-binder handle from its storage position.

6.3.2.2 Engage the flip block to the sprocket wheel in the direction necessary to loosen the ratchet binder (see Figure 1).

6.3.2.3 Loosen the ratchet binder by pulling the handle in the appropriate direction.

6.3.2.4 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 2).

6.3.2.5 Remove the threadless bolt by pulling the bolt through the holes in the upper ratchet binder connector and lid closure lug (see Figure 2).

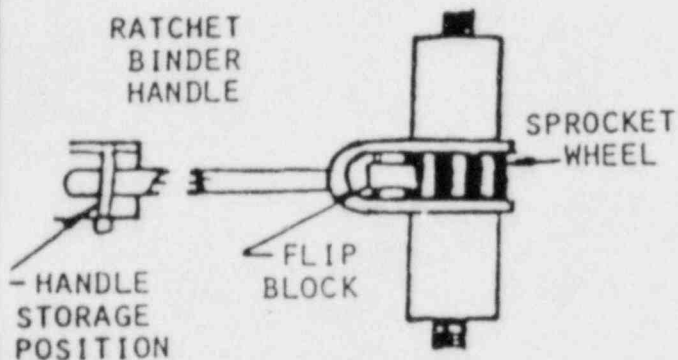


Figure 1

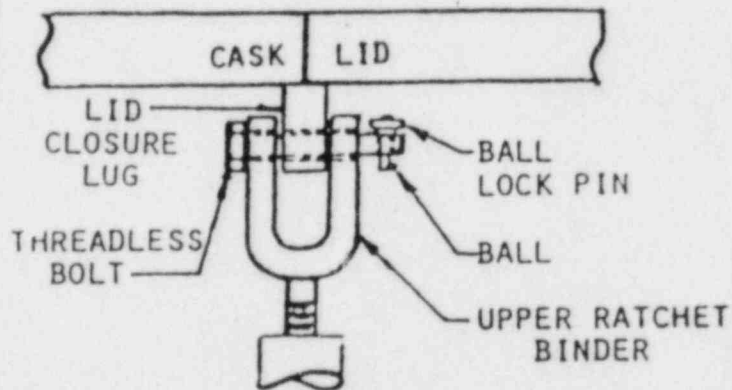


Figure 2

6.3.2.6 Remove the three (3) casks 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.

ALSO, ENSURE THAT THE CASK LID IS MOVED HIGH ENOUGH ABOVE THE CASK TOP TO AVOID DAMAGE TO THE CASK LID GUIDE PINS WHEN THE LID IS MOVED AWAY FROM OR OVER THE CASK.

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6.3.2.7 Remove the cask lid using the three (3) lifting lugs on the cask lid to accommodate suitable rigging.

6.3.2.8 Inspect interior of cask for free standing water. All water must be removed prior to loading and shipping.

6.3.2.9 Inspect interior of cask for obstructions which could affect loading or proper placement of drum pallets and liners.

6.3.3 Loading seven-drum pallets into the cask:

6.3.3.1 Using the slings provided and exercising caution in the handling of the pallet due to possible contamination, remove the top pallet from the cask. Inspect slings on both pallets for damage or conditions which could affect safety.

NOTE: Empty pallet weight - approx. 750 lbs.

6.3.3.2 Exercising caution to avoid placing drums on the pallet lift slings, load seven (7) drums on the lower pallet left in the cask. (See Figure 3 for drum placement on pallet.)

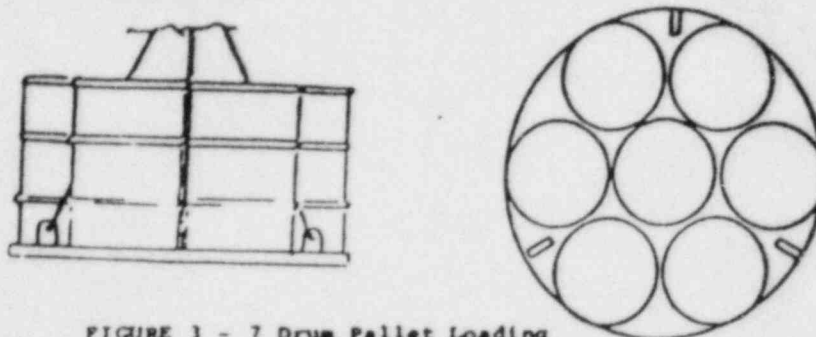


FIGURE 3 - 7 Drum Pallet Loading

NOTE: For maximum shielding, load higher dose rate drums in the center position and the positions toward the front and rear of the trailer.

- 6.3.3.3 Place the top pallet into the cask. Ensure lower pallet slings are accessible for retrieving pallet when off-loading.

Pallet Weight - 750 lbs.

Exercising caution to avoid placing drums on the pallet lift slings, load seven (7) drums on the top pallet in the cask (see Figure 3).

- 6.3.3.4 Install primary lid in accordance with step 6.3.7.

6.3.4 Loading the Seven-Drum Pallets Outside the Cask:

- 6.3.4.1 Using slings provided and exercising caution in the handling of the pallet due to possible contamination, remove both the pallets from the cask.

NOTE: Empty Pallet Weight - approx. 750 lbs.

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6.3.4.2 Inspect slings on both pallets for damage or conditions which would affect safety.

6.3.4.3 Load seven (7) drums onto each pallet (see Figure 3).

For maximum shielding, load higher dose rate drums in the center position.

6.3.4.4 Lift one of the loaded pallets and place it inside the cask. For maximum shielding, ensure proper orientation of pallet (see Note of Figure 3). Ensure slings of lower pallet are accessible for retrieving when off-loading.

6.3.4.5 Lift the other loaded pallet and place it inside the cask on the top of the first pallet. For maximum shielding, ensure proper orientation of pallet (see Note of Figure 3).

NOTE: Ensure easy access to the pallet lifting slings for removal of pallet at burial site.

6.3.4.6 Install primary lid in accordance with step 6.3.7.

6.3.5 Loading a Prefilled Liner into the Cask:

6.3.5.1 Ensure lid and all plugs or caps are installed on liner.

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6.3.5.2 Using the lifting slings provided, place liner into the cask.

6.3.5.3 Install shims/shoring between liner and cask as necessary to secure in position, if necessary.

6.3.5.4 Install primary lid in accordance with step 6.3.7.

6.3.6 Installing and loading empty liner in cask:

6.3.6.1 Using the slings provided, place liner in the cask.

6.3.6.2 Install shims/shoring between liner and cask as necessary to secure in position.

6.3.6.3 Install primary lid in accordance with step 6.3.7.

6.3.6.4 Remove the 8-3/4" secondary lid holddown nuts.

6.3.6.5 Remove the secondary lid lifting lug cover.

6.3.6.6 Exercising caution due to possible contamination of the underside of the secondary lid, remove the secondary lid.

6.3.6.7 Load liner through secondary lid opening.

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6.3.6.8 Install the liner lid, plugs or caps onto the liner.

6.3.6.9 Place the secondary lid on the cask using the secondary lid guide pins for proper positioning.

NOTE: Care should be taken to avoid damage to the gasket.

6.3.6.10 Secure the secondary lid by installing and tightening the 8-3/4" secondary lid holddown nuts in accordance with torquing steps provided in step 6.3.8.3.

6.3.6.11 Install the secondary lid lifting lug cover.

6.3.6.12 If cask is equipped with raincover, install raincover.

6.3.7 Installation of Primary Cask Lid

6.3.7.1 Inspect primary lid gasket for cuts, nicks or other damage which may affect the sealing capabilities. If necessary, necessary, replace in accordance with referene 4.5.

-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.

ALSO, ENSURE THAT THE CASK LID IS MOVED HIGH ENOUGH ABOVE THE CASK TOP TO AVOID DAMAGE TO THE CASK LID GUIDE PINS WHEN THE LID IS MOVED AWAY

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6.3.7.2 Using the three (3) lifting lugs on the primary lid to accommodate suitable rigging, lift the primary lid and place it on the cask using the alignment pins for proper positioning. If the primary lid guide pins were damaged and are missing, ensure that the holes in the cask lid line up with the guide pin positions. 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. Adjust the lid position as necessary to accomplish proper alignment.

6.3.7.3 Install the threadless bolt through the upper ratchet binder connector and the lid closure lug (see Figure 2).

6.3.7.4 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.

-CAUTION-

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

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6.3.7.5 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.

6.3.7.6 Disengage the flip block and rotate and secure the handle to its storage position (see Figure 1).

6.3.7.7 Install the three (3) primary cask lid lifting lug covers and three (3) cask lift lug covers.

6.3.7.8 Install security wire through 1/8 inch hole in cask lifting lug and 1/8 inch hole in primary lid.

6.3.8 Installation of Secondary Lid:

6.3.8.1 Inspect the secondary lid gasket for cuts, nicks or other damage which may affect the sealing capabilities. If necessary, replace in accordance with reference 4.5.

6.3.8.2 Using the one (1) lifting lug on the secondary lid to attach suitable rigging, lift and place secondary lid into the opening on the primary lid. Use alignment pins to assure proper lid alignment. If the alignment pins are damaged, verify proper lid alignment using the painted alignment markers on the secondary lid and the primary cask lid. Be careful not to damage the gasket during installation.

6.3.8.3 Two types of secondary lids are utilized on the NUS 14-170 Series I shipping casks. The appropriate torquing sequence for the NUS 14-170 Series I cask with the 16 inch secondary lid will result in a 55 foot-pound torque and for the 29 inch secondary lid, a 100 foot pound torque.

Torquing Sequence for the 16 inch
Secondary Lid Only

Secure the 16 inch secondary lid by installing and tightening the secondary lid stud nuts in accordance with the following torquing sequence.

- Coat all threaded surfaces with an anti-seize compound.
- install and hand-tighten all fasteners.
- Torque all fasteners to twenty (20) foot-pounds using the following tightening sequence:
 - o Opposite pair randomly selected
 - o Opposite pair at 90°
 - o Opposite pair at 45°
- Torque all fasteners to forty (40) foot-pounds using the following tightening sequence:
 - o Opposite pair different than those selected above
 - o Opposite pair at 90°
 - o Opposite pair at 45°
- Torque all fasteners to fifty-five (55) foot-pounds using the following tightening sequence:
 - o Opposite pair different than those selected above

- o Opposite pair at 90°
- o Opposite pair at 45°
- Check tight all fasteners to one hundred (100) foot-pounds (+5 -0 ft-lbs).

6.3.8.4 Install the secondary lid lifting lug cover.

6.3.8.5 Install shipping security wire through the 1/8 inch hole in the one secondary lid stud.

6.3.9 Cask Installation on Trailer:

-CAUTION-

DO NOT USE CASK LID LIFTING LUGS TO LIFT THE CASK.

6.3.9.1 Using the four (4) cask lift lugs and suitable rigging, lift cask and place in proper position within the shear blocks provided on the trailer. See Figure 4 for proper orientation.

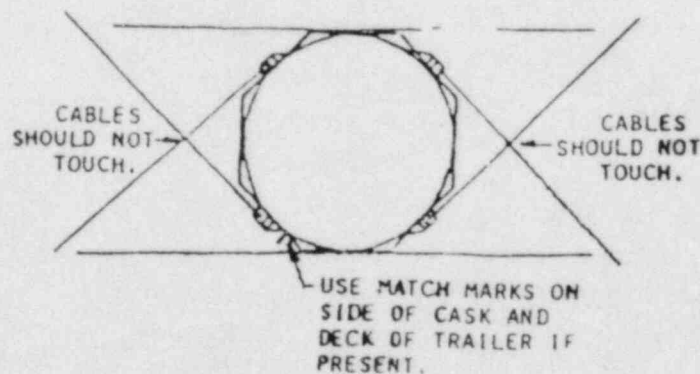


Figure 4

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

6.4 Unloading the Cask

Remove the container(s) from inside the cask as follows:

- 6.4.1 If the cask is equipped with a rain cover, remove the raincover from the cask.
- 6.4.2 Disconnect and remove the primary lid as per Section 6.3.2.
- 6.4.3 Remove contents from inside cask, being careful not to damage inside of the cask lining.

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- 6.4.4 Perform survey of interior of cask and cask pallets if used. Contamination should not exceed limits of Reference 4.4.
- 6.4.5 Install pallets, if removed.
- 6.4.6 Reinstall cask primary lid as per Section 6.3.7.
- 6.4.7 Ensure all lifting lug covers are accounted for and installed properly.
- 6.4.8 If the cask is equipped with a raincover, reinstall and attach tiedowns.
- 6.4.9 Prepare the empty cask for transport as per Reference 4.4.

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MAY 31 1985

MEMORANDUM FOR: Steve Scott, Chief
Document Management Branch, TIDC

FROM: Charles E. MacDonald, Chief
Transportation Certification Branch, FC, NMSS

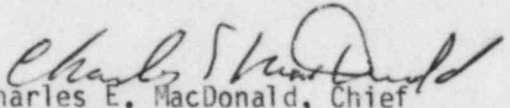
SUBJECT: PROPRIETARY DATA - PUBLIC DOCUMENT ROOM

The following application and/or drawings marked "Proprietary" should be placed in the NRC Public Document Room:

NUS Process Services Corporation application dated
May 7, 1985

Authorization:

NUS letter dated May 28, 1985.


Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: NUS ltr
dtd 05/28/85
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