List of Effective Pages

List of Effective Pages

Master Table of Contents

Chapter 1

List of Effective Pages (Continued)

Chapter 2

List of Effective Pages (Continued)

Chapter 3

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

List of Effective Pages (Continued)

Chapter 13

1.5 License Drawings

This section presents the License Drawings for the NAC-MPC System.

1.5.1 NAC-MPC License Drawings

Drawing Number	Title	Revision No.	No. of Sheets
455-821	Adapter Ring, Transfer Adapter to NAC-STC MPC-Yankee	0	1
455-856	Name Plate - NAC-VCC Cask	0	1
455-859	Assembly, Transfer Adapter, MPC-Yankee	1	3
455-860	Assembly, Transfer Cask (TFR), MPC - Yankee	3	4
455-861	Weldment, Structure, Vertical Concrete Cask (VCC), MPC - Yankee	3	2
455-862	Loaded Vertical Concrete Cask (VCC), MPC - Yankee	2	1
455-863	Lid, Vertical Concrete Cask (VCC), MPC- Yankee	2	1
455-864	Shield Plug, Vertical Concrete Cask (VCC), MPC- Yankee	1	1
455-866	Reinforcing Bar and Concrete Placement, Vertical Concrete Cask (VCC), MPC- Yankee	0	3
455-870	Canister Shell, MPC- Yankee	3	1
455-871	Details, Canister, MPC- Yankee	[redacted]	2
455-872	Assembly, Transportable Storage Canister (TSC), MPC- Yankee	5	1
455-873	Assembly, Drain Tube, Canister, MPC- Yankee	2	1
455-881	PWR Fuel Tube, Captivated BORAL, MPC- Yankee	2	1
455-891	Bottom Weldment, Fuel Basket, MPC- Yankee	0	1
455-892	Top Weldment, Fuel Basket, MPC- Yankee	1	1
455-893	Support Disk and Misc. Basket Details, MPC- Yankee	3	1
455-894	Heat Transfer Disk, Fuel Basket, MPC- Yankee	1	1
455-895	Fuel Basket Assembly, MPC- Yankee	2	1

FIGURE WITHHELD UNDER 10 CFR 2.390

SYM	GEOMETRY	TOLERANCES UNLESS OTHERWISE SPECIFIED				GROUP	NAME	DATE
	FLATNESS	3 PLACE DEC.	TOL.	2 PLACE DEC.	TOL.	PREPARER	R. Walker	3-17-99
	STRAIGHTNESS	UNDER 3		UNDER 6	±.04	CHECKER	[illegible]	[illegible]
	ANGULARITY	3-12		6-18	±.06	PROJECT MANAGER	[illegible]	[illegible]
	PERPENDICULARITY	OVER 12		OVER 18	±.09	VP/CHIEF ENGINEER	N/A	
	PARALLELISM	1 PLACE DEC.	±.1	FILLETS .03		DIRECTOR of PROJECTS	[illegible]	3/18/99
	CONCENTRICITY	FINISH (√)-AA-125 MICRO IN		ANGLES ±.5°		LICENSING MANAGER	[illegible]	[illegible]
	TRUE POSITION	THREADS-UNIFIED CL2A-2B		CORNERS R.03		QUALITY	[illegible]	3/18/99
		NEXT ASSEMBLY: 455-872				SBU VP	NA	
		DRAWING TYPE: LICENSE						

ASSY | ASSY | ASSY
QUANTITY

NAC INTERNATIONAL

DETAILS,
CANISTER,
MPC-YANKEE

PROJECT	DESIGN PACKAGE	DRAWING	REV
455		871	3
SCALE 1/8	EST.WT.	SH 1 OF 2	10:59AM 3-17-99

FIGURE WITHHELD UNDER 10 CFR 2.390

NAC INTERNATIONAL

DETAILS,
CANISTER,
MPC–YANKEE

PROJECT 455	DESIGN PACKAGE	DRAWING 871	REV 3
SCALE 1/8	EST. WT.	SH 2 OF 2	11:00AM 3-17-99

8.1 Loading the NAC-MPC Storage System

The NAC-MPC storage system consists of three principal components: the transportable storage canister (canister), the transfer cask, and the vertical concrete cask (concrete cask). The transfer cask is used to hold the canister during loading and while the canister is being closed and sealed. The transfer cask is also used to transfer the canister to the concrete cask and to load the canister into the transport cask. The principal handling operations involve closing and sealing the canister by welding and loading it into the concrete cask. The vent and drain port locations are shown in Figure 8.1-1.

This procedure assumes that the canister with an empty basket is installed in the transfer cask, that the transfer cask is positioned in the decontamination area or other suitable work station, and that the concrete cask is positioned on a heavy-haul transporter in the cask receiving area or other suitable staging area. The staging area should be within the handling "footprint" of the cask handling crane.

The operator must ensure that the fuel assemblies selected for loading into the canister conform to the requirements of Table 2.1-1 and the Certificate of Compliance or Site Specific Approval.

8.1.1 Loading and Closing the Transportable Storage Canister

1. Visually inspect the basket fuel tubes to ensure they are unobstructed and free of debris. Ensure that the welding zones on the canister, shield and structural lids, and the port covers are prepared for welding. Ensure transfer cask door lock bolts are installed and secure.
2. Flood the canister with clean water until the water is about 4 inches from the top of the canister.

   Note: Do not fill the canister completely in order to avoid spilling water during the transfer to the spent fuel pool.
3. Attach a clean water line to the transfer cask.
4. If it is not already attached, attach the transfer cask lifting yoke to the cask handling crane, and engage the transfer cask lifting trunnions.

   Note: The minimum temperature of the transfer cask (i.e., external ambient temperature) must be verified to be higher than 0°F prior to lifting. See Appendix 12A, Section 3.1.2.
5. Raise the transfer cask and move it over the pool, following the prescribed travel path.
6. Lower the transfer cask to the pool surface and turn on the clean water line to flood the annulus between the transfer cask and canister.

19. Attach the hydrogen gas detector to the vent port. Verify that the concentration of any detectable hydrogen gas is below 2.4%.

    Note: If the concentration exceeds 2.4%, operate the vacuum system to remove gases from the under side of the shield lid and re-verify hydrogen gas concentration.

20. Operate the welding equipment to complete the root weld joining the shield lid to the canister shell following approved procedures.

    Note: Stop welding if the hydrogen detector indicates a hydrogen concentration above 2.4% and clear hydrogen gas buildup.

21. Prepare the weld and perform a liquid penetrant weld examination of the root pass. Record the results of the weld examination.

    Note: The hydrogen detector may be removed from the vent port, if necessary.

22. Complete welding of the shield lid to the canister wall and remove the weld equipment.
23. Prepare the weld and perform a liquid penetrant weld examination of the final pass. Record the results of the weld examination.
24. Remove any lines attached to the drain port. Attach an air pressure line to the vent port. Pressurize the canister to 50 psig and hold the pressure. There must be no loss of pressure for 10 minutes (To be consistent with the specified canister transportation test pressure).
25. Release the pressure and visually inspect the shield lid to canister shell weld for indications of leaks and defects. Record the results of the inspection.
26. Attach the suction pump to the drain line. Ensure that the vent line is open. Using the pump, remove the remaining free water from the canister cavity.

    Note: Steps 26 through 35 must be completed within 16 hours in accordance with LCO 3.1.5.

27. Remove any free water in the drain port cavity. Install the drain port cover.

    Note: If previously removed, reinstall the hydrogen gas detector to the vent port. Operate the detector to verify that the concentration of hydrogen gas is below 2.4%. If not, use the vacuum system to clear hydrogen gas from the cavity and the drain line.

28. Weld the drain port cover to the shield lid.
29. Prepare the weld and perform a liquid penetrant examination of the drain port cover weld root and final passes. Record the results of the weld examination.
30. Attach the vacuum equipment to the vent port line.
31. Operate the vacuum equipment, until a vacuum of 3 mm of mercury exists in the canister, in accordance with the requirements of Technical Specification LCO 3.1.2.
32. Verify that no water remains in the canister by holding the vacuum for 30 minutes. If water is present in the cavity, the pressure will rise as the water vaporizes. Continue the vacuum/hold cycle until there is no indicated rise in pressure after 30 minutes.

49. Prepare the weld and perform an ultrasonic inspection of the weld, if required, then perform a liquid penetrant examination of the final weld pass. Record the results of the weld examinations.
50. Perform a smear survey of the accessible area at the top of the canister to ensure that the surface contamination is less than the limits established for the site (typically less than 20 dpm/100 cm^2 alpha, and less than 1,000 dpm/ 100 cm^2 beta-gamma). Smear survey results shall meet the requirements of Technical Specification LCO 3.2.2.
51. Install the transfer cask retaining ring.
52. Decontaminate the external surface of the transfer cask.

8.1.2 Loading the Vertical Concrete Cask

This section of the loading procedure assumes that the vertical concrete cask (concrete cask) is located on the bed of a heavy-haul trailer under the cask handling crane and that the concrete cask shield plug and lid are not in place.

1. Using a suitable crane, place the transfer adapter on the top of the concrete cask.
2. Using the transfer adapter bolt hole pattern, align the adapter to the concrete cask. Bolt the adapter to the cask using four (4) socket head cap screws.
3. Verify that the bottom door connectors on the adapter plate are in the fully extended position.
4. If not already done, attach the transfer cask lifting yoke to the cask handling crane. Verify that the transfer cask retaining ring is installed.
5. Install six (6) swivel hoist rings in the structural lid of the canister. Verify that the hoist ring threads are fully engaged, and attach two (2) three-legged slings. Stack the slings on the top of the canister so they are available for use in lowering the canister into the concrete cask.
6. Engage the transfer cask trunnions with the transfer cask lifting yoke. Ensure that all lines are disconnected from the transfer cask.
7. Raise the transfer cask and move it over the concrete cask. Lower the transfer cask, ensuring that the transfer cask bottom door rails and connector tees align with the adapter plate rails and door connectors. Prior to final set down, remove transfer cask door lock bolts.

   Note: The minimum temperature of the transfer cask must be verified to be higher than 0°F (i.e., external ambient temperature) prior to lifting in accordance with Technical Specification LCO 3.1.2.
8. Ensure that the bottom door connector tees are engaged with the adapter plate door connectors.

9. Disengage the transfer cask yoke from the transfer cask and from the cask handling crane hook.
10. Return the cask handling crane hook to the top of the transfer cask and engage the two (2) three-legged slings attached to the canister by attaching the master links to the crane hook. Lift the canister slightly (about ½ inch) to take the canister weight off of the transfer cask bottom doors.

    Note: A load cell may be used to determine when the canister is supported by the crane. Avoid raising the canister to the point that the structural lid engages the transfer cask retaining ring, as this could result in lifting the transfer cask.

    Caution: The three-legged sling master links must be at least 67 inches above the canister lid. (Refer to Technical Specifications, Appendix 12A, Section 4.5.2).
11. Using the hydraulic system, open the bottom doors to access the concrete cask cavity.
12. Lower the canister into the concrete cask, using a slow crane speed as the canister nears the bottom of the concrete cask.
13. Disconnect the slings from the canister and close the transfer cask bottom doors.
14. Retrieve the transfer cask lifting yoke and attach the yoke to the transfer cask.
15. Lift the transfer cask off the concrete cask and return it to the decontamination area or designated work station.
16. Using the auxiliary crane, remove the adapter plate from the top of the concrete cask.
17. Remove the swivel hoist rings from the structural lid and replace them with bolts.
18. Using the auxiliary crane, retrieve the shield plug and install the shield plug in the top of the concrete cask.
19. Using the auxiliary crane, retrieve the concrete cask lid and install the lid in the top of the concrete cask using six stainless steel bolts.
20. Ensure that there is no foreign material left at the top of the concrete cask. Install the tamper-indicating seal.
21. Verify that the concrete cask surface dose rates are less than those established by the requirements of Technical Specification LCO 3.2.1 (The average surface dose rate shall not exceed 50 mrem per hour on the sides and 35 mrem per hour on the top. The dose rates measured at the inlets and outlets shall be less than 100 mrem per hour measured at a point that is the extension of the external surface.)

8.1.3 Transporting the Vertical Concrete Cask

This section of the procedure assumes that the loaded concrete cask is positioned on a heavy-haul trailer.

1. Using a suitable towing vehicle, tow the heavy-haul trailer to the dry storage pad (ISFSI). Verify that the bed of the trailer is approximately at the same height as the pad surface.
2. Install four (4) hydraulic jacks at the four (4) designated jacking points at the bottom cooling air vents.
3. Raise the concrete cask approximately 3 inches.

   Caution: Do not exceed a maximum lift height of 6 inches, in accordance with the requirements of Technical Specification LCO 3.1.8.
4. Move the air-bearing rig set under the cask.

   Note: A hydraulic skid may also be used to move the concrete cask. The height the concrete cask is raised depends upon the height of the skid or air pad set used, but may not exceed 6 inches.
5. Inflate the air-bearing rig set. Remove the four (4) hydraulic jacks.
6. Using a suitable towing vehicle, move the concrete cask from the bed of the transporter to the designated location on the storage pad.
7. Turn off the air-bearing rig set, allowing it to deflate.
8. Reinstall the four (4) hydraulic jacks and raise the concrete cask approximately 3 inches.

   Caution: Do not exceed a maximum lift height of 6 inches, in accordance with the requirements of Technical Specification LCO 3.1.8.
9. Remove the air-bearing rig set pads. Ensure that the surface of the dry storage pad under the cask is free of foreign objects.
10. Lower the concrete cask to the surface.

    Note: Ensure that the spacing between concrete casks is 15 (+1, -0) feet.
11. Remove the four (4) hydraulic jacks.
12. Install screens in the inlets and outlets.
13. Install/connect the temperature monitoring equipment.
14. Scribe/stamp the concrete cask name plate to indicate loading.
15.

8.2 Removal of the Transportable Storage Canister from the Vertical Concrete Cask

Removal of the loaded canister from the concrete cask is expected to occur at the time of shipment of the canistered fuel off site. Alternately, removal could be required in the unlikely event of an accident condition that rendered the concrete cask or canister unsuitable for continued long-term storage or for transport. This procedure identifies the general steps to return the loaded canister to the transfer cask and return the transfer cask to the decontamination station, or other designated work area. Since these steps are the reverse of those undertaken to place the canister in the concrete cask, as described in Section 8.1.2, they are summarized here.

At the option of the user, the canister may be removed from the concrete cask and transferred to another concrete cask or to the NAC-STC transport cask at the ISFSI site. This transfer is done using the transfer cask, which provides shielding for the canister contents during the transfer.

1. Using the hydraulic jacking system and the air pad set, move the concrete cask from the ISFSI pad to the heavy-haul trailer. The bed of the trailer must be approximately level with the surface of the pad.

   Caution: Do not exceed a maximum lift height of 6 inches when raising the concrete cask to install the air pad set in accordance with the requirements of Technical Specification LCO 3.1.8.
2. Tow the transporter to the cask receiving area or other designated work station.
3. Remove the concrete cask shield plug and lid. Install the hoist rings in the canister structural lid. Verify that the hoist ring threads are fully engaged and attach the lift slings. Install the transfer adapter.
4. Retrieve the transfer cask and position it on the transfer adapter on the top of the concrete cask.

   Note: The minimum temperature of the transfer cask must be verified to be higher than 0°F (i.e., external ambient temperature) prior to lifting in accordance with Technical Specification LCO 3.1.9.
5. Open the shield doors. Attach the canister lift slings to the cask handling crane hook.

   Caution: The three-legged sling master links must be at least 67 inches above the canister lid. (Refer to Technical Specifications, Appendix 12A, Section 4.5.2).
6. Raise the canister into the transfer cask. Use caution to avoid contacting the transfer cask retaining ring with the canister.

20. Attach the clean water line to the transfer cask.
21. Retrieve the transfer cask lifting yoke and engage the transfer cask lifting trunnions.
    Note: The minimum temperature of the transfer cask must be verified to be higher than 0°F (i.e., external ambient temperature) prior to lifting in accordance with Technical Specification LCO 3.1.9.
22. Move the transfer cask over the pool and lower the bottom of the transfer cask to the surface. Start the flow of clean water to the transfer cask annulus. Continue to lower the transfer cask, as the annulus fills with clean water, until the top of the transfer cask is about 4 inches above the pool surface. Hold this position until clean water fills the top of the transfer cask.
23. Lower the transfer cask to the bottom of the cask loading area and remove the lifting yoke.
24. Attach the shield lid lifting sling to the crane hook.
25. Slowly lift the shield lid. Move the shield lid to one side after it is raised clear of the transfer cask (Caution: The drain line tube is suspended from the under side of the shield lid. The lid should be raised as straight as possible until the tube clears the canister basket. Use caution if the shield lid is removed from the pool. The under side of the shield lid and the attached drain line could be highly contaminated.).
26. Visually inspect the fuel for damage.

At this point, the spent fuel could be transferred from the canister to the fuel racks. If the fuel is damaged, special rigging could be required to remove the fuel. In addition, the bottom of the canister could be highly contaminated. Care must be exercised in the handling of the transfer cask when it is removed from the pool. Highly radioactive particles could rest on flat surfaces of the transfer cask resulting in high dose rates.

12.0 OPERATING CONTROLS AND LIMITS

This chapter identifies operating controls and limits, technical parameters and surveillance requirements imposed to ensure the safe operation of the NAC-MPC System. Section 12.1 provides the proposed operating controls and limits, which are presented in Technical Specification format in Appendix 12A of this Chapter. The bases for the specified controls and limits are presented in Appendix 12B of this Chapter.

Sections 4.4 and 4.5 of Appendix 12A present Site Specific Parameters and Design Specifications that are important to the safe operations of the NAC-MPC System, but that are not included as Technical Specifications. These include items which are singular events, those that cannot be readily determined or re-verified at the time of use of the system, or that are easily implemented, verified and corrected, if necessary, at the time the action is undertaken. Sections 5.1 and 5.2 of Appendix 12A provides a description of a suggested training program intended to assist the user in meeting the requirements of Subpart I of 10 CFR 72 for use of the NAC-MPC System. Section 5.3 of Appendix 12A presents the requirements for the first system placed in service. Section 5.4 of Appendix 12A presents the requirements for the NAC-MPC thermal monitoring program.

12.1 Proposed Operating Controls and Limits

The NAC-MPC System is designed to provide passive dry storage of containerized Yankee Class spent fuel. The system has few operating controls. The principal controls and limits for the NAC-MPC System are satisfied by the selection of fuel for storage that meets the technical specifications presented in Section 2.1 and in Tables 12A2-1 and 12A2-2 of Appendix 12A. The general areas where controls and limits are necessary for safe operation of the NAC-MPC System are shown in Table 12-1. The conditions for use of the system that are defined in the table, are based on the specifications and functionality of the system and on the safety assessments for normal and accident conditions. Appendix 12B presents the bases for the Technical Specifications, which describe the development of the operating controls and limits.

Table 12-1 NAC-MPC System Controls and Limits

Control or Limit	Applicable Technical Specification	Condition or Item Controlled
1. Fuel Characteristics	Table 12A2-1	Type and Condition
	Table 12A2-2	Dimensions and Weight
	Table 12A2-1	Burnup and Minimum Initial Enrichment
	Table 12A2-1	Cool Time
2. Canister	3.1.6	Time in Transfer Cask
Fuel Loading	Table 12A2-1	Weight and Number of Assemblies
Water	3.1.1	Water Temperature
Drying	3.1.2	Vacuum Pressure
Backfilling	3.1.3	Helium Pressure
Sealing	3.1.4	Helium Leak Rate
Vacuum	3.1.5	Drying Time
External Surface	3.2.2	Level of Contamination
Unloading	3.1.7	Cooldown Requirements
3. Concrete Cask	3.2.1	Surface Dose Rates
	Note 1	Cask Spacing
	3.1.8	Cask Handling Height
4. Surveillance	Note 2	Air Inlets and Outlets
	Note 2	Air Outlet Temperature
	Note 3	Annual Vertical Concrete Cask Concrete Inspection
5. Transfer Cask	3.1.9	Minimum Temperature
6. ISFSI Concrete Pad	Note 4	Pad Concrete Thickness
	Note 4	Pad Subsoil Thickness
	Note 4	Pad Concrete Compressive Strength

1. Limits are presented in Section 4.5.1.1 of Appendix 12A.
2. Monitoring requirements are presented in Section 5.4 of Appendix 12A.
3. Limits are applied annually.
4. Limits are verified at the time of construction of the ISFSI.

Appendix 12A
Table of Contents

Appendix 12A
Table of Contents (Continued)

3.1 NAC-MPC SYSTEM Integrity

3.1.5 <u>CANISTER Maximum Time in Vacuum Drying</u>

LCO 3.1.5 The following limits for vacuum drying time shall be met, as appropriate:

1. The time duration from completion of draining the CANISTER through completion of vacuum dryness testing and the introduction of helium backfill shall not exceed 16 hours.
2. The time duration from end of external forced air cooling of the CANISTER through completion of vacuum dryness testing and the introduction of helium backfill shall not exceed 10 hours.

APPLICABILITY: During LOADING OPERATIONS

ACTIONS

---NOTE---
Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO time limits not met	A.1 Commence filling CANISTER with helium	2 hours
	<u>AND</u>	
	A.2 Place TRANSFER CASK with helium filled loaded CANISTER in spent fuel pool.	2 hours
	<u>AND</u>	
	A.3 Maintain TRANSFER CASK and CANISTER in spent fuel pool for a minimum of 24 hours.	Prior to restart of LOADING OPERATIONS

3.1 NAC-MPC SYSTEM Integrity

3.1.8 CONCRETE CASK Maximum Lifting Height

LCO 3.1.8 A CONCRETE CASK containing a CANISTER loaded with INTACT FUEL ASSEMBLYs or RECONFIGURED FUEL ASSEMBLYs shall be lifted in accordance with the following requirement

a. A lift height ≤ 6 inches

APPLICABILITY: During TRANSPORT OPERATIONS

ACTIONS

------------------------------------NOTE------------------------------------

Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. NAC-MPC SYSTEM lifting requirements not met.	A.1 Initiate actions to meet CONCRETE CASK maximum lifting height.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	Verify CONCRETE CASK lifting requirements are met.	After the CONCRETE CASK is raised to install or remove air pad and prior to TRANSPORT OPERATIONS

3.1 NAC-MPC SYSTEM Integrity

3.1.9 TRANSFER CASK Minimum Operating Temperature

TRANSFER CASK Minimum Operating Temperature
A 3.1.9

LCO 3.1.9 The TRANSFER CASK shall not be used for loaded CANISTER transfer operations outside of the fuel handling facility when the external ambient temperature is ≤ 0°F.

APPLICABILITY: During LOADING or UNLOADING OPERATIONS

ACTIONS

-------------------------------------NOTE-------------------------------------
Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. External ambient temperature below LCO limit	A.1 Do not perform TRANSFER CASK operations external to the facility.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.9.1	Measure external ambient temperature.	Prior to start of LOADING or UNLOADING OPERATIONS AND 1 hour thereafter.

Table 12A3-1
CANISTER Limits

CANISTER	LIMITS
NAC-MPC CANISTER	
a. CANISTER Vacuum Drying Pressure	≤ 3 mm of Mercury for ≥ 30 min
b. CANISTER Helium Leak Rate	≤ 8×10^{-8} std cc/sec (helium)
c. CANISTER Helium Backfill Pressure	0 (+1, -0) psig
d. CANISTER Pressure Test	15.0 (+2,-0) psig for ≥ 10 min

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.1 NAC-MPC SYSTEM Average Surface Dose Rates

LCO 3.2.1 CONCRETE CASK dose rates shall be measured at the locations shown in Figure 12A3-1. The average surface dose rates of each CONCRETE CASK shall not exceed:

a. 50 mrem/hour (neutron + gamma) on the side (on the concrete surfaces)

b. 35 mrem/hour (neutron + gamma) on the top;

c. 100 mrem/hour (neutron + gamma) at air inlet and outlet vents.

APPLICABILITY: During LOADING OPERATIONS

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CONCRETE CASK average surface dose rate limits not met.	A.1 Administratively verify correct fuel loading. AND	24 hours

3.2 NAC-MPC SYSTEM Radiation Protection

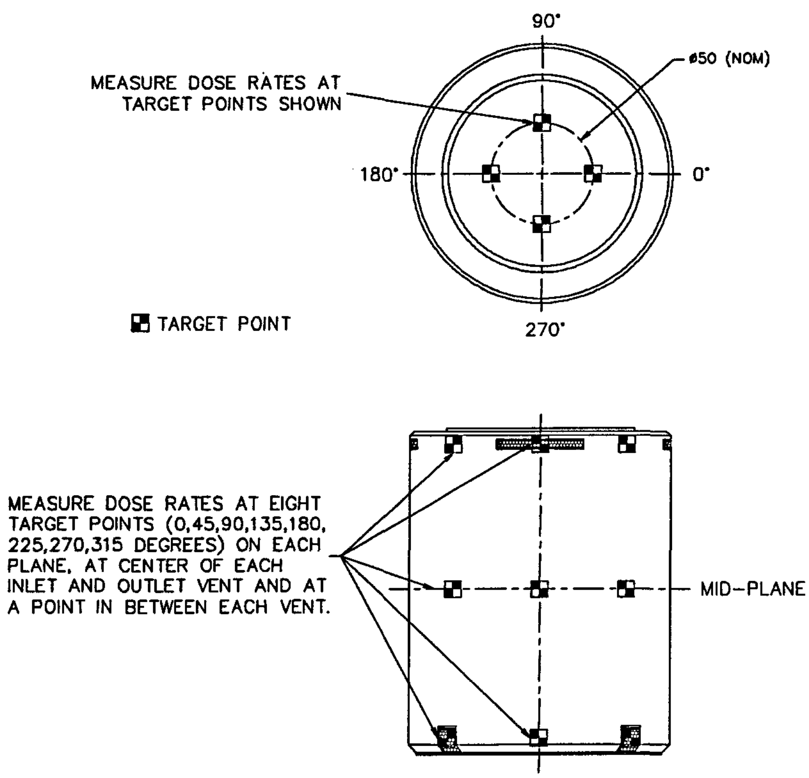
3.2.1 CONCRETE CASK Average Surface Dose Rates (Continued)

	A.2 Verify that the dose rate from the cask will not cause the ISFSI to exceed the offsite radiation protection requirements of 10 CFR 20 and 10 CFR 72.	Prior to TRANSPORT OPERATIONS
B. Required Action and Associated Completion Time not met.	B.1 Remove all fuel assemblies from the NAC-MPC SYSTEM.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify average surface dose rates of CONCRETE CASK containing fuel assemblies are within limits.	Prior to TRANSPORT OPERATIONS

Figure 12A3-1
CONCRETE CASK Surface Dose Rate Measurement



3.2 NAC-MPC SYSTEM Radiation Protection

3.2.2 <u>CANISTER Surface Contamination</u>

LCO 3.2.2 Removable contamination on the accessible exterior surfaces of the CANISTER and accessible interior surfaces of the TRANSFER CASK shall each not exceed:

a. 1000 dpm/100 cm^2 from beta and gamma sources and

b. 20 dpm/100 cm^2 from alpha sources.

APPLICABILITY: During LOADING OPERATIONS

ACTIONS

---NOTE---
Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CANISTER or TRANSFER CASK removable surface contamination limits not met.	A.1 Restore CANISTER and TRANSFER CASK removable surface contamination to within limits.	Prior to TRANSPORT OPERATIONS

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.2 CANISTER Surface Contamination (Continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.2.1	Verify that the removable contamination on the accessible exterior surfaces of the CANISTER containing fuel is within limits.	Prior to TRANSPORT OPERATIONS
SR 3.2.2.2	Verify that the removable contamination on the accessible interior surfaces of the TRANSFER CASK do not exceed limits.	Prior to TRANSPORT OPERATIONS

5.4 CONCRETE CASK Thermal Monitoring Requirements

This administrative control provides guidance for the temperature measurement and visual inspection activities that are used to monitor the thermal performance of each CONCRETE CASK.

a. The ambient air temperature and the air outlet temperatures are measured and compared every 24 hours. The temperature difference between the air outlet temperatures and the ambient air temperature is calculated and recorded. The air inlets and outlets are inspected and verified to be free of blockage every 24 hours.

b. If any air outlet temperature, or temperature difference between air outlet and ambient temperature show an unexplained reading, appropriate actions are taken to determine the cause and return the outlet temperatures to acceptable values. One of the immediate actions will be to increase the frequency of temperature monitoring until normal conditions are returned.

c. If an air outlet temperature exceeds the ambient air temperature by 92°F, the NRC will be notified and actions will be taken to evaluate the effects and impact of the elevated temperature on the CONCRETE CASK and CANISTER. A temperature differential of 92°F corresponds to a concrete temperature of 165°F. The long-term normal concrete temperature limit for the CONCRETE CASK is 200°F and the short-term bulk concrete temperature limit is 350°F.

Appendix 12B
Table of Contents

APPLICABILITY

CONCRETE CASK lifting height restrictions apply during TRANSPORT OPERATIONS, which include movement of the CONCRETE CASK while secured on the heavy haul trailer. CONCRETE CASK and TRANSFER CASK handling and drop events postulated to occur in the fuel loading facilities are addressed in the user's FSAR or PSDAR.

ACTIONS

A note has been added to the ACTIONS, which states that, for this LCO, separate condition entry is allowed for each NAC-MPC SYSTEM. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each NAC-MPC SYSTEM not meeting the LCO. Subsequent NAC-MPC SYSTEMs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the CONCRETE CASK lifting height requirement is not met, immediate action must be initiated and completed expeditiously to comply with the lifting height requirements, in order to preserve the NAC-MPC SYSTEM design and analysis basis.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

The CONCRETE CASK lift height requirement must be verified to be met after the CONCRETE CASK is secured to the transporter and prior to the transporter beginning to move the CONCRETE CASK to the ISFSI. This ensures potential drop accidents during TRANSPORT OPERATIONS are bounded by the drop analyses.

REFERENCES

1. SAR, Sections 8.1 and 8.3.

3.1 NAC-MPC SYSTEM Integrity

3.1.9 TRANSFER CASK Minimum Operating Temperature

BASES

BACKGROUND	The TRANSFER CASK is a shielded handling device designed to lift and protect the CANISTER during fuel LOADING and UNLOADING OPERATIONS. It is used to perform the vertical transfer of the CANISTER to and from the CONCRETE CASK. This transfer operation can occur within the confines of the fuel loading facility or in the open environment adjacent to the facility. The structural integrity of the TRANSFER CASK and its capability to handle and shield a loaded CANISTER is ensured by maintaining the TRANSFER CASK ferrous material temperatures significantly above the materials' nil ductility transition temperatures (NDTT), thereby precluding brittle fracture.
APPLICABLE SAFETY ANALYSIS	The structural analysis of the TRANSFER CASK is based on the ductile performance of the structural material. The TRANSFER CASK structural materials were selected for their low temperature fracture toughness. In accordance with NRC Reg Guide 7.11 (Ref. 1), the lowest service temperature of a ferrous material component should be established at a minimum of 40°F above the NDTT for the material. For the NAC-MPC transfer cask, the NDTT established in the SAR is -50°F. Therefore the minimum ambient temperature limit of 0°F is established. Conservatively, the decay heat from the contained spent fuel is not assumed to maintain the TRANSFER CASK material temperatures above ambient.
LCO	Limiting the TRANSFER CASK operations outside of covered or heated facilities when the external ambient temperature is below the minimum temperature limit maintains the NAC-MPC SYSTEM within the design and analysis basis of the SAR (Ref. 2). The minimum operating temperature selected is based on the properties of the materials of construction of the TRANSFER CASK.

APPLICABILITY	The minimum operating temperature limit applies for TRANSFER CASK operations external to the fuel facility during LOADING or UNLOADING OPERATIONS
ACTIONS	A note has been added to the ACTIONS, which states that, for this LCO, separate condition entry is allowed for each NAC-MPC SYSTEM. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each NAC-MPC SYSTEM not meeting the LCO. Subsequent NAC-MPC SYSTEMs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions. <u>A.1</u> For external TRANSFER CASK operations, if the external ambient temperature is at, or below, the minimum operating temperature limit, immediate action must be initiated to stop the LOADING or UNLOADING OPERATIONS sequence to ensure that the TRANSFER CASK is not operated outside of the fuel facility.
SURVEILLANCE REQUIREMENTS	SR 3.1.9.1 The external ambient temperature shall be measured, prior to and during the LOADING or UNLOADING OPERATIONS, to ensure that the ambient temperature does not fall below the established TRANSFER CASK minimum operating temperature for operations external to the fuel building.
REFERENCES	1. NRC RG 7.11. 2. SAR, Sections 2.2, 3.4, 4.1, 8.1 and 8.3.

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.1 CONCRETE CASK Average Surface Dose Rates

BASES

BACKGROUND	The regulations governing the operation of an ISFSI set limits on the control of occupational radiation exposure and radiation doses to the general public (Ref. 1). Occupational radiation exposure should be kept as low as reasonably achievable (ALARA) and within the limits of 10 CFR Part 20. Radiation doses to the public are limited for both normal and accident conditions in accordance with 10 CFR 72.
APPLICABLE SAFETY ANALYSIS	The CONCRETE CASK average surface dose rates are not an assumption in any accident analysis, but are used to ensure compliance with regulatory limits on occupational dose and dose to the public.
LCO	The limits on CONCRETE CASK average surface dose rates are based on the shielding analysis of the NAC-MPC SYSTEM (Ref. 2). The limits are selected to minimize radiation exposure to the public and maintain occupational dose ALARA to personnel working in the vicinity of the NAC-MPC SYSTEMs. The LCO specifies sufficient locations for taking dose rate measurements to ensure the dose rates measured are indicative of the effectiveness of the shielding material.
APPLICABILITY	The CONCRETE CASK average surface dose rates apply during LOADING OPERATIONS. These limits ensure that the CONCRETE CASK average surface dose rates during TRANSPORT OPERATIONS, STORAGE OPERATIONS, and UNLOADING OPERATIONS are bounded by the shielding safety analyses. Radiation doses during STORAGE OPERATIONS are monitored by the NAC-MPC SYSTEM user in accordance with the plant-specific radiation protection program required by 10 CFR 72.212(b)(6).
ACTIONS	A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each loaded CONCRETE CASK. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each CONCRETE CASK not meeting the LCO. Subsequent NAC-MPC

SYSTEMs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the CONCRETE CASK average surface dose rates are not within limits, it could be an indication that a fuel assembly was inadvertently loaded into the CANISTER that did not meet the Functional and Operating Limits in Section 2.1. Administrative verification of the CANISTER fuel loading, by means such as review of video recordings and records of the loaded fuel assembly serial numbers, can establish whether a misloaded fuel assembly is the cause of the out-of-limit condition. The Completion time is based on the time required to perform such a verification.

A.2

If the CONCRETE CASK average surface dose rates are not within limits and it is determined that the CONCRETE CASK was loaded with the correct fuel assemblies, an analysis may be performed. This analysis will determine if the CONCRETE CASK, once located at the ISFSI, would result in the ISFSI offsite or occupational calculated doses exceeding regulatory limits in 10 CFR Part 20 or 10 CFR Part 72. If it is determined that the out of limit average surface dose rates do not result in an the regulatory limits being exceeded, TRANSPORT OPERATIONS may proceed.

B.1

If it is verified that the fuel was misloaded and the ISFSI offsite radiation protection requirements of 10 CFR Part 20 or 10 CFR Part 72 will not be met with the CONCRETE CASK average surface dose rates above the LCO limit, the fuel assemblies must be placed in a safe condition in the spent fuel pool. The Completion Time is reasonable based on the time required to transfer the CANISTER to the TRANSFER CASK, remove the structural lid and vent and drain port cover welds, perform fuel cooldown operations, cut the shield lid weld, move the TRANSFER CASK and CANISTER into the spent fuel pool, remove the shield lid, and remove the spent fuel assemblies in an orderly manner and without challenging personnel.

SURVEILLALNCE SR 3.2.1.1

REQUIREMENTSS

This SR ensures that the CONCRETE CASK average surface dose rates are within the LCO limits prior to transporting the NAC-MPC SYSTEM to the ISFSI. The surface dose rates are measured approximately at the locations indicated on Figure 12A3-1, following standard industry practices for determining average surface dose rates for large containers.

REFERENCES

1. 10 CFR Parts 20 and 72.
2. SAR Sections 5.1 and 8.1.

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.2 CANISTER Surface Contamination

BASES

BACKGROUND	A TRANSFER CASK containing an empty CANISTER is immersed in the spent fuel pool in order to load the spent fuel assemblies. The external surfaces of the CANISTER are maintained clean by the application of clean water to the annulus of the TRANSFER CASK. However, there is potential for the surface of the CANISTER to become contaminated with the radioactive material in the spent fuel pool water. This contamination is removed prior to moving the CONCRETE CASK containing the CANISTER to the ISFSI in order to minimize the radioactive contamination to personnel or the environment. This allows the ISFSI to be entered without additional radiological controls to prevent the spread of contamination and reduces personnel dose, due to the spread of loose contamination or airborne contamination. This is consistent with ALARA practices.
APPLICABLE SAFETY ANALYSIS	The radiation protection measures implemented at the ISFSI are based on the assumption that the exterior surfaces of the CANISTER have been decontaminated. Failure to decontaminate the surfaces of the CANISTER could lead to higher-than-projected occupational dose and potential site contamination.
LCO	Removable surface contamination on the CANISTER exterior surfaces is limited to 1000 dpm/100 cm^2 from beta and gamma sources and 20 dpm/100 cm^2 from alpha sources. These limits are taken from the guidance in IE Circular 81-07 (Ref. 2) and are based on the minimum level of activity that can be routinely detected under a surface contamination control program using direct survey methods. Only loose contamination is controlled, as fixed contamination will not result from the CANISTER loading process. Experience has shown that these limits are low enough to prevent the spread of contamination to clean areas and are significantly less than the levels, which would cause significant personnel skin dose.

LCO 3.2.2 requires removable contamination to be within the specified limits for the accessible exterior surfaces of the CANISTER. The location and number of CANISTER surface swipes used to verify compliance with this LCO are determined based on standard industry practice and the user's plant-specific contamination measurement program for objects of this size. Accessible portions of the CANISTER are the upper portion of the CANISTER external shell wall accessible after draining of the TRANSFER CASK annulus and the structural lid. The user shall determine a reasonable number and location of swipes for the accessible portion of the CANISTER. The objective is to determine a removable contamination value representative of the entire upper circumference of the CANISTER and the structural lid, while implementing sound ALARA practices.

Verification swipes and measurements of removable surface contamination levels on the inside surfaces of the TRANSFER CASK shall be performed following transfer of the CANISTER to the CONCRETE CASK. These measurements will provide indirect evidence that the inaccessible surfaces of the CANISTER do not have removable contamination levels exceeding the limit.

APPLICABILITY

Verification that the CANISTER accessible surface contamination is less than the LCO limit is performed during LOADING OPERATIONS. This occurs before TRANSPORT OPERATIONS and STORAGE OPERATIONS. Measurement of the CANISTER surface contamination is unnecessary during UNLOADING OPERATIONS as surface contamination would have been measured prior to moving the subject CANISTER to the ISFSI.

ACTIONS

A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each CANISTER. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each CANISTER not meeting the LCO. Subsequent CANISTERs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the removable surface contamination of the CANISTER that has been loaded with spent fuel is not within the LCO limits, action must be initiated to decontaminate the CANISTER and bring the removable surface contamination within limits. The Completion Time of "Prior to TRANSPORT OPERATIONS" is appropriate, given that the time needed to complete the decontamination is indeterminate and surface contamination does not affect the safe storage of the spent fuel assemblies. The heat-up of the CANISTER and stored spent fuel, and the allowable time in the TRANSFER CASK shall be controlled by LCO 3.1.6.

SURVEILLANCE REQUIREMENTS

SR 3.2.2.1

This SR verifies that the removable surface contamination on the accessible surface of the CANISTER is less than the limits in the LCO. The Surveillance is performed using smear surveys to detect removable surface contamination. The Frequency requires performing the verification prior to initiating TRANSPORT OPERATIONS in order to confirm that the CANISTER can be moved to the ISFSI without spreading loose contamination.

SR 3.2.2.2

This SR verifies that the removable surface contamination on the interior surfaces of the TRANSFER CASK is less than the limits, thereby providing indirect confirmation that the removable surface contamination on the inaccessible surfaces of the CANISTER are within the limits. It also confirms that the proper functioning of the annulus clean water fill system. The Surveillance is performed using smear surveys to detect removable surface contamination. The Frequency requires performing the verification prior to TRANSPORT OPERATIONS.

REFERENCES

1. SAR Section 8.1.
2. NRC IE Circular 81-07.

DRAFT

Table of Contents

DRAFT

Table of Contents (Continued)

3.1 NAC-MPC SYSTEM Integrity

3.1.5 CANISTER Maximum Time in Vacuum Drying

LCO 3.1.5 The following limits for vacuum drying time shall be met, as appropriate:

1. The time duration from completion of draining the CANISTER through completion of vacuum dryness testing and the introduction of helium backfill shall not exceed 16 hours.
2. The time duration from end of external forced air cooling of the CANISTER through completion of vacuum dryness testing and the introduction of helium backfill shall not exceed 10 hours.

APPLICABILITY: During LOADING OPERATIONS

ACTIONS

-----------------------------------NOTE-----------------------------------

Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO time limits not met	A.1 Commence filling CANISTER with helium AND	2 hours
	A.2 Place TRANSFER CASK with helium filled loaded CANISTER in spent fuel pool. AND	2 hours
	A.3 Maintain TRANSFER CASK and CANISTER in spent fuel pool for a minimum of 24 hours.	Prior to restart of LOADING OPERATIONS

3.1 NAC-MPC SYSTEM Integrity

3.1.8 CONCRETE CASK Maximum Lifting Height

LCO 3.1.8 A CONCRETE CASK containing a CANISTER loaded with INTACT FUEL ASSEMBLYs or RECONFIGURED FUEL ASSEMBLYs shall be lifted in accordance with the following requirement

a. A lift height $\leq$ 6 inches

APPLICABILITY: During TRANSPORT OPERATIONS

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. NAC-MPC SYSTEM lifting requirements not met.	A.1 Initiate actions to meet CONCRETE CASK maximum lifting height.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	Verify CONCRETE CASK lifting requirements are met.	After the CONCRETE CASK is raised to install or remove air pad and prior to TRANSPORT OPERATIONS

3.1 NAC-MPC SYSTEM Integrity

3.1.9 TRANSFER CASK Minimum Operating Temperature

LCO 3.1.9 The TRANSFER CASK shall not be used for loaded CANISTER transfer operations outside of the fuel handling facility when the external ambient temperature is ≤ 0°F.

APPLICABILITY: During LOADING or UNLOADING OPERATIONS

ACTIONS

--------------------------------------NOTE--------------------------------------
Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. External ambient temperature below LCO limit	A.1 Do not perform TRANSFER CASK operations external to the facility.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.9.1	Measure external ambient temperature.	Prior to start of LOADING or UNLOADING OPERATIONS <u>AND</u> 1 hour thereafter.

DRAFT

Table 3-1
CANISTER Limits

CANISTER	LIMITS
NAC-MPC CANISTER	
a. CANISTER Vacuum Drying Pressure	≤ 3 mm of Mercury for ≥ 30 min
b. CANISTER Helium Leak Rate	≤ 8×10^{-8} std cc/sec (helium)
c. CANISTER Helium Backfill Pressure	0 (+1, -0) psig
d. CANISTER Pressure Test	15.0 (+2,-0) psig for ≥ 10 min

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.1 NAC-MPC SYSTEM Average Surface Dose Rates

LCO 3.2.1 CONCRETE CASK dose rates shall be measured at the locations shown in Figure 3-1. The average surface dose rates of each CONCRETE CASK shall not exceed:

a. 50 mrem/hour (neutron + gamma) on the side (on the concrete surfaces)

b. 35 mrem/hour (neutron + gamma) on the top;

c. 100 mrem/hour (neutron + gamma) at air inlet and outlet vents.

APPLICABILITY: During LOADING OPERATIONS

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CONCRETE CASK average surface dose rate limits not met.	A.1 Administratively verify correct fuel loading. AND	24 hours

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.1 CONCRETE CASK Average Surface Dose Rates (Continued)

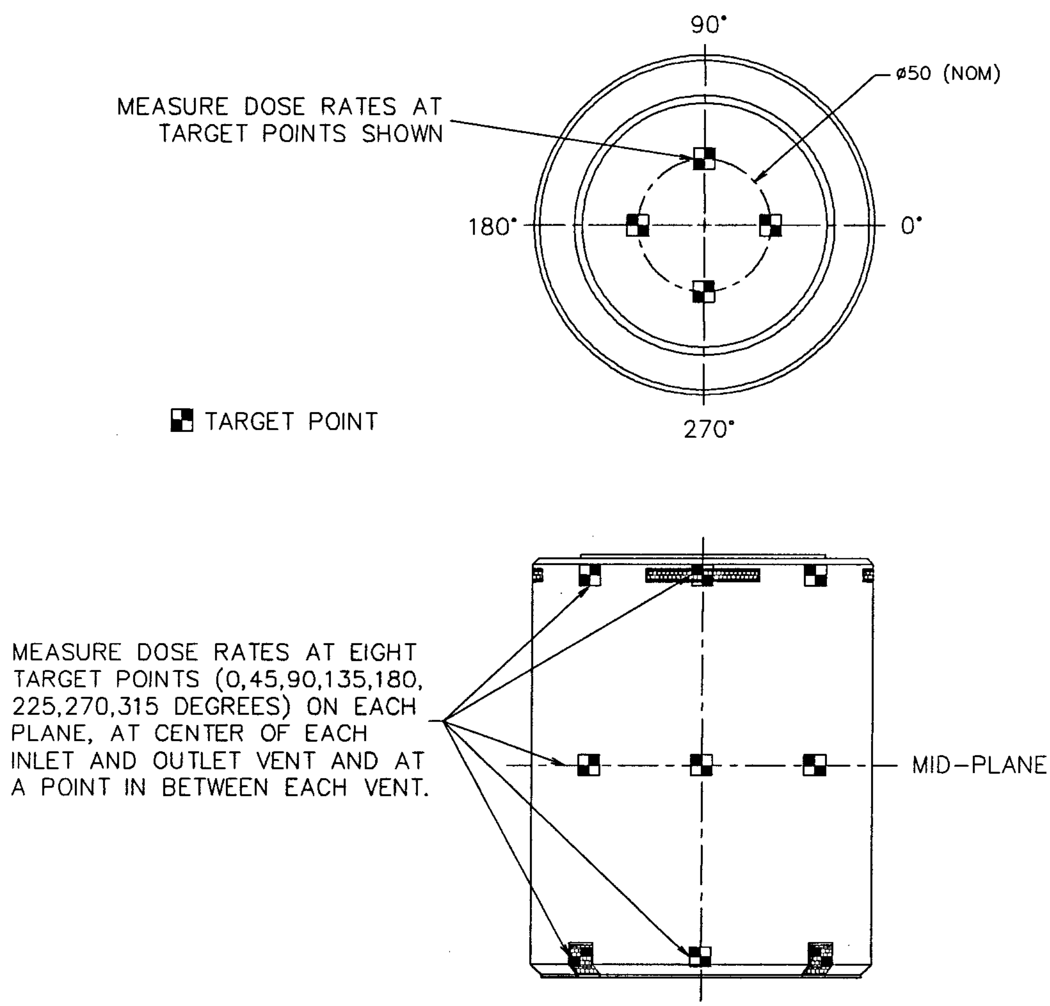
	A.2 Verify that the dose rate from the cask will not cause the ISFSI to exceed the offsite radiation protection requirements of 10 CFR 20 and 10 CFR 72.	Prior to TRANSPORT OPERATIONS
B. Required Action and Associated Completion Time not met.	B.1 Remove all fuel assemblies from the NAC-MPC SYSTEM.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify average surface dose rates of CONCRETE CASK containing fuel assemblies are within limits.	Prior to TRANSPORT OPERATIONS

Figure 3-1

CONCRETE CASK Surface Dose Rate Measurement



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3.2 NAC-MPC SYSTEM Radiation Protection

3.2.2 CANISTER Surface Contamination

LCO 3.2.2 Removable contamination on the accessible exterior surfaces of the CANISTER and accessible interior surfaces of the TRANSFER CASK shall each not exceed:

a. 1000 dpm/100 cm^2 from beta and gamma sources and

b. 20 dpm/100 cm^2 from alpha sources.

APPLICABILITY: During LOADING OPERATIONS

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CANISTER or TRANSFER CASK removable surface contamination limits not met.	A.1 Restore CANISTER and TRANSFER CASK removable surface contamination to within limits.	Prior to TRANSPORT OPERATIONS

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.2 CANISTER Surface Contamination (Continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.2.1	Verify that the removable contamination on the accessible exterior surfaces of the CANISTER containing fuel is within limits.	Prior to TRANSPORT OPERATIONS
SR 3.2.2.2	Verify that the removable contamination on the accessible interior surfaces of the TRANSFER CASK do not exceed limits.	Prior to TRANSPORT OPERATIONS

5.4 CONCRETE CASK Thermal Monitoring Requirements

This administrative control provides guidance for the temperature measurement and visual inspection activities that are used to monitor the thermal performance of each CONCRETE CASK.

a. The ambient air temperature and the air outlet temperatures are measured and compared every 24 hours. The temperature difference between the air outlet temperatures and the ambient air temperature is calculated and recorded. The air inlets and outlets are inspected and verified to be free of blockage every 24 hours.

b. If any air outlet temperature, or temperature difference between air outlet and ambient temperature show an unexplained reading, appropriate actions are taken to determine the cause and return the outlet temperatures to acceptable values. One of the immediate actions will be to increase the frequency of temperature monitoring until normal conditions are returned.

c. If an air outlet temperature exceeds the ambient air temperature by 92°F, the NRC will be notified and actions will be taken to evaluate the effects and impact of the elevated temperature on the CONCRETE CASK and CANISTER. A temperature differential of 92°F corresponds to a concrete temperature of 165°F. The long-term normal concrete temperature limit for the CONCRETE CASK is 200°F and the short-term bulk concrete temperature limit is 350°F.

DRAFT

Appendix B
Table of Contents

3.1 NAC-MPC SYSTEM Integrity

3.1.8 CONCRETE CASK Maximum Lifting Height

BASES

BACKGROUND

A loaded CONCRETE CASK is transported between the loading facility and the ISFSI using a heavy haul trailer. The CONCRETE CASK is handled in the vertical orientation. The height to which the CONCRETE CASK is lifted is limited to ensure that its structural integrity, and that of the installed CANISTER, are not compromised should it be dropped.

APPLICABLE SAFETY ANALYSIS

The structural analyses of the CONCRETE CASK and CANISTER demonstrate that the end drop of a CONCRETE CASK from the Technical Specification height limits to a surface having the structural characteristics described in Design Features Section 4.4.6, will not compromise the NAC-MPC SYSTEM integrity or result in physical damage to the contained fuel assemblies. The structural analyses evaluated a CONCRETE CASK tip-over event onto an ISFSI surface also having structural characteristics, as described in Design Features, Section 4.4.6.

LCO

Limiting the CONCRETE CASK lifting height during TRANSPORT OPERATIONS maintains the NAC-MPC SYSTEM within the design and analysis basis. The maximum lifting height is a function of the NAC-MPC SYSTEM design.

Site Specific Parameters and Analysis, Section 4.4, provides the characteristics of the drop surface assumed in the analyses. As required by 10 CFR 72.212(b)(3), each licensee must "...determine whether or not the reactor site parameters...are enveloped by the cask design bases... ."

APPLICABILITY	CONCRETE CASK lifting height restrictions apply during TRANSPORT OPERATIONS, which include movement of the CONCRETE CASK while secured on the heavy haul trailer. CONCRETE CASK and TRANSFER CASK handling and drop events postulated to occur in the fuel loading facilities are addressed in the user's FSAR or PSDAR.
ACTIONS	A note has been added to the ACTIONS, which states that, for this LCO, separate condition entry is allowed for each NAC-MPC SYSTEM. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each NAC-MPC SYSTEM not meeting the LCO. Subsequent NAC-MPC SYSTEMs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions. <u>A.1</u> If the CONCRETE CASK lifting height requirement is not met, immediate action must be initiated and completed expeditiously to comply with the lifting height requirements, in order to preserve the NAC-MPC SYSTEM design and analysis basis.
SURVEILLANCE REQUIREMENTS	SR 3.1.8.1 The CONCRETE CASK lift height requirement must be verified to be met after the CONCRETE CASK is secured to the transporter and prior to the transporter beginning to move the CONCRETE CASK to the ISFSI. This ensures potential drop accidents during TRANSPORT OPERATIONS are bounded by the drop analyses.
REFERENCES	1. SAR, Sections 8.1 and 8.3.

3.1 NAC-MPC SYSTEM Integrity

3.1.10 TRANSFER CASK Minimum Operating Temperature

BASES

BACKGROUND

The TRANSFER CASK is a shielded handling device designed to lift and protect the CANISTER during fuel LOADING and UNLOADING OPERATIONS. It is used to perform the vertical transfer of the CANISTER to and from the CONCRETE CASK. This transfer operation can occur within the confines of the fuel loading facility or in the open environment adjacent to the facility.

The structural integrity of the TRANSFER CASK and its capability to handle and shield a loaded CANISTER is ensured by maintaining the TRANSFER CASK ferrous material temperatures significantly above the materials' nil ductility transition temperatures (NDTT), thereby precluding brittle fracture.

APPLICABLE SAFETY ANALYSIS

The structural analysis of the TRANSFER CASK is based on the ductile performance of the structural material. The TRANSFER CASK structural materials were selected for their low temperature fracture toughness. In accordance with NRC Reg Guide 7.11 (Ref. 1), the lowest service temperature of a ferrous material component should be established at a minimum of 40°F above the NDTT for the material. For the NAC-MPC transfer cask, the NDTT established in the SAR is -50°F. Therefore the minimum ambient temperature limit of 0°F is established. Conservatively, the decay heat from the contained spent fuel is not assumed to maintain the TRANSFER CASK material temperatures above ambient.

LCO

Limiting the TRANSFER CASK operations outside of covered or heated facilities when the external ambient temperature is below the minimum temperature limit maintains the NAC-MPC SYSTEM within the design and analysis basis of the SAR (Ref. 2). The minimum operating temperature selected is based on the properties of the materials of construction of the TRANSFER CASK.

APPLICABILITY

The minimum operating temperature limit applies for TRANSFER CASK operations external to the fuel facility during LOADING or UNLOADING OPERATIONS

ACTIONS

A note has been added to the ACTIONS, which states that, for this LCO, separate condition entry is allowed for each NAC-MPC SYSTEM. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each NAC-MPC SYSTEM not meeting the LCO. Subsequent NAC-MPC SYSTEMs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

For external TRANSFER CASK operations, if the external ambient temperature is at, or below, the minimum operating temperature limit, immediate action must be initiated to stop the LOADING or UNLOADING OPERATIONS sequence to ensure that the TRANSFER CASK is not operated outside of the fuel facility.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

The external ambient temperature shall be measured, prior to and during the LOADING or UNLOADING OPERATIONS, to ensure that the ambient temperature does not fall below the established TRANSFER CASK minimum operating temperature for operations external to the fuel building.

REFERENCES

1. NRC RG 7.11.

2. SAR, Sections 2.2, 3.4, 4.1, 8.1 and 8.3.

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.1 CONCRETE CASK Average Surface Dose Rates

BASES

BACKGROUND	The regulations governing the operation of an ISFSI set limits on the control of occupational radiation exposure and radiation doses to the general public (Ref. 1). Occupational radiation exposure should be kept as low as reasonably achievable (ALARA) and within the limits of 10 CFR Part 20. Radiation doses to the public are limited for both normal and accident conditions in accordance with 10 CFR 72.
APPLICABLE SAFETY ANALYSIS	The CONCRETE CASK average surface dose rates are not an assumption in any accident analysis, but are used to ensure compliance with regulatory limits on occupational dose and dose to the public.
LCO	The limits on CONCRETE CASK average surface dose rates are based on the shielding analysis of the NAC-MPC SYSTEM (Ref. 2). The limits are selected to minimize radiation exposure to the public and maintain occupational dose ALARA to personnel working in the vicinity of the NAC-MPC SYSTEMs. The LCO specifies sufficient locations for taking dose rate measurements to ensure the dose rates measured are indicative of the effectiveness of the shielding material.
APPLICABILITY	The CONCRETE CASK average surface dose rates apply during LOADING OPERATIONS. These limits ensure that the CONCRETE CASK average surface dose rates during TRANSPORT OPERATIONS, STORAGE OPERATIONS, and UNLOADING OPERATIONS are bounded by the shielding safety analyses. Radiation doses during STORAGE OPERATIONS are monitored by the NAC-MPC SYSTEM user in accordance with the plant-specific radiation protection program required by 10 CFR 72.212(b)(6).
ACTIONS	A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each loaded CONCRETE CASK. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory

measures for each CONCRETE CASK not meeting the LCO. Subsequent NAC-MPC SYSTEMs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the CONCRETE CASK average surface dose rates are not within limits, it could be an indication that a fuel assembly was inadvertently loaded into the CANISTER that did not meet the Functional and Operating Limits in Section 2.1. Administrative verification of the CANISTER fuel loading, by means such as review of video recordings and records of the loaded fuel assembly serial numbers, can establish whether a misloaded fuel assembly is the cause of the out-of-limit condition. The Completion time is based on the time required to perform such a verification.

A.2

If the CONCRETE CASK average surface dose rates are not within limits and it is determined that the CONCRETE CASK was loaded with the correct fuel assemblies, an analysis may be performed. This analysis will determine if the CONCRETE CASK, once located at the ISFSI, would result in the ISFSI offsite or occupational calculated doses exceeding regulatory limits in 10 CFR Part 20 or 10 CFR Part 72. If it is determined that the out of limit average surface dose rates do not result in an the regulatory limits being exceeded, TRANSPORT OPERATIONS may proceed.

B.1

If it is verified that the fuel was misloaded and the ISFSI offsite radiation protection requirements of 10 CFR Part 20 or 10 CFR Part 72 will not be met with the CONCRETE CASK average surface dose rates above the LCO limit, the fuel assemblies must be placed in a safe condition in the spent fuel pool. The Completion Time is reasonable based on the time required to transfer the CANISTER to the TRANSFER CASK, remove the structural lid and vent and drain port cover welds, perform fuel cooldown operations, cut the shield lid weld, move the TRANSFER CASK and CANISTER into the spent fuel pool, remove the shield lid, and remove the spent fuel assemblies in an orderly manner and without challenging personnel.

SURVEILLALNCE REQUIREMENTSS

SR 3.2.1.1

This SR ensures that the CONCRETE CASK average surface dose rates are within the LCO limits prior to transporting the NAC-MPC SYSTEM to the ISFSI. The surface dose rates are measured approximately at the locations indicated on Figure 3-1, following standard industry practices for determining average surface dose rates for large containers.

REFERENCES

1. 10 CFR Parts 20 and 72.

2. SAR Sections 5.1 and 8.1.

3.2 NAC-MPC SYSTEM Radiation Protection

3.2.2 CANISTER Surface Contamination

BASES

BACKGROUND	A TRANSFER CASK containing an empty CANISTER is immersed in the spent fuel pool in order to load the spent fuel assemblies. The external surfaces of the CANISTER are maintained clean by the application of clean water to the annulus of the TRANSFER CASK. However, there is potential for the surface of the CANISTER to become contaminated with the radioactive material in the spent fuel pool water. This contamination is removed prior to moving the CONCRETE CASK containing the CANISTER to the ISFSI in order to minimize the radioactive contamination to personnel or the environment. This allows the ISFSI to be entered without additional radiological controls to prevent the spread of contamination and reduces personnel dose, due to the spread of loose contamination or airborne contamination. This is consistent with ALARA practices.
APPLICABLE SAFETY ANALYSIS	The radiation protection measures implemented at the ISFSI are based on the assumption that the exterior surfaces of the CANISTER have been decontaminated. Failure to decontaminate the surfaces of the CANISTER could lead to higher-than-projected occupational dose and potential site contamination.
LCO	Removable surface contamination on the CANISTER exterior surfaces is limited to 1000 dpm/100 cm^2 from beta and gamma sources and 20 dpm/100 cm^2 from alpha sources. These limits are taken from the guidance in IE Circular 81-07 (Ref. 2) and are based on the minimum level of activity that can be routinely detected under a surface contamination control program using direct survey methods. Only loose contamination is controlled, as fixed contamination will not result from the CANISTER loading process. Experience has shown that these limits are low enough to prevent the spread of contamination to clean areas and are significantly less than the levels, which would cause significant personnel skin dose.

LCO 3.2.2 requires removable contamination to be within the specified limits for the accessible exterior surfaces of the CANISTER. The location and number of CANISTER surface swipes used to verify compliance with this LCO are determined based on standard industry practice and the user's plant-specific contamination measurement program for objects of this size. Accessible portions of the CANISTER are the upper portion of the CANISTER external shell wall accessible after draining of the TRANSFER CASK annulus and the structural lid. The user shall determine a reasonable number and location of swipes for the accessible portion of the CANISTER. The objective is to determine a removable contamination value representative of the entire upper circumference of the CANISTER and the structural lid, while implementing sound ALARA practices.

Verification swipes and measurements of removable surface contamination levels on the inside surfaces of the TRANSFER CASK shall be performed following transfer of the CANISTER to the CONCRETE CASK. These measurements will provide indirect evidence that the inaccessible surfaces of the CANISTER do not have removable contamination levels exceeding the limit.

APPLICABILITY

Verification that the CANISTER accessible surface contamination is less than the LCO limit is performed during LOADING OPERATIONS. This occurs before TRANSPORT OPERATIONS and STORAGE OPERATIONS. Measurement of the CANISTER surface contamination is unnecessary during UNLOADING OPERATIONS as surface contamination would have been measured prior to moving the subject CANISTER to the ISFSI.

ACTIONS

A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each CANISTER. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each CANISTER not meeting the LCO. Subsequent CANISTERs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the removable surface contamination of the CANISTER that has been loaded with spent fuel is not within the LCO limits, action must be initiated to decontaminate the CANISTER and bring the removable surface contamination within limits. The Completion Time of "Prior to TRANSPORT OPERATIONS" is appropriate, given that the time needed to complete the decontamination is indeterminate and surface contamination does not affect the safe storage of the spent fuel assemblies. The heat-up of the CANISTER and stored spent fuel, and the allowable time in the TRANSFER CASK shall be controlled by LCO 3.1.6.

SURVEILLANCE REQUIREMENTS

SR 3.2.2.1

This SR verifies that the removable surface contamination on the accessible surface of the CANISTER is less than the limits in the LCO. The Surveillance is performed using smear surveys to detect removable surface contamination. The Frequency requires performing the verification prior to initiating TRANSPORT OPERATIONS in order to confirm that the CANISTER can be moved to the ISFSI without spreading loose contamination.

SR 3.2.2.2

This SR verifies that the removable surface contamination on the interior surfaces of the TRANSFER CASK is less than the limits, thereby providing indirect confirmation that the removable surface contamination on the inaccessible surfaces of the CANISTER are within the limits. It also confirms that the proper functioning of the annulus clean water fill system. The Surveillance is performed using smear surveys to detect removable surface contamination. The Frequency requires performing the verification prior to TRANSPORT OPERATIONS .

REFERENCES

1. SAR Section 8.1.
2. NRC IE Circular 81-07.