8/15/78

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)
DISTRIBUTION FOR INCOMING MATERIAL 50-261

REC: SCHWENCER A
NRC

ORG: UTLEY E E
CAROLINA PWR & LIGHT

DOCDATE: 08/09/78
DATE RCVD: 08/14/78

DOCTYPE: LETTER NOTARIZED: NO
SUBJECT:

COPIES RECEIVED
LTR 1 ENCL 1

RESPONSE TO NRC LTR DTD 06/12/78...FURNISHING INFO CONCERNING PHYSICAL LAYOUT OF SUBJECT FACILITY"S HANDLING AREAS AND HEAVY LOADS WHICH ARE HANDLED OVER SPENT FUEL...W/ATT SUPPORTING AND RELATING INFO.

PLANT NAME: H B ROBINSON -- UNIT 2

REVIEWER INITIAL: XJM
DISTRIBUTOR INITIAL: mc

********** DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS **********

GENERAL DISTRIBUTION FOR AFTER ISSUANCE OF OPERATING LICENSE.
(DISTRIBUTION CODE A001)

FOR ACTION: BR CHIEF ORB#1 BC**W/7 ENCL

INTERNAL:
REG FILE**W/ENCL
I & E**W/2 ENCL
HANAUER**W/ENCL
AD FOR SYS & PROJ**W/ENCL
REACTOR SAFETY BR**W/ENCL
EEB**W/ENCL
J. MCGOUGH**W/ENCL
NRC PDR**W/ENCL
OELD**LTR ONLY
CORE PERFORMANCE BR**W/ENCL
ENGINEERING BR**W/ENCL
PLANT SYSTEMS BR**W/ENCL
EFFLUENT TREAT SYS**W/ENCL

EXTERNAL:
LPDR'S
HARTSVILLE, SC**W/ENCL
TERA**W/ENCL
NSIC**W/ENCL
ACRS CAT B**W/16 ENCL

Thisc Appl

DISTRIBUTION: LTR 40 ENCL 39
SIZE: 6P+35P

CONTROL NBR: 782190063

********** THE END **********

cp

CP&L
Carolina Power & Light Company

August 9, 1978

FILE: NG-3514(R)

SERIAL: GD-78-2207

Office of Nuclear Reactor Regulation
Division of Operating Reactors
ATTENTION: Mr. A. Schwencer, Chief
Operating Reactors Branch No. 1
United States Nuclear Regulatory Commission
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
CONTROL OF HEAVY LOADS NEAR SPENT FUEL

Dear Mr. Schwencer:

Your letter of June 12, 1978, requested information on the physical layout of the Robinson fuel handling areas and on the heavy loads which are handled over spent fuel. Submittal of our responses has been delayed a few days beyond your requested schedule due to in-house workload. We hope that this does not cause you undue inconvenience. Your questions and the Carolina Power & Light Company responses for Robinson Unit No. 2 are listed below:

Question 1. Provide a diagram which illustrates the physical relation between the reactor core, the fuel transfer canal, the spent fuel storage pool and the set down, receiving or storage areas for any heavy loads moved on the refueling floor.

Response: Refer to Figure 1 (attached) which is a diagram of the Robinson Unit 2 fuel handling areas.

Question 2: Provide a list of all objects that are required to be moved over the reactor core (during refueling), or the spent fuel storage pool. For each object listed, provide its approximate weight and size, a diagram of the movement path utilized (including carrying height) and the frequency of movement.

336 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

A001
S/11

Response:

Reactor Core

A) The reactor vessel head is removed from and returned to the vessel along path 1 as shown in Figure 2 once per refueling.

Weight - Approximately 57 Tons
Dimension - 189 Inches in Diameter
Carrying Height - 30 Feet Above Reactor Core

B) The reactor upper internals are removed from and returned to the vessel along path 2 as shown in Figure 2 once per refueling.

Weight - 43 Tons
Dimensions - 170 Inches in Diameter, 15 Feet High
Carrying Height - 15 Feet Above Reactor Core

C) The reactor coolant pump motors are normally moved only when the reactor vessel head is in place. Occasionally, during refueling, the motors may be moved near the reactor vessel cavity, but never over the open vessel, during motor maintenance activities. The areas noted as 1, 2, and 3 on Figure 3 are the areas used for reactor coolant pump maintenance work.

Weight - 68,700 pounds
Dimensions - 81 Inches in Diameter, 148 Inches High
Carrying Height - 40 Feet Above Reactor Core

Spent Fuel Storage Pool

A) The GE-IF-300 spent fuel cask is the only heavy load carried over the spent fuel storage pool.

Weight - Approximately 70 Tons
Dimensions - 6 Feet in Diameter, 18 Feet Long
Carrying Height - About Two Feet Above the Spent Fuel Pool Surface

Question 3: What are the dimensions and weights of the spent fuel casks that are or will be used at your facility?

Response: The only spent fuel cask CP&L plans to use is the GE-IF-300 which weighs approximately 70 tons and is approximately 6 feet in diameter and 18 feet long.

Question 4: Identify any heavy load or cask drop analyses performed to date for your facility. Provide a copy of all such analyses not previously submitted to the NRC staff.

Response: In lieu of detailed cask drop analyses, CP&L has committed to the use of single failure-proof cranes and lifting apparatus. Refer to the response to Question 7 for the appropriate references.

Question 5: Identify any heavy loads that are carried over equipment required for the safe shutdown of a plant that is operating at the time the load is moved. Identify what equipment could be affected in the event of a heavy load handling accident (piping, cabling, pumps, etc.) and discuss the feasibility of such an accident affecting this equipment. Describe the basis for your conclusions.

Response: Due to the location of equipment required for safe shutdown of the plant, the only area to which this item applies is the reactor containment building. The reactor building polar crane operation would not normally occur during reactor operation because of the radiation levels in the vicinity of the crane control cab. In addition, normal circumstances requiring the movement of heavy loads usually dictate that the plant be in a cold shutdown condition prior to moving these loads.

Question 6: If heavy loads are required to be carried over the spent fuel storage pool or fuel transfer canal at your facility, discuss the feasibility of a handling accicent which could result in water leakage severe enough to uncover the spent fuel. Describe the basis for your conclusions.

Response: The only load which could result in significant damage to the spent fuel pool would be the spent fuel cask and, as stated above, it could not be part of a credible accident due to the redundancy of the crane and lifting apparatus.

There is no accident involving the fuel transfer canal that could result in uncovering the spent fuel because the elevation of the canal is, at a minimum, six feet above the top of the fuel in the spent fuel pool.

Question 7: Describe any design features of your facility which affect the potential for a heavy load handling accident involving spent fuel; e.g., utilization of a single failure-proof crane.

Response: Carolina Power & Light Company utilizes a single failure-proof crane at Robinson. Details of the crane were provided to the NRC by letter NG-74-1246 on October 17, 1974 to Mr. Karl R. Goller.

Question 8: Provide copies of all procedures currently in effect at your facility for the movement of heavy loads over the reactor core during refueling, the spent fuel storage pool, or equipment required for safe shutdown of a plant that is operating at the time the move occurs.

Response: The Robinson Plant does not have any special procedures for movement of heavy loads other than the spent fuel cask movement procedure. Refer to the attached REFUELING INSTRUCTION FT 15.2.

Question 9: Discuss the degree to which your facility complies with the eight (8) regulatory positions delineated in Regulatory Guide 1.13 (Revision 1, December, 1975) regarding Spent Fuel Storage Facility Design Basis.

Regulatory Position 1: The spent fuel storage facility (including its structures and equipment except as noted in paragraph 6 below) should be designed to Category I seismic requirements.

Response: The spent fuel storage pit is of a Class I seismic design as described in the H. B. Robinson FSAR, Section 9.5.2.

Regulatory Position 2: The facility should be designed (a) to keep tornadic winds and missiles generated by these winds from causing significant loss of watertight integrity of the fuel storage pool and (b) to keep missiles generated by tornadic winds from contacting fuel within the pool.

Response: The extent to which the Robinson Fuel Handling Building conforms to Regulatory Position 2 above is covered in CP&L's response to AEC questions of March 24, 1969 and September 17, 1969 in Appendices II and VII, respectively, of Volume 4 of the Robinson FSAR.

Regulatory Position 3: Interlocks should be provided to prevent cranes from passing over stored fuel (or near stored fuel in a manner such that if a crane failed, the load could tip over on stored fuel) when fuel handling is not in progress. During fuel handling operations, the interlocks may be bypassed and administrative control used to prevent the crane from carrying loads that are not necessary for fuel handling over the stored fuel or other prohibited areas. The facility should be designed to minimize the need for bypassing such interlocks.

Regulatory Position 5: The spent fuel storage facility should have at least one of the following provisions with respect to the handling of heavy loads, including the refueling cask:

a. Cranes capable of carrying heavy loads should be prevented, preferably by design rather than by interlocks, from moving into the vicinity of the pool; or

b. Cranes should be designed to provide single failure-proof handling of heavy loads, so that a single failure will not result in loss of capability of the crane-handling system to perform its safety function; or

c. The fuel pool should be designed to withstand, without leakage that could uncover the fuel, the impact of the heaviest load to be carried by the crane from the maximum height to which it can be lifted. If this approach is used, design provisions should be made to prevent the crane, when carrying heavy loads, from moving in the vicinity of stored fuel.

Response: The spent fuel cask handling crane is a 300-ton rated, single failure-proof crane. Interlocks are provided which prevent cask handling crane movement of heavy loads over the stored spent fuel racks at all times. The cask handling crane can maneuver to place the cask in the sit-down area of the spent fuel pool. Refer to Plant Operating Manual, Volume 9, Procedure FT-13.

Regulatory Position 4: A controlled leakage building should enclose the fuel pool. The building should be equipped with an appropriate ventilation and filtration system to limit the potential release of radioactive iodine and other radioactive materials. The building need not be designed to withstand extremely high winds, but leakage should be suitably controlled during refueling operations. The design of the ventilation and filtration system should be based on the assumption that the cladding of all of the fuel rods in one fuel bundle might be breached. The inventory of radioactive materials available for leakage from the building should be based on the assumptions given in Regulatory Guide 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors" (Safety Guide 25).

Response: A controlled leakage building totally encloses the spent fuel pit area and provides an appropriate ventilation and filtration system to limit the potential release of radioactive iodine and other radioactive materials. Refer to the H. B. Robinson FSAR, Section 11.2.1.

Regulatory Position 6: Drains, permanently connected mechanical or hydraulic systems, and other features that by maloperation or failure could cause loss of coolant that would uncover fuel should not be installed or included in the design. Systems for maintaining water quality and quantity should be designed so that any maloperation or failure of such systems (including failures resulting from the Safe Shutdown Earthquake) will not cause fuel to be uncovered. These systems need not otherwise meet Category I seismic requirements.

Regulatory Position 8: A seismic Category I make-up system should be provided to add coolant to the pool. Appropriate redundancy or a back-up system for filling the pool from a reliable source, such as a lake, river, or on-site seismic Category I water-storage facility, should be provided. If a back-up system is used, it need not be a permanently installed system. The capacity of the make-up systems should be such that water can be supplied at a rate determined by consideration of the leakage rate that would be expected as the result of damage to the fuel storage pool from the dropping of loads, from earthquakes, or from missiles originating in high winds.

Response: The location of the spent fuel pit cooling and drain piping and connections are such that a major rupture of any or all drains or pipes would not drain the coolant in the pit to below the level of the fuel elements. In addition, a back-up cooling system is available in the event of coolant leakage. Refer to the H. B. Robinson FSAR, Section 9.3.

Regulatory Position 7: Reliable and frequently tested monitoring equipment should be provided to alarm both locally and in a continuously manned location if the water level in the fuel storage pool falls below a predetermined level or if high local-radiation levels are experienced. The high-radiation-level instrumentation should also actuate the filtration system.

Response: Monitoring and alarm instrumentation are provided for the spent fuel pit area to detect inadequate cooling and excessive radiation levels. Refer to the H. B. Robinson FSAR, Section 11.2.

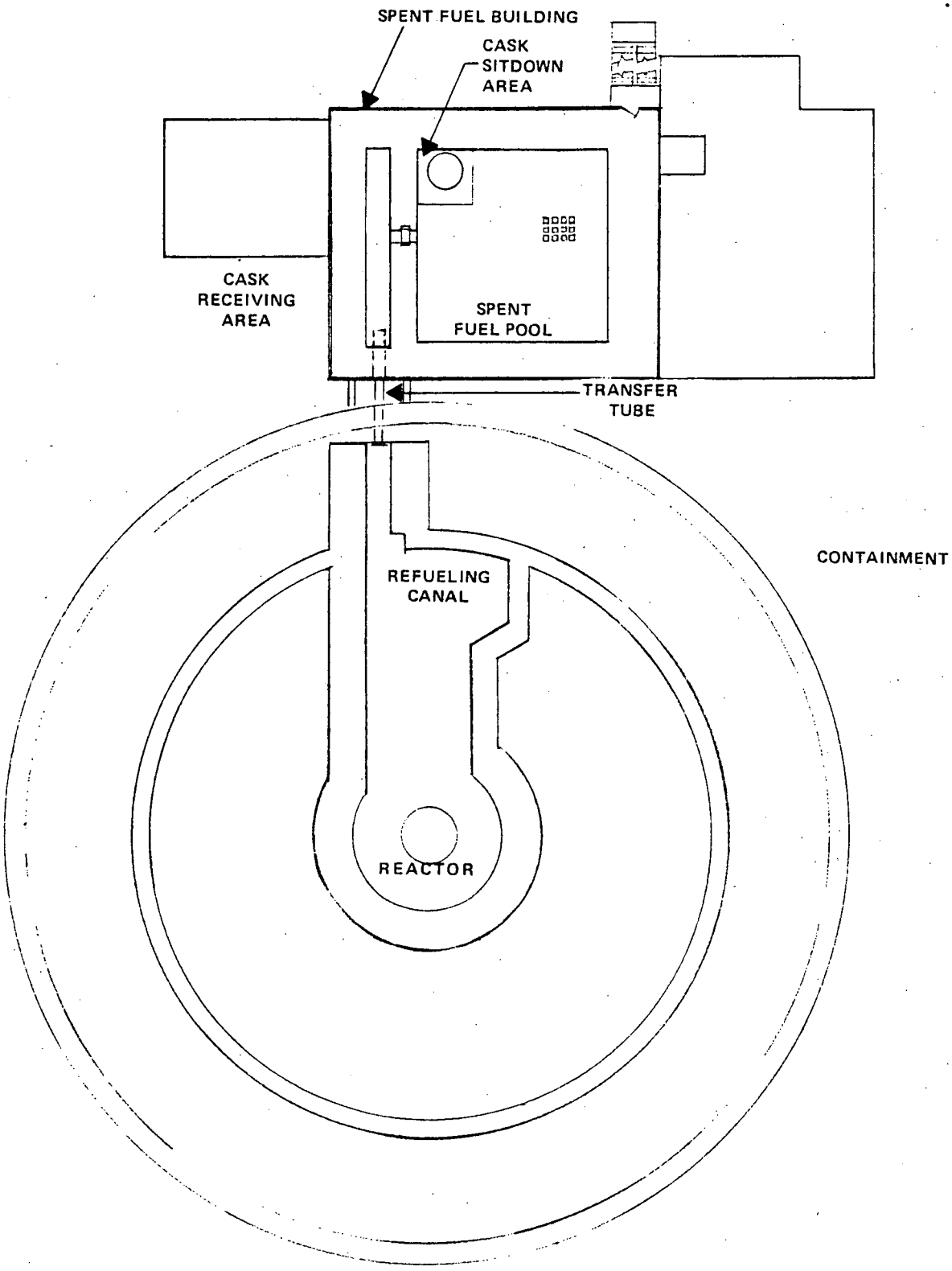
Yours very truly,

E. E. Utley
Senior Vice President
Power Supply

DCS/mf
Attachments

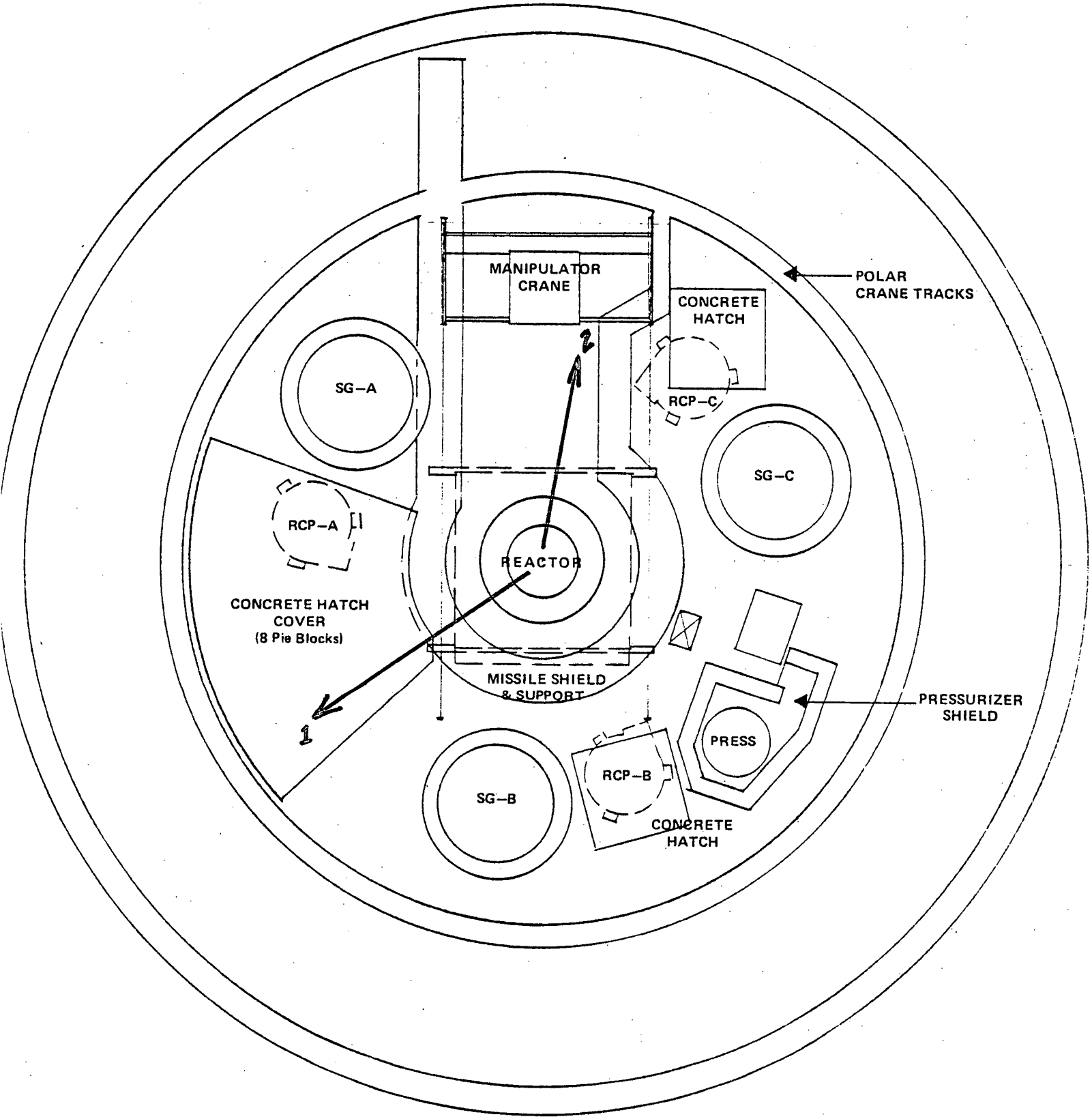
H. B. ROBINSON – UNIT NO. 2
FUEL HANDLING AREAS

FIGURE 1



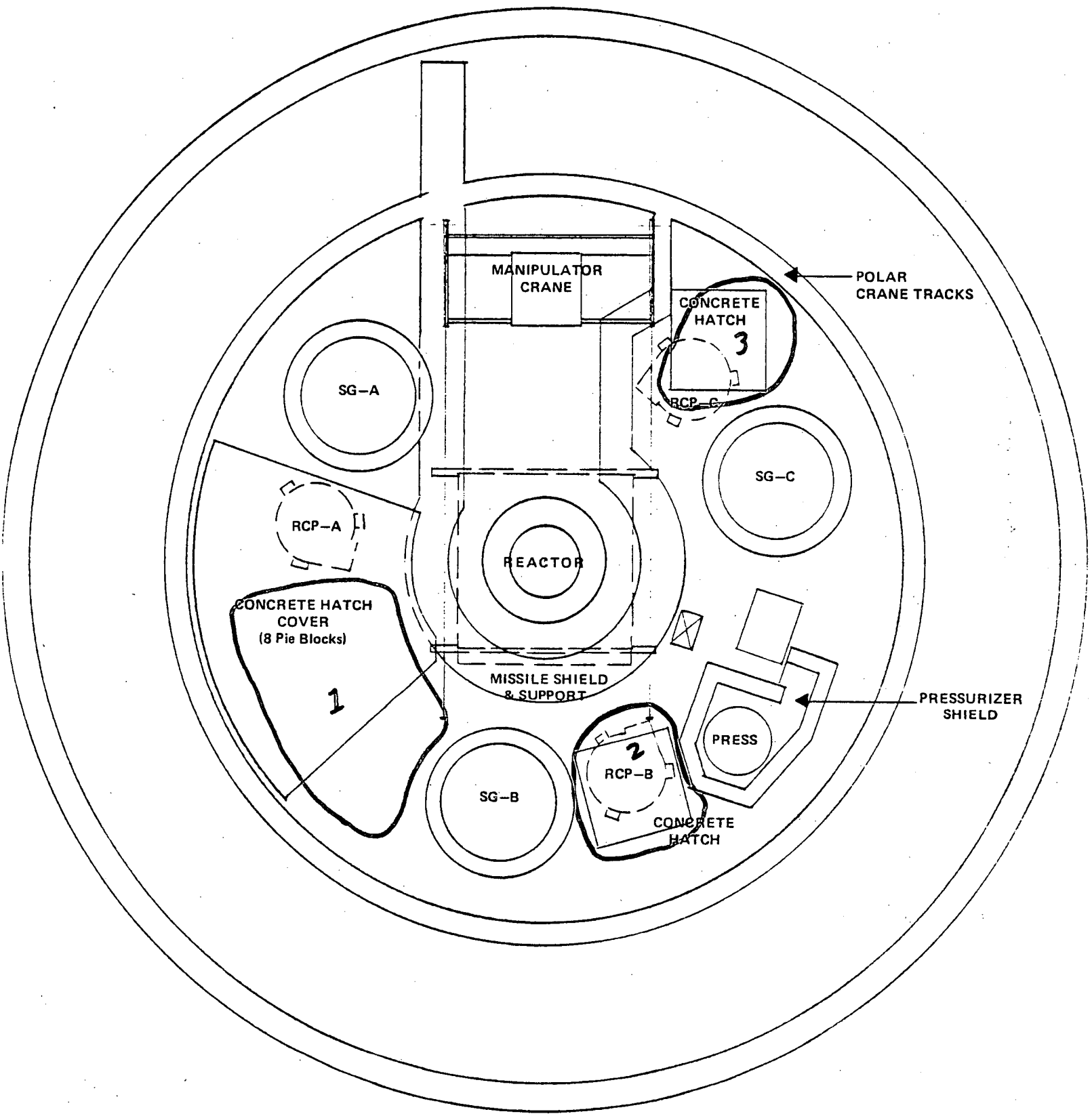
H. B. ROBINSON – UNIT NO. 2
REFUELING FLOOR

FIGURE 2



H. B. ROBINSON – UNIT NO. 2
REFUELING FLOOR

FIGURE 3



CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON UNIT NO. 2

REFUELING INSTRUCTION

FT 15.2

SPENT FUEL CASK HANDLING INSTRUCTIONS

FOR

LOADING AND SHIPPING OF PWR FUEL

OCTOBER 13, 1977

Recommended

Approval: R E Mangum — Operating Supervisor — 10-14-77 Date

Approved: J B McGuire — Plant Manager — 10/14/77 Date

INTRODUCTION

1.0 These instructions are designed to ensure the safe operation of the cask handling equipment and the proper loading of the spent fuel cask. The IF-300 cask consists, basically, of a shielded vessel (cask) mounted on an equipment skid with an integral cooling system. The equipment forms a completely self-contained unit for the shipment of irradiated reactor fuel. The IF-300 cask is designed primarily for rail shipment; however, it may be transported by truck for short distances.

2.0 Precautions

2.1 The cask and handling tools are massive and heavy, and many pinch-point hazards exist.

2.2 Even a very slow swing of the suspended cask can transfer a large amount of energy upon impact, which may result in severe injury to personnel and damage to equipment.

1.1 2.3 The cask is 18 feet high in the vertical position, thereby, constituting a fall hazard. Minimize the time the cask is in the SFP or the decon area when not attached to the crane.

2.4 Improper rigging can cause a cask or equipment to drop, possibly resulting in injury to personnel or damage to equipment.

2.5 Personnel should be informed that the surface of the loaded cask at equilibrium temperature may be uncomfortably hot.

2.6 Improper installation of the closure head can result in radiation-streaming when the cask is lifted from a storage pool. Radiation monitoring should be performed during specified periods in the handling operation when high streaming potential exists. Health Physics shall cover operations for potential radiation hazards.

2.7 Ensure spent fuel pit level is 12" below the air vents to prevent spillover during submersion of fuel cask.

2.8 Ensure 2 persons are in the SFP crane cab when out of the "Restricted Path" mode and operating in the spent fuel building.

1.7 1.5 2.9 Do NOT operate the spent fuel cask crane when the ambient temperature is equal to or less than 33°F (as indicated by Unit No. 2 computer meteorological data). This applies to cask lifting operations only.

3.0 Initial Conditions

3.1 Ensure the spent fuel cask crane hook has been inspected within the previous 12-month period or last refueling period (PT-38.0).

Date Inspected _____ _____

3.2 Ensure the spent fuel cask crane has been functionally tested per PT-37.0 within the previous 30 days.

Date Tested _____ _____

3.3 Ensure the cavity globe valves and the cask cavity have been hydrostatically tested at 400 PSIG within the previous 12 months.

Date Tested _____ _____

3.4 Ensure the cask cavity relief valve has been tested for cracking pressure verification and leakage examination as per PT 39.0.

Date Tested _____ _____

3.5 Information on designated elements has been received from Fuels Group in Raleigh. Ensure acceptability of fuel records by completing Form 1, Fuel Shipment Data. _____

3.6 A visual inspection of the redundant lifting yoke and its equipment has been performed.

3.7 A radiological survey and smear survey has been performed on the rail car and enclosures. _____

3.8 A general inspection for damage of the rail car, auxiliary equipment and enclosures was performed. _____

3.9 Calibration of equipment for this procedure has been performed. Refer to Form No. 3. _____

3.10 Remove the cover to the decon pad and the roof cover and wall of the spent fuel pit. (The roof and wall cover of the SFP may be removed at later specified procedure step). _____

3.11 A check (in last 12 months) was performed to ensure that the neutron shielding tanks are filled with a 50/50 mixture of ethylene glycol and water.

4.0 Instructions

4.1 Position the rail car and set brakes. Chocks should be placed beneath the wheels as an additional precaution. _____

4.2 Open the aluminum enclosure as follows:

a. Unlock and remove all padlocks (4, Figure 4-1).

b. Refer to Figure 4-1. Remove the two retaining pins (1), or two padlocks (4), on the front corners of the large enclosure.

c. Unlatch the six enclosure handles in turn as follows:

(1) Rotate the keeper (8) until the handle (2) is released.

(2) Rotate the handle (2) out 90 degrees while pulling up on the handle.

(3) Release the keeper (8). Hold the handle up in the raised position and rotate the handle back into the enclosure.

(4) With the handle raised to its limit, rotate the handle into the retaining notch (3) to hold the handle pin in the unlocked position.

d. Remove the two additional padlocks (4) securing the lock handles (5) (one on each side of the enclosure). Raise the handles

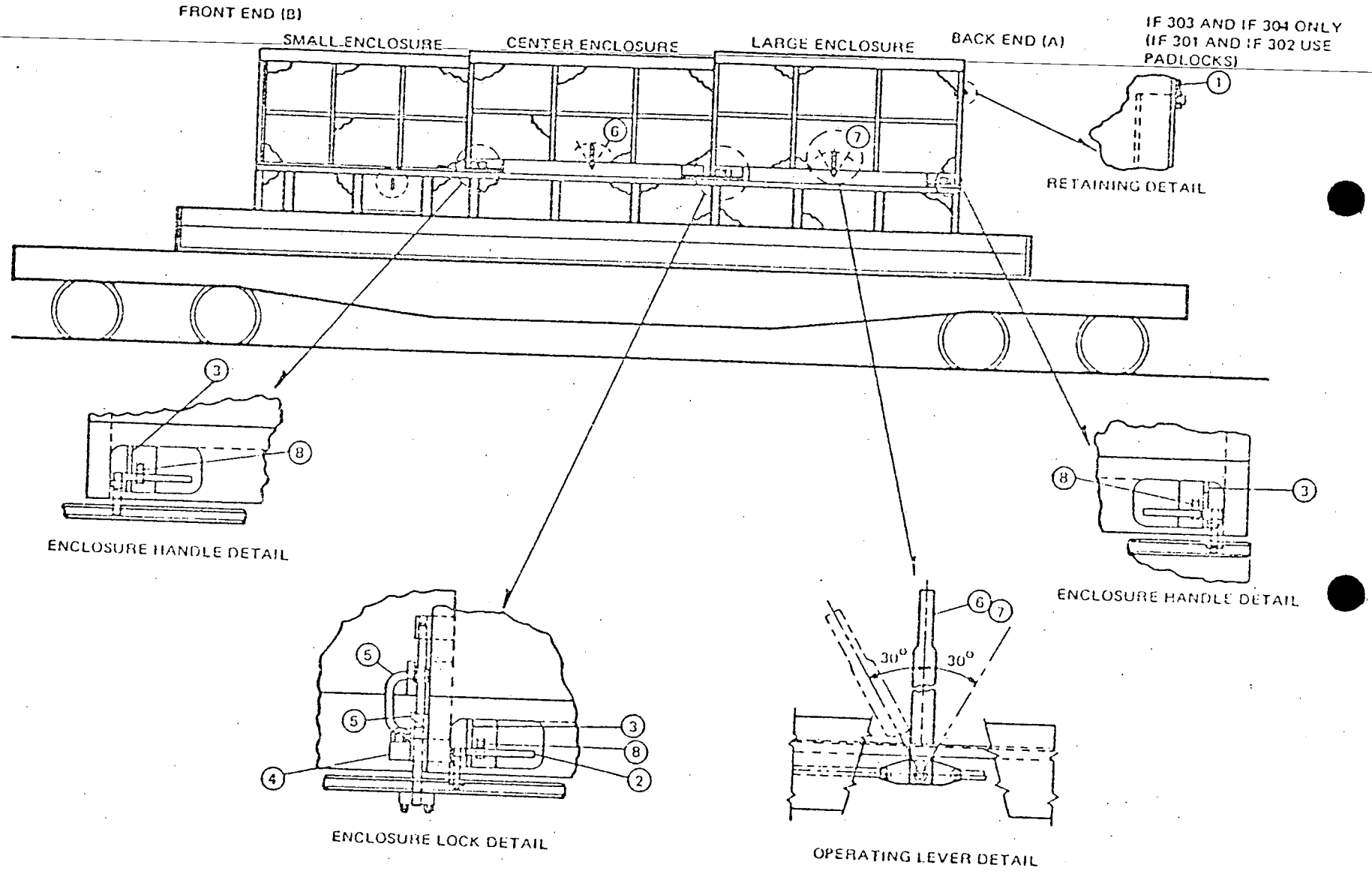


Figure 4-1. Enclosure Lock and Handle Details

to their limit and rotate them outward 90 degrees into the retainers to hold them open.

e. Grasp the operating levers on either side of the center enclosure and push the handles toward the small enclosure. The levers will rotate approximately 30 degrees (as shown in Figure 4-1) to lift the enclosure onto the rollers. One man on either side is sufficient to move the enclosure. A coordinated effort will prevent binding.

f. Continue pushing on the levers until the center enclosure is over the small enclosure and has come against the stops on the rails.

g. Release the levers to lower the center enclosure off the rollers and maintain it in position over the small enclosure after reaching the stops.

h. Using the operating levers (7) on either side of the large enclosure, perform Steps e. through g., above, until the large enclosure is positioned over the center and small enclosures.

WARNING

The cask surface is contaminated.
Protective clothing may be required.

Enclosure opening complete. _____

4.3 Perform a radiological survey on contact and at three feet from the cask surface. Perform a smear survey. _____

4.4 Perform a general inspection of the cask and auxiliary equipment.

_____

4.5 Extend the air ducts as follows:

a. Remove the two rectangular band couplings (1,Figure 4-2), one per upper air duct.

CAUTION

Each coupling should be loosened sufficiently to slide onto the duct. Excessive spreading will damage the coupling.

b. Raise the four lock pins (two (2) on the outside of each duct). Raise each pin until it clears the top of the guide (3), then turn the pin so that it rests in the guide and is retained in the open position.

c. Remove the lock pin (9) on each side of the cask, between the vertical duct support leg and the walkway on the skid.

d. Raise and lock the vertical duct support leg to the diagonal support leg, using the removed lock pins. Grasp the duct support tube (4) and extend the duct outward to its limit. Extension of the air ducts completed. _____

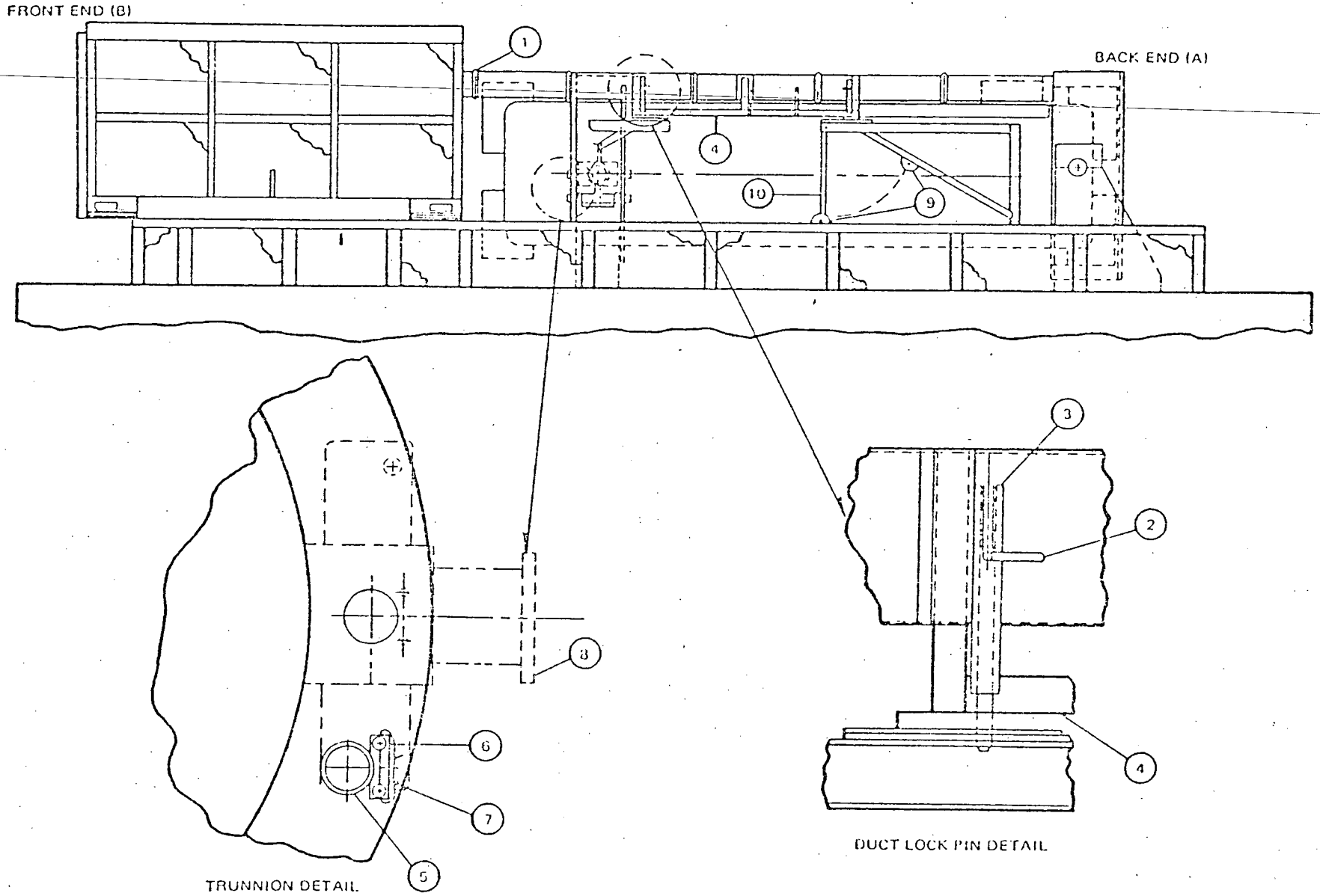


Figure 4-2. Duct Lock and Lifting Trunnion Details

1.8

4.6 Remove the cavity valve box cover bolts using a 3/4 inch hexagonal key wrench and remove covers (2). (Weight is approx. 300 lb.) Remove the Neutron Shield tank valve box covers (2). _____

4.7 Disengage the overflow drain hose from the upper valve box. _____

4.8 Remove the four (4) bolts and lower the hinged end panel to a horizontal position at the bottom of the IF-300 cask. _____

4.9 Remove the cask tiedown pins. To remove the two 3-inch tiedown pins (5, Figure 4-2) which secure each side of the cask to the front saddle, remove the four bolts (6) and the two keepers (7) which hold the two pins in place, using a 3/4-inch wrench. The insertion and removal tool (Part No. M22-21) may be used for this. _____

4.10 Install the lifting trunnions. The tiedown pins are used to pin the trunnion in place. Secure in place using the keepers and bolts noted in Step 4.9. The insertion and removal tool may be used. _____

4.11 Attach the lifting yoke to the cask crane main hook. All lifts over the spent fuel pit will require the redundant yoke. The nonredundant yoke may be used elsewhere. _____

4.12 Remove the cask thermocouple connection lead away from cask. _____

4.13 Attach the yoke to the cask in the following manner: _____

1.8

a. Using Never-Seez Pure nickel Special Lubricant or equivalent, lubricate the yoke hooks.

b. Using the crane, move the lifting yoke perpendicular to the axial centerline of the cask until the yoke hooks are between the cask trunnions and the top end of the cask, with the open sides of the yoke hooks toward the bottom end of the cask.

c. Using the crane, carefully lower the yoke and guide the yoke hooks to straddle the cask until the open area of the hooks is positioned to accept the cask trunnions.

d. Move the yoke laterally along the centerline of the railroad car toward the bottom end of the cask until the yoke hooks are directly under the cask trunnions.

CAUTION

This operation should be accomplished without using tag lines or other aids in positioning the yoke in order to avoid possible misalignment during the lift.

e. Raise and traverse the crane trolley/bridge parallel to the centerline of the railroad car until the yoke hooks have simultaneously and fully engaged the trunnions.

f. Stop the crane and verify that the yoke hooks are properly engaged to the trunnions.

4.14 Verify that the enclosure is fully open, the tilting cradle is free of obstructions, the rail car brakes are set, and wheels are chocked. _____

4.15 Using the crane, lift and rotate the cask to a vertical position above the tilting cradle by carefully raising the crane hook and moving the crane trolley/bridge parallel to the centerline of the railroad car in order to maintain vertical load lines.

WARNING

To avoid injury to personnel or damage to equipment, make certain that visual and oral communication is maintained at all times between the crane operator and cask handling personnel. The visibility of the crane operator may be limited.

A few degrees before the cask reaches the full-upright position, slowly move the trolley/bridge parallel to the centerline of the railroad car so that the vertical lift will maintain the full load of the cask as it reaches the full upright position. This will prevent the cask from rocking on the tilting cradle at the top of the arc. This pivot point is 3 inches off-center; therefore, "rockover" should not occur.

CAUTION

This operation must be done carefully. Serious damage to the tilting cradle and railroad car may occur if the cask hangs in the tilting cradle due to misalignment.

Check that the cask is perpendicular to the railroad car in both directions by holding a 3-foot level to the side of the cask. The cask must be perpendicular before the vertical lift is made. _____

4.16 Lift the cask from the cradle. Stop when the cask clears the cradle by approximately two feet and stabilize the load. Hold for one minute to check brakes. _____

4.17 Lower the cask by six inches and hold for one minute to check brakes. _____

4.18 If the brakes are verified to be functional, move the cask to the decon pad and lower into the lower half of the redundant yoke. _____

4.19 Retract the air ducts and close the enclosure on the rail car to protect the equipment and prevent plant personnel accidential contamination. _____

4.20 Disengage the yoke, and remove lockwire from valves and closure head sleeve nuts. _____

4.21 Close the Decon Building Roof and wash down the cask to remove transit dirt. _____

1.10

1.1

4.22 Fill the cask with DI water as follows:

a. Remove the valve caps (dust covers) from the vent and drain valves in the upper and lower valve boxes on the cask.

b. Connect a hose from cask drain Snap-tite fitting in the lower valve box to the DI manifold Snap-tite fittings, ST-4 (Figure 4.4).

c. Connect a hose from the cask vent Snap-tite fitting in the upper valve box to the vent manifold Snap-tite fitting ST-5.

WARNING

Possible airborne contamination may occur from the cask vent when filling. Ensure proper venting as per the procedure.

d. Open the cask vent and drain valves.

1.8

CAUTION

The cask valve handles can be broken if tightened too tight.

e. Open CD-7 and DI water supply, DW-284.

f. When the cask is full, close DW-284. (When flow indication occurs at the vent manifold flow meter the cask is full).

g. Close CD-7 and the cask vent and drain valves.

h. Remove the hoses from the cask Snap-tite fittings.

4.23 Remove the sleeve nuts as follows:

a. Ensure no gage pressure exists in the cask cavity and the beginning with nut number one, proceed clockwise and loosen the 32 closure head sleeve nuts. Due to the head seal preload, each nut should be slackened 10 to 15 degrees, and the sequence repeated as required.

NOTE: Step a. above, must be performed with care. The total preload is approximately 1/2 inch of gap between flange faces. Each complete slackening cycle gains less than 1/64 inch of gap. A twin head torque wrench is used for this operation. If a nut does not loosen, retighten the nuts on either side of that nut to 500 foot-pounds of torque. This will take some of the preload from the nut. It can then be loosened.

b. Remove all but four closure head sleeve nuts, leaving one in each quadrant, 90 degrees apart. Use sleeve nut removal tool MFR-C-10012. Place the sleeve nuts in a storage location.

1.1 4.24 If not already done, remove the roof and wall cover of the spent fuel pit. Remove the Decon Building roof.

4.25 Connect the main crane hook to the redundant yoke and check the operability of the control system prior to latching to the cask.

4.26 Attach the redundant yoke to the cask as follows:

a. Ensure the cables and turnbuckles on the yoke for head removal are adjusted to the same length prior to engaging the head.

b. Raise the crane hook and cask lifting yoke. Center the yoke over the cask for attachment of the lifting yoke cables to the cask closure head. Connect the four yoke lifting cables to the closure head, using the shackles provided.

CAUTION: The cables must remain slack at all times, except when the yoke is centered over the cask. This prevents the possibility of tipping the cask or breaking the cables.

c. Lower the yoke until the cables have slackened sufficiently to permit traversing the yoke 9 to 15 inches. The hooks of the yoke will then clear the trunnions.

d. Engage the lifting yoke to the cask lifting trunnions. Lower the yoke parallel to the cask until the hooks are slightly below the trunnions (the open portion of the hooks should be facing in the direction of the valve boxes). Traverse and raise the yoke until both trunnions are fully engaged.

e. Open the cask vent valve (V). Connect a short length of hose (about 2 feet) to the vent valve. This opens the Snaptite valve and permits venting of the cask while in the pool. _____

4.27 With the cask fully seated into the lower half of the redundant yoke (weight on lower half), use the yoke controls to lower the redundant yoke assembly latching arms. Once the engagement assemblies are seated, actuate the pins to latch the redundant yoke. Jog each arm up to remove all slack at the connection. _____

4.28 With the crane in "Restricted Path" mode, move the cask to the spent fuel pit and attach a plywood shield (3/4") to the bearing surface of the redundant yoke. _____

4.29 With the crane in "Restricted Path" mode, move the spent fuel cask into position for lowering into the spent fuel pit. _____

NOTE

During the first use of the cask at the reactor site index marks should be made on the X and Y axes of crane hook travel so that the crane hook and lifting yoke may be returned to the exact position for closure head replacement when the cask is loaded. In addition, index marks should be made indicating the yoke elevation at the time the load transfers from the crane hook to the pool floor and indicating the yoke elevation at the time the yoke hooks clear the bottoms of the cask trunnions (when the yoke is disengaged from thy cask). If index marks are not use, an alternate method of crane alignment may be substituted.

4.30 With the valve boxes on the East side commence to lower the cask into the pool. Wet all surfaces with DI or primary as it is lowered to reduce the adherence of the contaminants. _____

4.31 Stop down travel when the cask flange is 1 foot above the surface of the pool. Remove and store the four remaining sleeve nuts.

4.32 Resume down travel until the cask rests on the bottom of the pool.

4.33 Disengage the redundant yoke lower half. Move the engagement assembly latching arms to the full up position.

CAUTION

The head cables must remain slack at all times, except when the yoke is centered over the cask. This prevents the possibility of tipping the cask or breaking the cables.

4.34 Remove the yoke and cask head as follows:

a. Resume down travel of the crane hook about 10 inches until the yoke hooks clear the bottom of the cask trunnions. Then remove the crane from the "Restricted Path" mode.

b. Move the crane hook west approximately 10 inches until the yoke hooks are completely free of the trunnions.

CAUTION

The closure head cables must remain slack and prevented from becoming taut while the crane is moving laterally; excessive lateral travel of the crane hook will tip the cask and may result in major damage to equipment.

c. Raise the crane hook about 20 inches until the bottoms of the yoke hooks clear the cask trunnions.

d. Move the crane hook laterally to recenter the yoke over the top of the cask in accordance with the crane index marks. Replace the crane in the "Restricted Path" mode.

CAUTION

Be sure that the four cables tauten at the same time. If they do not, the cables may be of unequal length or the hookup is not over the center of the cask. Adjust as necessary.

e. Carefully raise the crane hook so that the closure head cables become taut and the closure head lifts off the cask. Closely observe the cask for any indication of cask movement during the lifting of the closure head. When the head is completely clear of the cask, raise it out of the water. Rinse all surfaces with DI or primary water. Remove the crane from the "Restricted Path" mode. Move the head to the decon area, keeping it low to the floor of the spent fuel building to minimize radiation levels. Store the head on wooden blocks and do not allow any material to contact the seal ring. Disconnect shackles from head and store the yoke. The head should be marked to maintain proper orentation.

4.35 After disconnecting from the yoke, replace the wall and roof cover on the spent fuel pit. _____

4.36 Establish operation of HVE-15A for fuel movement. Total run time since last tested for iodine remove efficiency shall not exceed 720 hours. Humidity upsteam of the filter shall not exceed 70% during fuel movement. A negative differential pressure shall be established across the spent fuel pit confinement structure. 1.3

Radiation Monitor (R-5) Operating (Initials)	_____	
HVE-15A Running (Initials)	_____	
Total run time since last test	_____	Hr.
Humidity less than 70% (Initials)	_____	
Negative pressure differential (Initials)	_____	
Pool temperature	_____	^{o}F
Pool Level	_____	Ft.
Pool Boron Concentration (>1950ppm)	_____	ppm

4.37 Using the spent fuel handling tool load the elements selected into the cask in sequential order of the cell numbers. Refer to Figure 4-3 for location of cells.

NOTE: Should any of these assemblies have visual characteristics which would make the advisability of shipping them questionable, they should not be loaded and the next sequential alternate assembly should be substituted in its place. A list of alternate assemblies which may be substituted are listed below. Notify the cognizant engineer of all substitutes. 1.4

Spent Fuel Location	Cell No.	Element ID No.	Time	Date	Initials
_____	1	_____	____	_____	_____
_____	2	_____	____	_____	_____
_____	3	_____	____	_____	_____
_____	4	_____	____	_____	_____
_____	5	_____	____	_____	_____
_____	6	_____	____	_____	_____
_____	7	_____	____	_____	_____

List of Assemblies which may be substituted. 1.4

_____ _____ _____ _____ _____ _____ _____

1.8 1.2 Verify each fuel assembly identification number when the assembly is removed from the spent fuel racks and placed in the cask. _____

Upon completion of the fuel transfer, shut down HVE 15A and restart HVE-15. Shutdown the humitity control system. _____

1.8 1.4 1.1 4.38 If the last closure of the cask head seal was #8 or greater, replace the seal ring.

This Closure # _____ Serial # (If Replaced) _____

_____

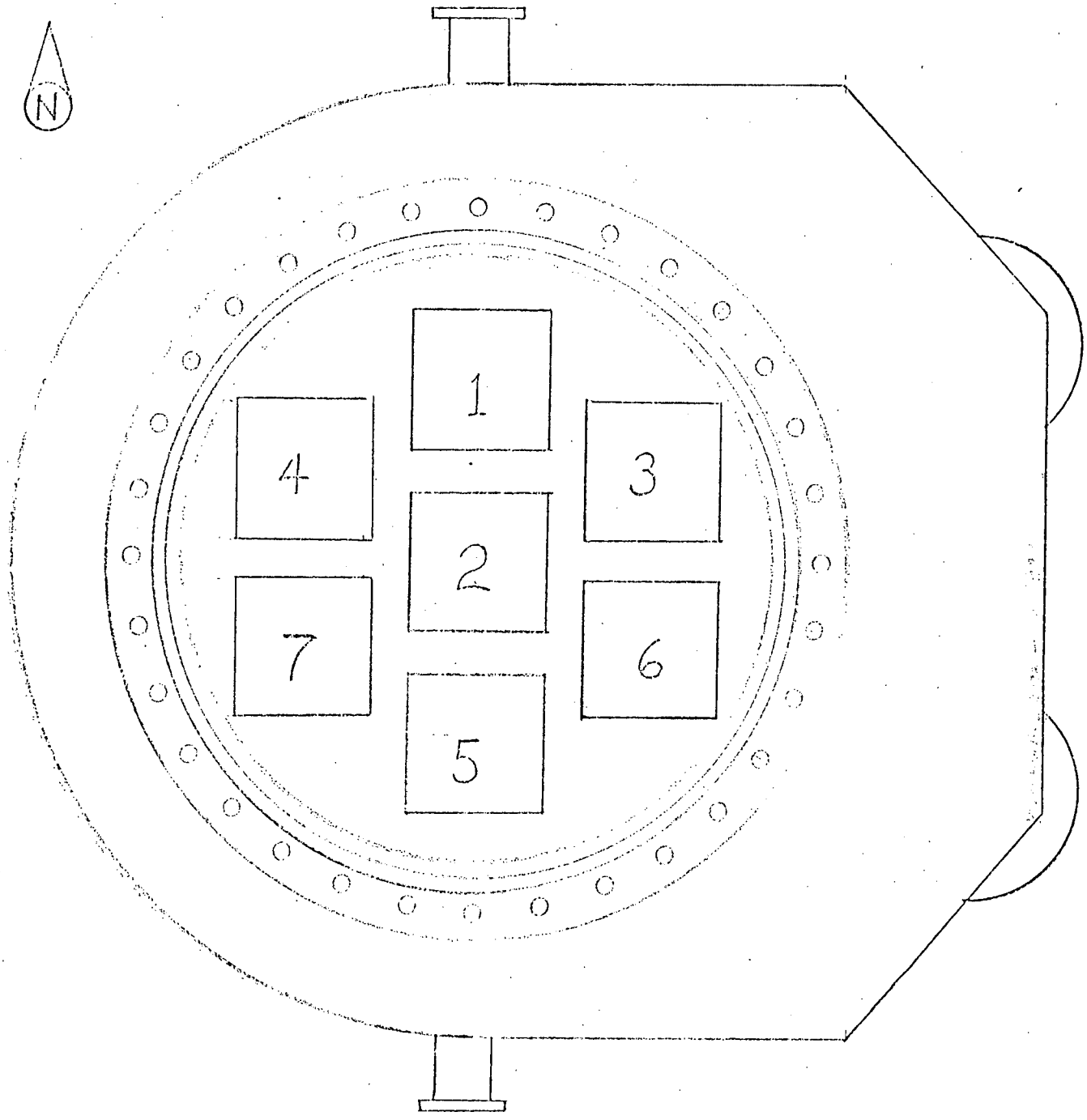


FIGURE 4-3

CASK CELL LOCATIONS

4.39 Remove the wall and roof cover of the spent fuel pit. _____

4.40 Reattach the yoke to the main hook of the crane and proceed with attachment of the cask closure head to the yoke. Ensure identical orientation of the head, yoke, and the cables are used at this point as compared to the removal process. Check the operability of the yoke control system prior to attaching to the cask. _____

CAUTION

The following operation requires great care and skill. Tolerances between the head and cask are small. All contact between the head and cask must be very gentle to avoid damage to the seal ring, guide pins, and studs.

4.41 Move the closure head over the pool to the index marks. Place the crane in "Restricted Path" mode. _____

4.42 Commence lowering the closure head into the pool, spraying down all parts entering the water. _____

NOTE

Due to the position of the cask closure head which is hanging about 1 degree from the perpendicular and swinging slightly), the cask may not align exactly under the crane trolley index marks. Slight lateral adjustments of the crane may be necessary to assure that the closure head is directly over the cask. Remove from "Restricted Path" mode as required.

4.43 Seat the closure head as follows:

a. Carefully lower the closure head over the cask so that the holes in the closure head engage the guide pins on the cask.

b. Continue lowering the crane hook to the index marks on the cable, so that the closure head is seated on the cask and sufficient slack exists in the lifting cables to permit attachment of the yoke to the cask.

c. Make the following observations to ascertain that the closure head is seating properly.

(1) Observe the flow of air bubbles around the closure head as the gasket enters the cask. A uniform pattern of bubbles completely around the cask indicates proper seating. Excess bubbling on one side indicates a cocked condition.

(2) Ascertain that all four cables slacken simultaneously.

(3) Observe the penetration of the guide pins to see that they have the same relative seating position observed during closure head removal with the cask in the pool. Skill and experience is required for accurate observation.

(4) Using an underwater television camera, periscope, or other method inspect the gap between the closure head and the cask, which should be uniformly about 1/2 inch around the cask.

NOTE: The gasket support ring on the closure head must uniformly penetrate the cask cavity about 2 inches for proper gasket seating.

d. Corrective actions which may be necessary if the closure head becomes cocked include:

CAUTION: Watch for cask movement to prevent the possibility of tipping the cask or breaking the cables.

(1) Slowly raise the closure head from the guide pins. When clear of the guide pins, laterally move the crane trolley about ½ inch toward the low side of the cocked head.

(2) Re-seat the closure head. Inspect for correct seating. Repeat several times if necessary, making slight lateral adjustments to the crane trolley travel.

(3) If this fails, it may be necessary to adjust the length of the cables between the closure head and the yoke. This is accomplished by bringing the closure head out of the pool, and placing it on a pedestal. Loosen the set screws, adjust the turnbuckles, and tighten the set screws. Raise the closure head above the floor and check with a level for a slope which is parallel to the bottom of the pool. Return the closure head to the pool and resume operations.

NOTE: The need for the cable adjustment indicates that the closure head was not parallel to the bottom of the pool because of improper initial adjustment of the cables or because the pad at the bottom of the pool is not level. If the latter is true, the slope of the pad must be determined as accurately as possible in order that the cables may be properly adjusted. Some trial and error may be necessary.

(4) If the closure head still does not seat properly, a guide pin or stud may have been bent during removal operations. In order to inspect for this condition, the cask must be unloaded. Refer to paragraph 4.37 and transfer the spent fuel back to their original locations. Disconnect the closure head from the yoke and transfer the cask from the pool to the decontamination pad. A machinist's square shall be used to check for a bent condition of any guide pin or stud.

Verify seating of the closure head. _____

WARNING
RADIATION HAZARD

A high radiation field is present directly above the cask cavity opening while the closure head is removed. Appropriate protective measures must be taken in accordance with established procedures. _____

4.44 Relat[illegible] the yoke and cask for removal [illegible]om the pool as follows:

a. Remove the crane from the "Restricted Path" mode. Move the crane hook laterally (away from the valve boxes on the cask) until the yoke hooks clear the cask trunnions as indicated by the index marks on the crane trolley.

b. Lower the crane hook until the yoke hooks clear the bottoms of the cask trunnions. Verify the position by means of the index marks on the crane cables.

c. Move the crane hook laterally to the index mark centering the hook and yoke over the cask. Replace the crane in the "Restricted Path" mode.

d. Carefully raise the crane hook until the yoke hooks have engaged the cask trunnions as indicated by the yoke position and cable index mark.

e. Stop the crane and verify that the yoke hooks are properly engaged to the trunnions.

f. Lower the engagement assembly latching arms until seated on the lower half of the redundant yoke.

g. Actuate the latching pins and ensure latched.

h. Jog both arms up to remove all slack.

WARNING
RADIATION HAZARD

Monitor the cask, as it approches the surface of the pool and emerges, in accordance with radiation protection procedures established at the reactor site. If radiation streaming exists (>2.0R/hr) during lift of the cask from the pool, stop the lift and lower the cask back into the pool until streaming ceases. Ascertain the cause of streaming and correct. Streaming may result from improper sealing of the closure head.

4.45 Carefully raise the crane hook until the cask lifts off the floor of the fuel storage pool. Stop the crane and check the rigging for proper engagement. Continue raising the cask, monitoring continuously as the top of the cask approaches the surface of the pool. Stop the lift when the top of the cask reaches the level of the pool curb and install four closure head sleeve nuts, one in each quadrant, as a precautionary measure. Close the cavity vent valve.

NOTE

In performing Step 4.45 above, take care to prevent dropping the closure head sleeve nuts ito the pool.

4.46 Using a spray wand, or hose, thoroughly spray the top of the cask. Operate the crane to slowly continue raising the cask from the pool so that the cask is thoroughly washed with clean water. Remove the plywood shield from the lower half of the reduntant yoke and store in the SFP. Using

the crane, transport the cask from the fuel storage pool to the decon area in "Restricted Path" mode. Carefully lower the cask onto the decon pad. Attach thermocouple wire to cask prior to setting down cask. _____

4.47 Attach a temperature recorder (calibrated to accept Type K chrome-Alumel thermocouple) to the cask thermocouple and start monitoring continuously. Compare the temperature data taken to temperature-pressure graphs (provided by Raleigh Fuels Group) to ensure compliance to ship spent fuel. (Reference Figures 4.5, 4.6 and 4.7) Complete Form #4. _____

1.10

WARNING
RADIATION
HAZARD

A radiation field will exist around the gap between the cask and closure head which will diminish as the closure head is tightened.

WARNING

Depending upon the heat load of the fuel, it may be necessary to flush the cask to maintain a safe working temperature on the cask surface. Flushing is required if the thermocouple reading exceeds 180 degrees Fahrenheit. Refer to Paragraph 4.55.

1.8

1.1 4.48 Disconnect the lower half of the yoke. Remove the head lifting cables and the upper yoke from the cask and store the yoke. _____

4.49 Close the roof cover on the decon area and the confinement structure of the spent fuel pit. Decon of Cask may begin. _____

4.50 Remove the four nuts from the head. Remove the short vent hose from the cask and attach a hose from the cask vent to the vent manifold. Open the cavity vent valve and manifold valves to vent the cask. _____

4.51 Clean all sleeve nuts and studs and apply Never-Seez Pure Nickel Special Lubricant, or equivalent, to threads and turning surfaces. _____

4.52 Tighten the closure head sleeve nuts. Proceed as follows:

a. Establish parallelism between the glange faces by adjusting the nuts as required. Tool Numbers M22-15 and M22-8 may be used.

b. Check parallelism by using a suitable set of feeler gages.

c. Start tightening the nuts in the sequence stamped on the top of the closure head, applying 100 foot-pounds of torque for the first two complete cycles. Re-check parallelism. Adjust if necessary by tightening down only on the high side.

d. Continue with two complete cycles at 300 foot-pounds. Re-check parallelism. Adjust if necessary by tightening down only on the high side.

e. Continue torquing at 650-foot pounds until the closure head is within 1/32 inch of metal-to-metal contact with the cask body. Re-check parallelism and adjust if necessary every three or four cycles.

f. Reduce the torque to 370-foot pounds. Continue the torquing operation until metal-to-metal contact is achieved, either through an indication of 0.005 or less gap between the surfaces or by going through a complete cycle during which no nuts will rotate.

g. Power-operated torque wrenches may be used for this operation.

NOTE: Approximately 16 to 20 tightening cycles will be required to close the gap between the cask and the closure head. Care must be taken to ensure that this gap is decreased evenly so that the surfaces remain essentially parallel to avoid cocking the closure head. If this occurs, the closure head must be carefully unbolted, and the tightening operation resumed from the beginning.

CAUTION: It is mandatory that the closure head is fully tightened and that metal-to-metal contact exists with the cask body. This is a requirement of NRC Certificate of Compliance Number 9001.

h. Closure head verified fully tightened. _____

i. Lockwire the closure head sleeve nuts. _____

4.53 Pressure test the cask cavity as follows:

a. Remove the short length of hose from the cask vent valve and close the vent valve. Connect a pressure gauge to the cask vent valve and open valve.

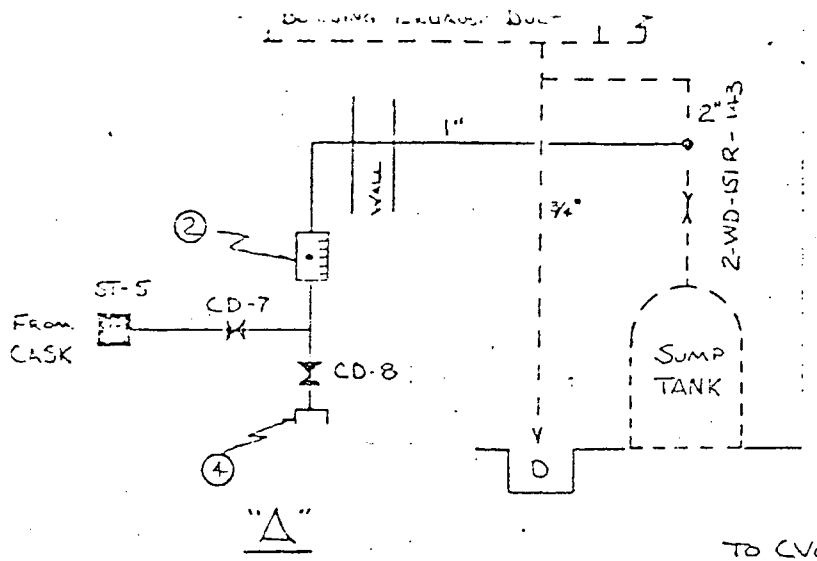
b. At the cask drain manifold (Fig. 4.4): Close CD-1 and CD-2; connect the high pressure pump discharge to the hydro connection (ST-2) and open CD-4; attach a hose from ST-1 to the cask at its drain connection.

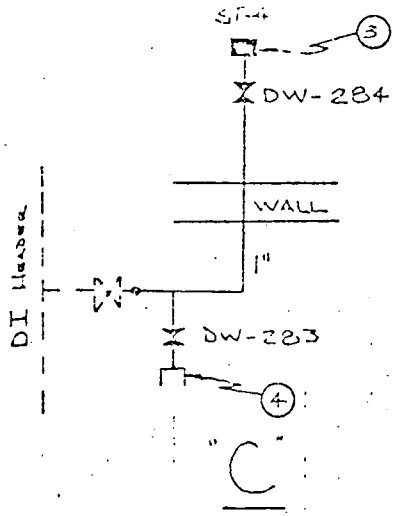
c. Connect a hose from the suction side of the high pressure pump to the DI header (Fig. 4.5) and open DW-284.

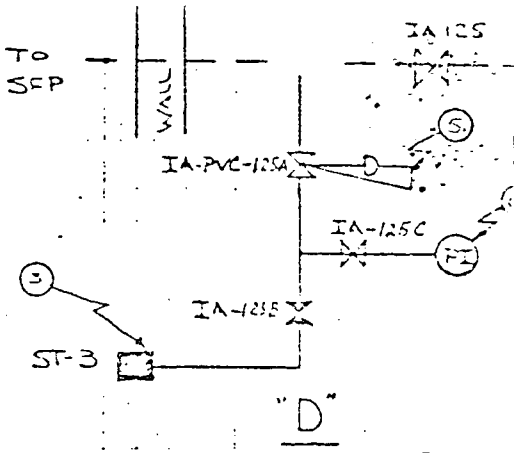
d. Start the high-pressure pump and slowly open the cask drain valve (D). When pressure (as measured at the pressure gauge mounted at the cask vent valve) reaches $200 \begin{smallmatrix}+5\\-0\end{smallmatrix}$ psig, close the cask drain valve. Stop the pump (P), close DW-284, and CD-4 and disconnect the hose from the cask drain valve.

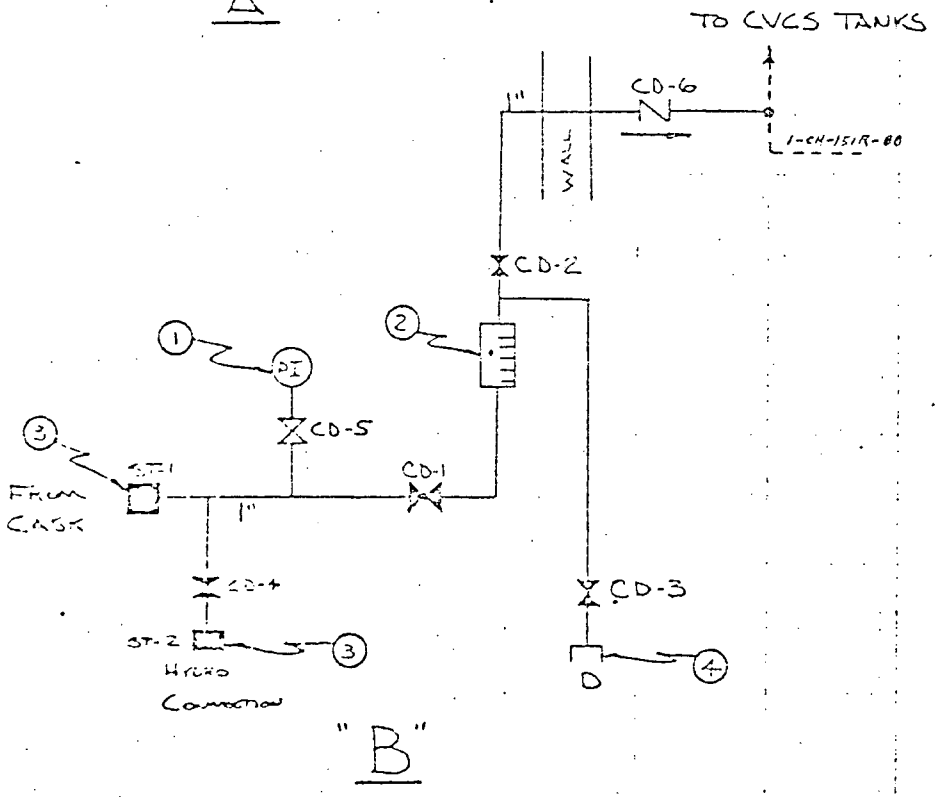
e. Observe the pressure gage and record the pressure and temperature. Hold for 10 minutes and again note the pressure and temperature. If the pressure changes, determine the cause, make necessary repairs, and repeat Section 4.53 as required. Inspect all valves, valve flanges, and the closure head flange for indications of leakage.

1.1 1.10









ITEM NO.	DESCRIPTION
1	0-500 PSIG TEST GAUGE (6" DIA MIN)
2	0-50 GPM BALL FLOW INDICATOR
3	SNAP TITE COUPLINGS
4	CROW'S FOOT FITTING
5	0-100 PSIG ADJUSTABLE SELF CONTAINED PRESSURE REGULATOR (10 CFM MIN.)
6	0-100 PSIG PRESSURE GAUGE

A. VENT MANIFOLD
B. DRAIN MANIFOLD
C. D.I. MANIFOLD
D. INSTRUMENT AIR. MANIFOLD

FIGURE 4.4

FORM 4

CAVITY PRESSURE - TEMPERATURE DATA

SFP TEMPERATURE ________ °F

CASK LEFT POOL		CAVITY PRESSURE (PSIG)	CAVITY TEMPERATURE (°F)	AMBIENT TEMPERATURE (°F)
TIME	ELAPSED TIME			

f. After the test is complete, remove the hoses from the DI header and the high pressure pump.

NOTE: Cask jacket leakage may be detected by the presence of water at the flange, vent valve, drain valve, or relief valve. Corrective action must be determined at the reactor site. This will normally require replacement of a part which will require unloading of the cask.

Value	Initial Reading	Final Reading
Pressure	_____	_____
Temperature (Cavity)	_____	_____
Temperature (Ambient)	_____	_____

1.10

Comments: _____

_____

_____

Pressure Test Accepted. _____

4.54 Drain borated water from the cask to the CVCS storage tanks as follows:

1.1

a. Install a hose from the cask drain valve to the cask drain manifold at ST-1. Open the cask drain valve. _____

b. Open CD-1 and CD-2 on the drain manifold. Ensure CVC 1103 open and WD1237 closed. Ensure open: CVC 1104, CVC 1105 or CVC 1106. _____

c. Ensure no pressure exists in the cask as per pressure gauge on the drain manifold. _____

d. Connect a hose from the instrument air manifold (Fig. 4.5) Snaptite valve ST-3 to the cask vent Snap-tite fitting and open the cask vent valve. _____

e. Regulate instrument air to 5-10 psig at IA-PVC-125A and then open IA-125B. _____

CAUTION: Air flow to the CVCS Holdup Tanks may create an explosive mixture ($H_2 + O_2$). Prevent by careful monitoring of the drain flow meter. When flow indication drops, air will be flowing to the CVCS Holdup Tanks.

1.1

f. When drained, (flow indication will suddenly drop on flow meter at the drain manifold) close CD-1 immediately. Then close CD-2, the cask vent valve, IA-125B and the air regulator valve, IA-PVC-125A. _____

4.55 Fill and flush the cask with DI water to reduce the boron concentration and the activity (Gamma scan) as follows:

a. Close the cask vent and drain valves and remove the hose from the cask drain Snap-tite fitting.

b. Remove the hose attached to the instrument air manifold and the cask vent Snap-tite fitting.

c. Connect a hose to the cask vent Snap-tite fitting from the vent manifold Snap-tite fitting (ST-5).

d. Connect a hose from the DI manifold Snap-tite fitting (ST-4) to the cask drain Snap-tite fitting.

e. Open the cask vent and drain valves.

WARNING
RADIATION HAZARD

The internal temperature of the fuel rods may exceed 212°F, this creating steam flashing on the initial input of water. The vent hose should be directed as dictated by the procedure.

f. Open CD-7 and DW-284 to fill the cask (monitor the vent manifold flow meter; when flow indication occurs, the cask is full).

g. Once filled, continue to flush the cask cavity water to reduce activity and residual boron. Option of filling (step 4.55) and draining (step 4.54) is acceptable for reducing activity & residual boron.

h. Sample discharged water (CD-8) at beginning of flush and at 30 - minute intervals for boron concentration. Continue flushing until boron concentration is less than 5 ppm. _____

4.56 Drain the cask using same procedure as Step 4.54. Carefully monitor radiation levels (General area at 3 and 6 feet). _____

Level	3 Feet	6 Feet
Full	_____	_____
Drained	_____	_____

4.57 Drain the cask till air is exhausted through the drain manifold flow meter (indicated by sudden drop in flow) _____

WARNING

It is mandatory that air is exhausted from the drain hose. NRC Certificate of Compliance Number 9001 requires that not more than 0.420 cubic foot of water (PWR configuration) calculated at a water temperature of 70°F, remains in the cask during dry shipment.

4.58 Vent [redacted] pressure from the cask cavity [redacted] rough the vent valve as follows:

a. Close the cask vent and drain valves, IA-125B and IA-PVC-125A.

b. Remove the hose from ST-3 and connect it from the cask vent Snap-tite fitting to the vent manifold Snap-tite fitting (ST-5).

c. Open CD-7 and the cask vent valve to vent the pressure.

4.59 Firmly close the vent and drain valves and remove hoses. Install a pressure gage to the vent valve and open the vent valve. _____

4.60 Commence monitoring the temperature and pressure increase in the cavity. The rate of rise must be compared to the rate predicted by the Fuels Group (Figures 4.5, 4.6 and 4.7). This verifies that a "hot" element is not present in the shipment. _____

Disconnect the pressure gage and temperature recorder after adequate correlation of collected data and the appropriate figure referenced above (minimum time span of collected data is considered to be ten hours) and a temperature equilibrium has been established for approximately four hours. (Use Form 4 for Equilibrium Data) _____

4.61 Commence decontamination of the spent fuel cask. A baseline smear survey should be taken and results recorded on Procedure HP 31. Each survey performed after decon efforts should also be recorded on HP 31. Contamination within acceptable limits when levels are less tha 22,000 DPM/100 CM^2 Beta/Gamma and 2200 DPM/100 CM^2 alpha (49CFR173.397A). _____

4.62 Remove the roof cover from the decon area. Reconnect to the lifting yoke and re-engage on the cask trunnions. _____

4.63 Raise the cask sufficiently to decon the bottom fins. _____

4.64 Open the railcar enclosure and extend the air ducts. _____

4.65 Remove the cask from the decon area and position over the rail car.

NOTE

Orientation of the cask must be such that the valve boxes will be on the top side of the cask when the cask is rotated to the horizontal position on the equipment skid.

FIGU 4.5

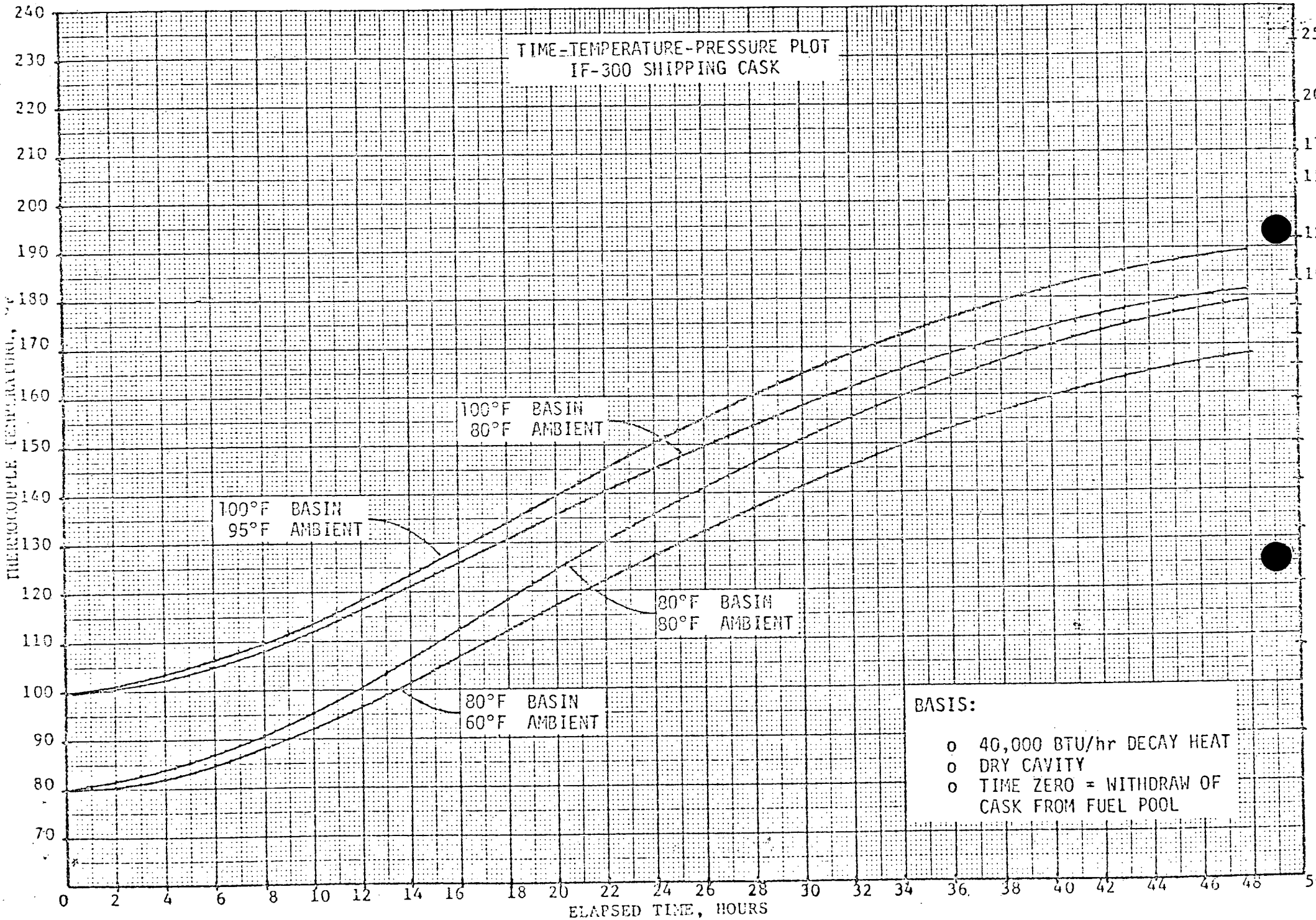
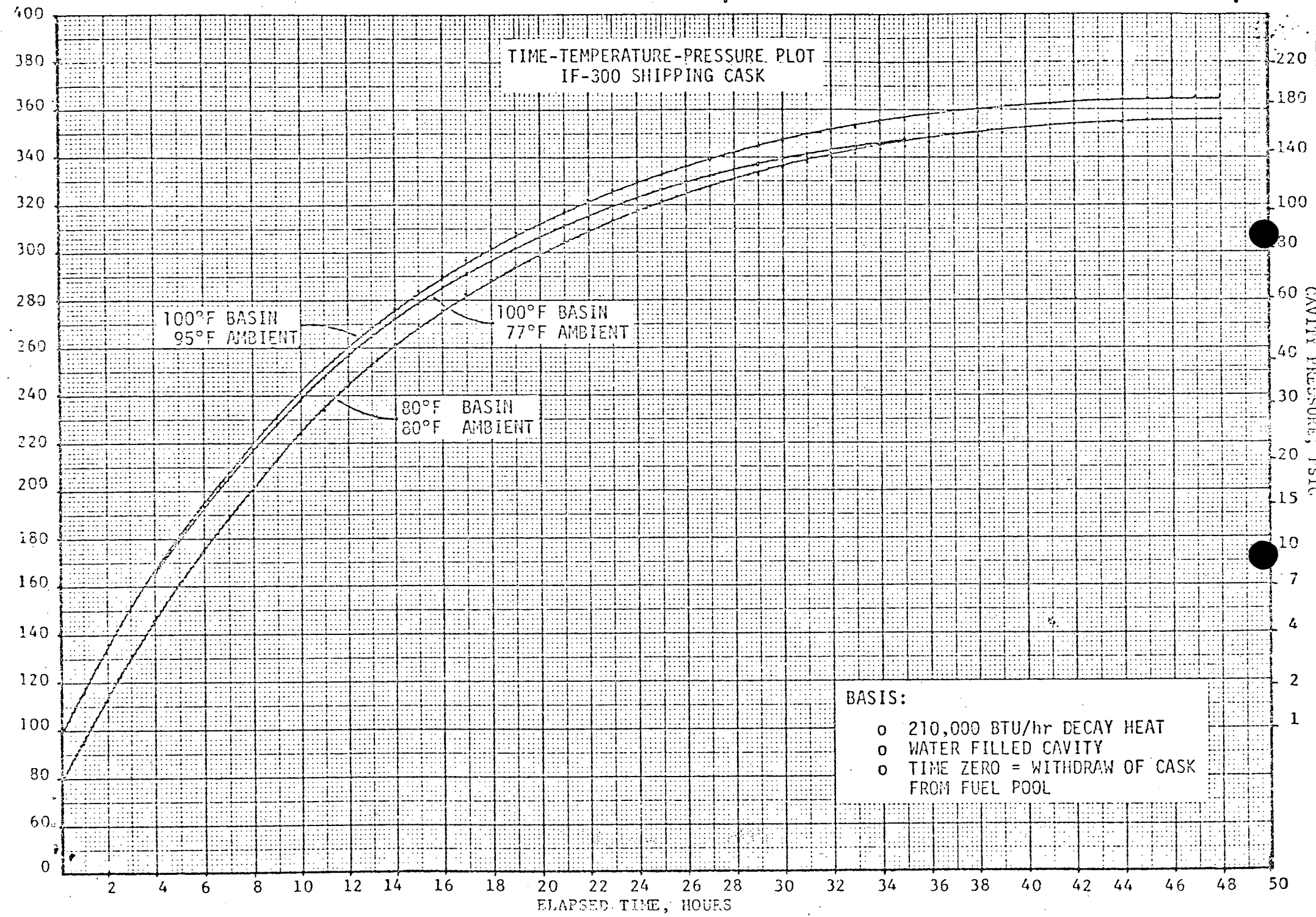
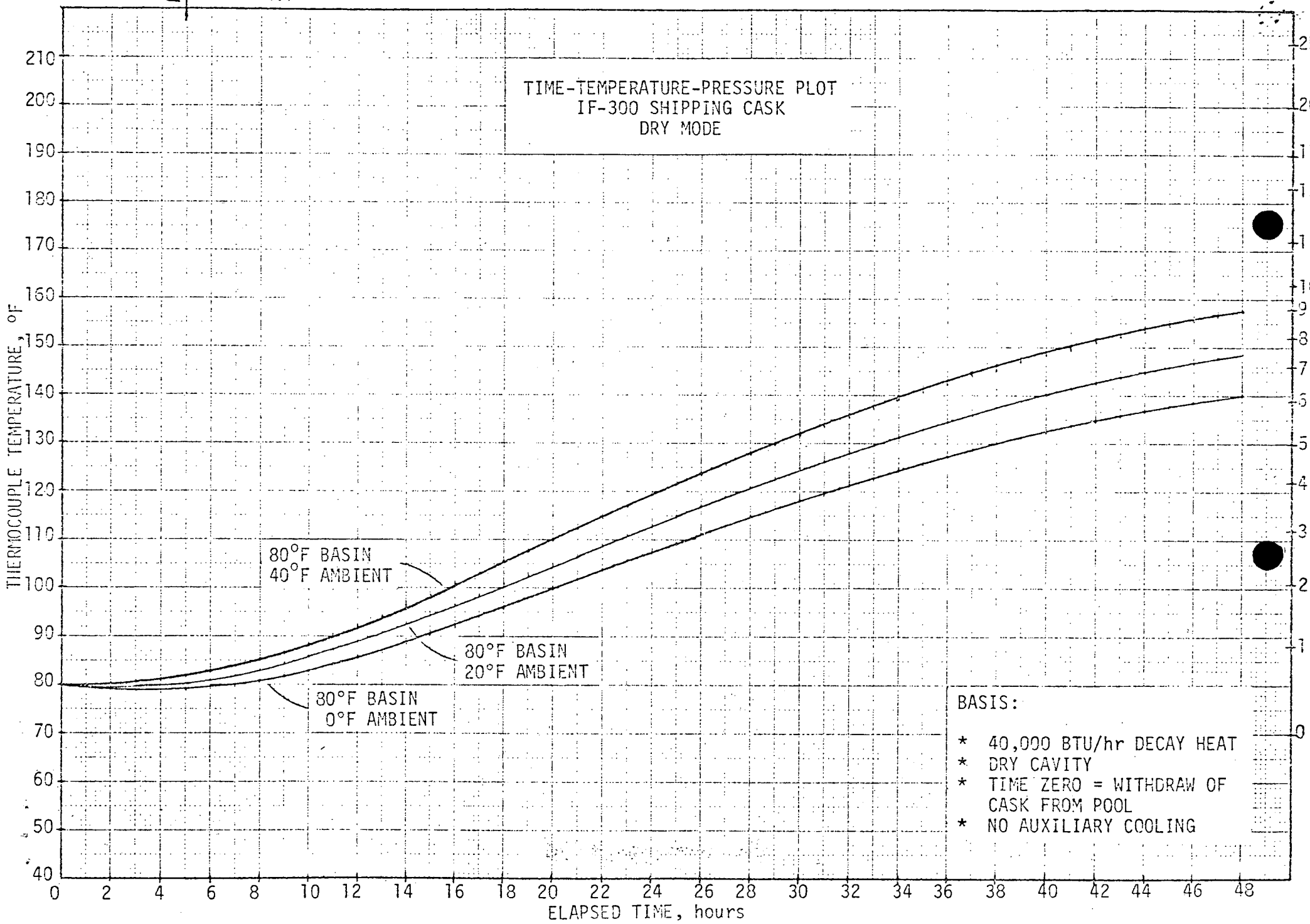

TIME-TEMPERATURE-PRESSURE PLOT
IF-300 SHIPPING CASK
THERMOCOUPLE TEMPERATURE, °F
ELAPSED TIME, HOURS
100°F BASIN
80°F AMBIENT
100°F BASIN
95°F AMBIENT
80°F BASIN
80°F AMBIENT
80°F BASIN
60°F AMBIENT
BASIS:
o 40,000 BTU/hr DECAY HEAT
o DRY CAVITY
o TIME ZERO = WITHDRAW OF CASK FROM FUEL POOL

FIGURE 4.6


TIME-TEMPERATURE-PRESSURE PLOT
IF-300 SHIPPING CASK
100°F BASIN
95°F AMBIENT
100°F BASIN
77°F AMBIENT
80°F BASIN
80°F AMBIENT
BASIS:
o 210,000 BTU/hr DECAY HEAT
o WATER FILLED CAVITY
o TIME ZERO = WITHDRAW OF CASK FROM FUEL POOL
ELAPSED TIME, HOURS
CAVITY PRESSURE, PSIG
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
0
220
180
140
100
80
60
40
30
20
15
10
7
4
2
1
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50

1.9 FIGURE 4.7


TIME-TEMPERATURE-PRESSURE PLOT
IF-300 SHIPPING CASK
DRY MODE
THERMOCOUPLE TEMPERATURE, °F
ELAPSED TIME, hours
80°F BASIN
40°F AMBIENT
80°F BASIN
20°F AMBIENT
80°F BASIN
0°F AMBIENT
BASIS:
* 40,000 BTU/hr DECAY HEAT
* DRY CAVITY
* TIME ZERO = WITHDRAW OF CASK FROM POOL
* NO AUXILIARY COOLING

Align the cask such that the two undersized fins will act as guides in the two 1-1/8 inch slots in the tilting cradle. Slowly lower the cask into the tilting cradle. When the cask bottom contacts the socket and the cask begins to tip, simultaneously lower the crane hook and travel the crane to the opposite end of the equipment skid so that the load line will remain vertical as the cask lowers to the horizontal position. Be sure that the guide fins are fully engaged in the sockets.

NOTE

When the cask is nearly horizontal, it will engage the head-end support and will be pulled forward approximately 1 inch.

Stop horizontal travel of the crane when the cask is fully seated on the equipment skid. Continue down travel of the crane hook until the yoke hooks are below the cask lifting trunnions. Move the crane laterally until the yoke hooks are free of the cask lifting trunnions. _____

4.66 Lift the trunnions to take up slack to relieve the pins of the load. Disengage the tiedown pin, pin keeper, and bolts from each trunnion. Remove the trunnions from the cask and move to the storage location. Install the tiedown pins through the equipment skid saddle, one on each side of the cask. Secure the pins in place by means of the pin keeper and bolts. Secure the bolts in place with lockwire. Move the crane as required to transport the yoke to its storage location. Decon the area where the trunnions had been installed. _____

1.3

4.67 Lockwire all valves and replace dust caps. Ensure that all valves are tightly closed prior to lockwiring. _____

4.68 Replace valve box covers and the overflow drain hose. _____

4.69 Perform a radiological survey 3 feet from the surface of the cask. The sum of the products listed below shall not exceed 1000 mr/hr.

Neutron dose rate _____ mr/hr x 111.0 =
Gamma dose rate _____ mr/hr x 11.3 = _____

Sum =

The sum was less than 1000 mr/hr. _____

4.70 Retract air ducts and secure in place. _____

4.71 Connect the thermocouple to the alarm system. _____

4.72 Complete the checkout of the cooling system (Form 2) and start the engines according to the instructions mounted on the instrument panel. _____

CAUTION

To prevent damage to the engine, do not run the starter motor longer than 5 seconds, and do not engage the

starter motor while the crankshaft is rotating from a previous start.

a. Reduce the speed as soon as the engine is operating normally, as indicated by the charging indicator light.

b. Verify that the pointer of the oil indicator gauge is in the green field. If the pointer drops back to the red field, immediately stop the engine. Refer to the engine manufacturer's instruction manual and determine the cause of low oil pressure.

c. Increase the engine speed to 2300 - 2500 RPM and once it has stabilized, engage the clutch. _____

d. Observe the overall operation of the engine and drive fan (drive belts, bearing vibration, etc.) _____

4.73 Verify that the cavity thermocouple temperature setting is 350°F, by visually observing the temperature indicator located in the engine compartment, above the rear entrance door. _____

4.74 Turn on the cavity thermocouple temperature alarm switch (located in the Instrument Panel for Diesel Engine Number 2). If the alarm sounds, push the "ACK" switch, located inside the rear entrance to the diesel compartment. If this action does not stop the alarm, turn off the switch. _____

4.75 Test the cavity thermocouple temperature alarm system by actuating the test button, located at the inside rear of the enclosure. _____

4.76 Ensure proper labeling, placarding and marking of the shipment is done per DOT regulations. _____

4.77 Ensure proper shipping papers and arrangements have been completed to ship per DOT regulations. _____

4.78 The cask is ready for shipment. _____

4.79 The cask has been delivered to the carrier. _____

Date Shipped_____ Estimated Time of Arrival _____

Time_____ Date _____

Destination_____

1.6

4.80 The Principal Engineer (Surveillance and Accountability) and the Engineering Supervisor at receiving plant (BSEP) has been notified that the shipment has been delivered to the carrier and of the expected time of arrival. The positions of the spent fuel elements in the cask and orientation of retrieving the elements from the cask has been sent to BSEP. _____

4.81 The cask has arrived at BSEP. _____

Date Arrived _____

Time _____

4.82 The following accountability records for compliance are to be performed:

a. Initial Special Nuclear Material Shipment and Receipt Reports.

b. Adjust Fuel Component Records Cards.

c. Adjust Special Nuclear Material Ledger.

d. File NRC/ERDA - 741 with plant accountability records.

Performed _____

Form 1

Fuel Shipment Data Form

Date _____ Prepared By _____

Shipment No. _____

Fuel Element Identification Numbers

1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____

Data	Value	Requirement	Initials
Initial U kg/element*		≤ 457	
Initial Enrichment (w/o) *		≤ 4.0	
EOL Pin Pressure (psia) *		≤ 1800 psia at 900°F	
Decay Time (days)		> 120	
Maximum Shipment Weight (lb.)		≤ 21,000	
Decay Heat Per Assembly (BTU/hr.) *		≤ 5,725	
Decay Heat Per Shipment (BTU/hr.)		≤ 40,000	
Specific Power (kw/kgU) *		≤ 40	
Burnup (MWD/MTU) *		≤ 28,500	
Fuel Form		Clad UO_2 Pellets	
Cladding Material		Zr or SS	
Maximum Bundle Cross Section, Inches		8.75	
Fuel Pin Array		14 x 14 / 15 x 15	
Fuel Diameter, Inch		0.380 - 0.460	
Fuel Pin Pitch Range, Inch		0.502 - 0.582	
Maximum Active Fuel Length, Inches		144	

* Nominal Value

Form 2

Cooling System Checkout

Date _____ Performed By _____

Shipment No. _____

Equipment	Engine 1 Value	Engine I Comments	Engine 2 Value	Engine 2 Comments
1. Hour Reading (Record)				
2. Oil Level - Engine Oil Level - Reservoir				
3. Fuel Gauges (Record to Nearest 1/8)				
4. Oil Pressure Gauge (Record)				
5. Tachometer (Record)				
6. Generator/Alternator Output (Record if Applicable)				
7. Engine RPM (Record				
8. Cylinder Head Temp. (Record)				
9. Generator Belts (Visible Inspection, Adj. if Req.)	N/A		N/A	
10. Blowers-Lubricate Bearings & Visible Inspection	N/A		N/A	
.. Blower Belts	N/A		N/A	
12. Blower Dampers	N/A		N/A	
13. Blower Clutch-Check Tension and Condition	N/A		N/A	
14. Battery Electrolyte - Consider Interval & Transit Time				
15. Check Fuel & Oil Lines for Leaks	N/A		N/A	
16. Cooling System Oper. Check	N/A		N/A	
17. Engine R.P.M. (Engaged)				
18. Temp. Alarm Set Point - Check and Record				
19. Temp. Alarm Functional Test	N/A		N/A	

Comments:

Trouble Ticket Nos. (If Required):

FORM 3

CALIBRATION CHECKOFF LIST

1. Torque Wrenches (Interval - Before each fuel shipment)

Serial #: _____ Serial #: _____

Date Calibrated: _____ Date Calibrated: _____

Serial #: _____

Date Calibrated: _____

1.6

2. Cavity Pressure Test Gauge (Interval - Previous 12 months)

Date Calibrated: _____

3. Temperature Recorder (Interval - Previous 12 months)

Date Calibrated: _____

Serial #: _____

1.6

4. Pressure Gauge (0 - 30 PSIG) (Interval - Previous 12 months)

Date Calibrated: _____

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket 50-261

August 4, 1978

All Power Reactor Licensees

Gentlemen:

This letter and enclosed NUREG-0219 titled "Nuclear Security Personnel for Power Plants, Content and Review Procedures for a Security Training and Qualification Program," dated July 1978, are being sent to all licensees authorized to operate a nuclear power reactor and to all applicants with applications for a license to operate or construct a power reactor.

Within the next few weeks the Commission is scheduled to publish in final form amendments to 10 CFR 73 to impose upgraded qualification, training, and equipping requirements for security personnel protecting against theft of special nuclear material and industrial sabotage of nuclear facilities or nuclear shipments. The enclosed document provides a basis on which commercial nuclear reactor applicants and licensees can develop acceptable programs to implement these new requirements.

A second draft of this document was published for comment on April 21, 1978 and as a result the staff has considered the comments received and incorporated many changes. The following summarizes the major comments received and how the NRR staff addressed them in preparing the final document:

1. Approximately one third of the 32 that commented stated that the sample plan indicated an excessive amount of detail and the guidance should not exceed that currently given for safety related training.

   The final document contains only 25 pages of guidance (Parts 1&2); the remainder is a sample plan. The sample was provided to assist the applicants and licensees in preparation of a plan based on a new approach. As noted in item 3 below, the sample should not be considered a requirement.

   The staff reformated the sample plan to reduce the amount of detail and removed many tasks based on the ratings submitted in response to the request in Draft 2. This resulted in a reduction of 46% in the number of pages devoted to performance objectives (173 vs. 94) and a reduction of 44% in the number of performance objectives (344 vs. 191). A further reduction should be realized when the site analysis is completed, since the sample plan includes many tasks that are not appropriate for all sites.

Encl Appx A
CCP

2. Many comments stated that the number of onsite evaluations by the NRC was excessive (i.e., 1 by NRR every 2 years and 3 each year by I&E).

   The I&E schedule set forth in the draft was based on the established frequency of onsite I&E physical security inspections with the assumption that these inspections would be expanded to include training and personnel qualification. However, all references to I&E inspection have now been deleted from the final version since this document addresses NRR policy only.

3. Some commented that although we state that each site is required to develop a qualification program based on a site specific job analysis, that the NRR reviewers would treat the sample plan in NUREG-0219 as the only acceptable approach.

   The NRR staff feels that the sample plan provides valuable guidance and should remain in the document. However, the final version was revised to stress that the sample is not a requirement. One example is found on page 1-1 and reads:

   > "It must be stressed that it is the responsibility of each site, using the methodology described in this document, to identify its site-specific tasks, elements, and performance objectives. The security program selected must evaluate each individual's ability to implement the site-approved physical security and contingency plans. Training and evaluation are not done for their own sake.
   >
   > The sample qualification plan found in part 3 should not be considered a requirement, but only a guide; Each specific site plan is reviewed on its own merits."

4. Other comments stated that tasks shown in the sample were too extensive. They indicated that the sample program exceeded that required by most military and police organizations and/or the requirements to meet the 73.55 threat level. A few commented that the type of response indicated in the sample plan is outside the responsibility and capabilities of private security.

   The applicants and licensees are required to identify in their qualification plan only those security tasks critical to successful implementation of the site contingency and physical security plans. If a licensee can develop acceptable contingency plans that meet the threat and do not require police or military tactics, then the tactical tasks can be deleted. However, it must be realized that the military and police are the only organizations with experience dealing with such problems. The vast majority of the military and police related tasks contained in the sample are at the basic training level.

5. Finally, a few commented that the NRC should hold working sessions with the utilities to develop its detailed requirements.

   Although the actual development of training and qualification plans are the responsibility of each licensee, NRR is planning to hold a series of workshops with the utilities to develop a mutual understanding of how to implement the methodology described in NUREG-0219. These workshops will be small and devoted to actual plan development.

Additional copies of NUREG-0219 can be obtained from the National Technical Information Service, Springfield, Virginia 22161 at current prices.

Sincerely,

James R. Miller, Assistant Director
for Reactor Safeguards
Division of Operating Reactors

Enclosure:
NUREG-0219

cc w/o enclosure:
Service List

cc: G. F. Trowbridge, Esquire
Shaw, Pittman, Potts & Trowbridge
1800 M Street, NW
Washington, D.C. 20036

Hartsville Memorial Library
Home and Fifth Avenues
Hartsville, South Carolina 29550