# TECHNICAL SPECIFICATIONS

# FOR NORTH ANNA INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

Renewed License
February 6, 2018

TABLE OF CONTENTS

# 1.0 USE AND APPLICATION

## 1.1 Definitions

NOTE

The defined terms of this section appear in capitalized type and are applicable throughout these Technical Specifications and Bases.

| Term | Definition |
|---|---|
| ACTIONS | ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times. |
| INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) | The facility within the perimeter fence licensed for storage of spent fuel within SSSCs. |
| LOADING OPERATIONS | LOADING OPERATIONS include all licensed activities on an SSSC while it is being loaded with fuel assemblies. LOADING OPERATIONS begin when the first fuel assembly is placed in the SSSC and end when the SSSC is suspended from the transporter. |
| SEALED SURFACE STORAGE CASKS (SSSCs) | SSSCs are storage containers for spent fuel approved for use at the ISFSI. |
| STORAGE OPERATIONS | STORAGE OPERATIONS include all licensed activities that are performed at the ISFSI while an SSSC containing spent fuel is sitting on a storage pad within the ISFSI perimeter. |
| TRANSPORT OPERATIONS | TRANSPORT OPERATIONS include all licensed activities performed on an SSSC loaded with one or more fuel assemblies when it is being moved to and from the ISFSI. TRANSPORT OPERATIONS begin when the SSSC is first suspended from the transporter and end when the SSSC is at its destination and no longer suspended from the transporter. |
| UNLOADING OPERATIONS | UNLOADING OPERATIONS include all licensed activities on an SSSC to be unloaded of the contained fuel assemblies. UNLOADING OPERATIONS begin when the SSSC is no longer suspended by the transporter and end when the last fuel assembly is removed from the SSSC. |

1.0 USE AND APPLICATION

## 1.2 Logical Connectors

| | |
|---|---|
| PURPOSE | The purpose of this section is to explain the meaning of logical connectors.<br><br>Logical connectors are used in Technical Specifications (TS) to discriminate between, and yet connect, discrete Conditions, Required Actions, Completion Times, Surveillances, and Frequencies. The only logical connectors that appear in TS are AND and OR. The physical arrangement of these connectors constitutes logical conventions with specific meanings. |
| BACKGROUND | Several levels of logic may be used to state Required Actions. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to a Required Action and the placement of the logical connector in the first level of nesting (i.e., left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentions of the logical connectors.<br><br>When logical connectors are used to state a Condition, Completion Time, Surveillance, or Frequency, only the first level of logic is used, and the logical connector is left justified with the statement of the Condition, Completion Time, Surveillance, or Frequency. |
| EXAMPLES | The following examples illustrate the use of logical connectors. |

## 1.2 Logical Connectors

EXAMPLES (continued)

EXAMPLE 1.2-1

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. LCO not met. | A.1 Verify ...<br>AND<br>A.2 Restore ... | |

In this example the logical connector AND is used to indicate that when in Condition A, both Required Actions A.1 and A.2 must be completed.

1.2 Logical Connectors

EXAMPLES (continued)

EXAMPLE 1.2-2

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. LCO not met. | A.1 Stop ...<br>OR<br>A.2.1 Verify ...<br>AND<br>A.2.2.1 Reduce ...<br>OR<br>A.2.2.2 Perform ...<br>OR<br>A.3 Remove ... | |

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three Actions may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.

# 1.0 USE AND APPLICATION

## 1.3 Completion Times

| | |
|---|---|
| PURPOSE | The purpose of this section is to establish the Completion Time convention and to provide guidance for its use. |
| BACKGROUND | Limiting Conditions for Operation (LCOs) specify the lowest functional capability or performance levels of equipment required for safe operation of the facility. The ACTIONS associated with an LCO state Conditions that typically describe the ways in which the requirements of the LCO can fail to be met. Specified with each stated Condition are Required Action(s) and Completion Times(s). |
| DESCRIPTION | The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., equipment or variable not within limits) that requires entering an ACTIONS Condition unless otherwise specified, providing the facility is in a specified condition stated in the Applicability of the LCO. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the facility is not within the LCO Applicability.<br><br>Once a Condition has been entered, subsequent subsystems, components, or variables expressed in the Condition, discovered to be not within limits, will not result in separate entry into the Condition unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition. |

## 1.3 Completion Times

EXAMPLES

The following examples illustrate the use of Completion Times with different types of Conditions and changing Conditions.

EXAMPLE 1.3-1

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| B. Required Action and associated Completion Time not met. | B.1 Perform Action B.1.<br><br>AND<br><br>B.2 Perform Action B.2. | 12 hours<br><br><br><br>36 hours |

Condition B has two Required Actions. Each Required Action has its own separate Completion Time. Each Completion Time is referenced to the time that Condition B is entered.

The Required Actions of Condition B are to complete action B.1 within 12 hours AND complete action B.2 within 36 hours. A total of 12 hours is allowed for completing action B.1 and a total of 36 hours (not 48 hours) is allowed for completing action B.2 from the time that Condition B was entered. If action B.1 is completed within 6 hours, the time allowed for completing action B.2 is the next 30 hours because the total time allowed for completing action B.2 is 36 hours.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-2

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One system not within limit. | A.1 Restore system to within limit. | 7 days |
| B. Required Action and associated Completion Time not met. | B.1 Complete action B.1<br><br>AND<br><br>B.2 Complete action B.2 | 12 hours<br><br><br><br>36 hours |

When a system is determined to not meet the LCO, Condition A is entered. If the system is not restored within 7 days, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the system is restored after Condition B is entered, Conditions A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-3

ACTIONS

- - - - - - - - - - - - - NOTE - - - - - - - - - - - - - -
Separate Condition entry is allowed for each component.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. LCO not met. | A.1 Restore compliance with LCO. | 4 hours |
| B. Required Action and associated Completion Time not met. | B.1 Complete action B.1<br><br>AND<br><br>B.2 Complete action B.2 | 6 hours<br><br><br><br>12 hours |

The Note above the ACTIONS Table is a method of modifying how the Completion Time is tracked. If this method of modifying how the Completion Time is tracked was applicable only to a specific Condition, the Note would appear in that Condition rather than at the top of the ACTIONS Table.

The Note allows Condition A to be entered separately for each component, and Completion Times tracked on a per component basis. When a component is determined to not meet the LCO, Condition A is entered and its Completion Time starts. If subsequent components are determined to not meet the LCO, Condition A is entered for each component and separate Completion Times start and are tracked for each component.

1.3 Completion Times

| | |
|---|---|
| IMMEDIATE COMPLETION TIME | When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner. |

# 1.0 USE AND APPLICATION

## 1.4 Frequency

| | |
|---|---|
| PURPOSE | The purpose of this section is to define the proper use and application of Frequency requirements. |
| DESCRIPTION | Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated Limiting Condition for Operation (LCO). An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.<br><br>The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR.<br><br>Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction. |

1.4 Frequency

EXAMPLES The following examples illustrate the various ways that Frequencies are specified.

EXAMPLE 1.4-1

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|---|
| Verify pressure within limit. | 12 hours |

Example 1.4-1 contains the type of SR most often encountered in the Technical Specifications (TS). The Frequency specifies an interval (12 hours) during which the associated Surveillance must be performed at least one time. Performance of the Surveillance initiates the subsequent interval. Although the Frequency is stated as 12 hours, an extension of the time interval to 1.25 times the interval specified in the Frequency is allowed by SR 3.0.2 for operational flexibility. The measurement of this interval continues at all times, even when the SR is not required to be met per SR 3.0.1 (such as when the equipment or a variable is outside specified limits, or the facility is outside the Applicability of the LCO). If the interval specified by SR 3.0.2 is exceeded while the facility is in a condition specified in the Applicability of the LCO, the LCO is not met in accordance with SR 3.0.1.

If the interval as specified by SR 3.0.2 is exceeded while the facility is not in a condition specified in the Applicability of the LCO for which performance of the SR is required, the Surveillance must be performed within the Frequency requirements of SR 3.0.2 prior to entry into the specified condition. Failure to do so would result in a violation of SR 3.0.4.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-2

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|---|
| Verify flow is within limits. | Once within 12 hours prior to starting activity<br><br>AND<br><br>24 hours thereafter |

Example 1.4-2 has two Frequencies. The first is a one time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicates that both Frequency requirements must be met. Each time the example activity is to be performed, the Surveillance must be performed within 12 hours prior to starting the activity.

The use of "once" indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). This type of Frequency does not qualify for the 25% extension allowed by SR 3.0.2.

"Thereafter" indicates future performances must be established per SR 3.0.2, but only after a specified condition is first met (i.e., the "once" performance in this example). If the specified activity is canceled or not performed, the measurement of both intervals stops. New intervals start upon preparing to restart the specified activity.

# 2.0 FUNCTIONAL AND OPERATING LIMITS

## 2.1 Functional and Operating Limits

### 2.1.1 Fuel To Be Stored At The ISFSI

The spent nuclear fuel to be stored in SSSCs at the North Anna ISFSI shall meet the following requirements:

a. Only fuel irradiated at the North Anna Power Station Unit Nos. 1 and 2 may be used.

b. Fuel assemblies shall be intact. Partial fuel assemblies, that is, fuel assemblies from which fuel rods are missing must not be loaded in SSSCs unless dummy fuel rods are used to displace an amount of water equal to that displaced by the original fuel rods.

c. Fuel assemblies known or suspected to have structural defects sufficiently severe to adversely affect fuel handling and transfer capability shall not be loaded into SSSCs for storage.

d. Fuel assemblies known or suspected to have cladding defects in excess of those approved for the SSSC design shall not be loaded into SSSCs for storage.

e. Fuel assemblies shall meet the limits for initial enrichment, average burnup, cooling time after reactor discharge, decay heat, fuel assembly design, fuel assembly initial uranium content, fuel assembly weight, and fuel assembly inserts as specified in Table 2.1-1.

## 2.1 Functional and Operating Limits Violations

If any Functional and Operating Limits of 2.1.1 are violated, the following actions shall be completed:

2.2.1 The affected fuel assemblies shall be placed in a safe condition.

2.2.2 Within 24 hours, notify the NRC Operations Center.

2.2.3 Within 30 days, submit a special report which describes the cause of the violation and actions taken to restore compliance and prevent recurrence.

Table 2.1-1 (page 1 of 2)
Fuel Assembly Limits

| SSSC MODEL | LIMIT |
|---|---|
| 1. TN-32 | |
| a. Initial Enrichment | ≤ 4.30 wt. % |
| b. Average Burnup | ≤ 45,000 MWD/MTU |
| c. Cooling Time After Discharge | See Figure 2.1-1 |
| d. Decay Heat Including BPRA/TPD | ≤ 1.02 kw/assembly |
| e. Fuel Assembly Design | Westinghouse 17 x 17 Standard<br>Westinghouse 17 x 17 Vantage 5H |
| f. Fuel Assembly Inserts | Fuel assemblies may contain burnable poison rod assemblies (BPRAs) and/or thimble plugging devices (TPDs). |
| g. Fuel Assembly Weight Including BPRA/TPD | ≤ 1,533 pounds |
| h. Cooling Time After Shutdown for BPRAs in TN-32 Dry Storage Casks | See Figure 2.1-2 |
| i. Cooling Time After Shutdown for TPDs in TN-32 Dry Storage Casks | See Figure 2.1-3 |
| j. Fuel Assembly Initial Uranium Content | ≤ 467.1 KgU/assembly |
| 2. TN-32B HBU | |
| a. Initial Enrichment | ≤ 4.60 wt. % (Areva Advanced Mark BW)<br>≤ 3.64 wt. % (Westinghouse Standard)<br>≤ 4.50 wt. % (Westinghouse Vantage 5H) |
| b. Average Burnup | ≤ 60 GWd/MTU |
| c. Zone Heat Load Limits | See Figure 2.1-4 |
| d. Decay Heat | ≤ 32.934 kW |
| e. Fuel Assembly Design | Areva Advanced Mark BW (AMBW)<br>Westinghouse Standard (LOPAR)<br>Westinghouse Vantage 5H (NAIF) |

Table 2.1-1 (page 2 of 2)
Fuel Assembly Limits

| SSSC MODEL | LIMIT |
|---|---|
| f. Fuel Assembly Inserts | Poison Rod Assemblies (unirradiated) |
| g. Fuel Assembly Weight Including PRA | ≤ 1551 pounds |
| h. Fuel Assembly Initial Uranium Content | ≤ 469.0 KgU/assembly |

Table 2.2-1 (page 1 of 1)
Decay Heat Load Methodology for Fuel Stored in TN-32B HBU Cask

| |
|---|
| The ORIGEN-ARP code of the SCALE 6.0 computer code package, or later, is to be used to determine the individual fuel assembly decay heat load for the zone loading represented in Figure 2.1-4. |

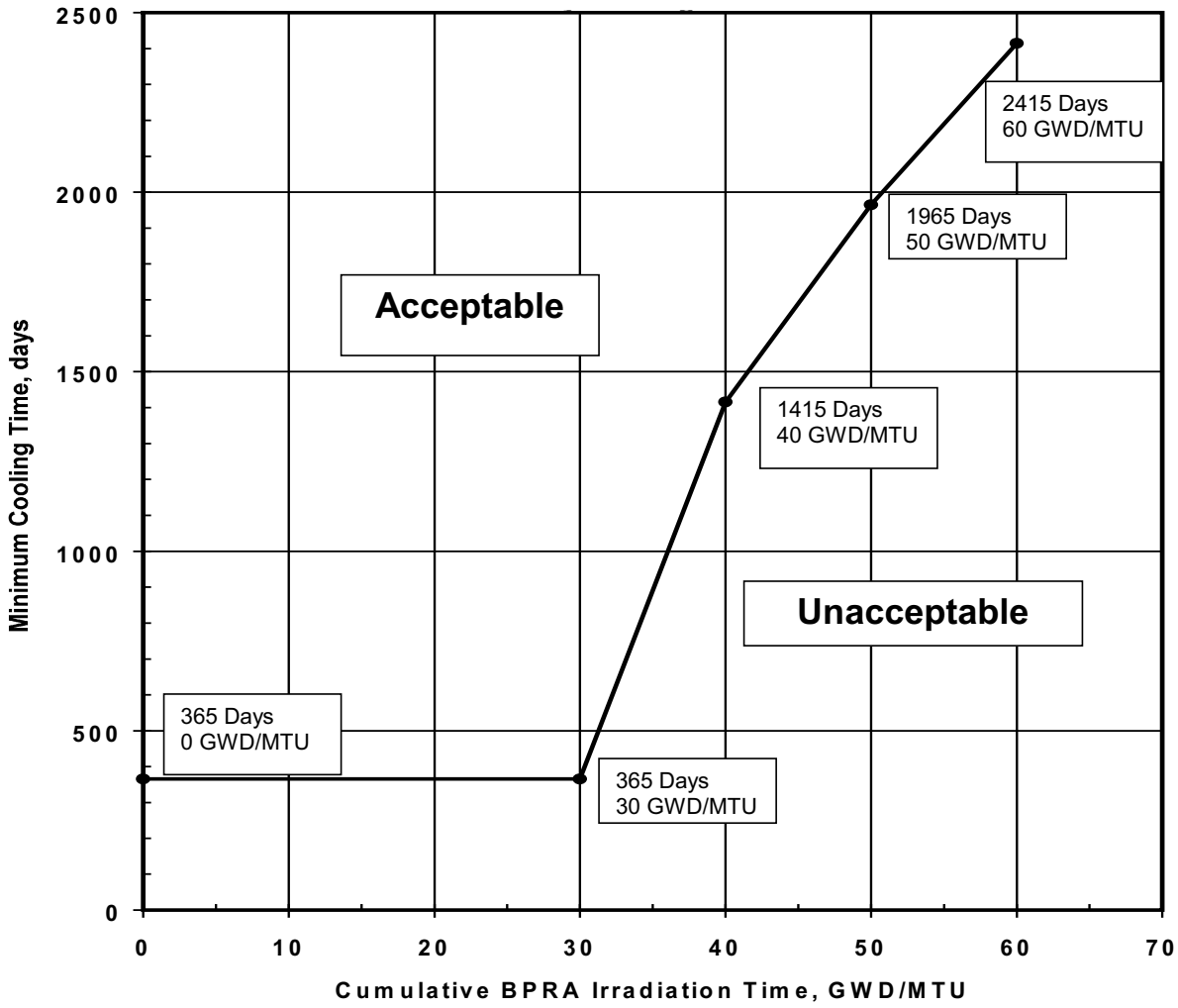
Figure 2.1-1
Minimum Acceptable Cooling Time in Years
As a Function of Burnup and Initial Enrichment
(For TN-32 Casks)

| Initial Enrichment | Burnup (GWD/MTU) (2) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (wt % U-235) (1) | 15 | 20 | 30 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| 1.2 | 7 | 7 | | | | | | | | | | | | | | | |
| 1.3 | 7 | 7 | | | | | | | | | | | | | | | |
| 1.4 | 7 | 7 | | | | | | | | | | | | | | | |
| 1.5 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | | | | | | | | | |
| 1.6 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | | | | | | |
| 1.7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | | | | | |
| 1.8 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | | | | | |
| 1.9 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | 10 | | | |
| 2.0 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | 10 | | |
| 2.1 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | 10 | | |
| 2.2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | 10 | |
| 2.3 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | 10 | |
| 2.4 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | 10 |
| 2.5 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 10 |
| 2.6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 10 |
| 2.7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 |
| 2.8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 |
| 2.9 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 |
| 3.0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 |
| 3.1 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 |
| 3.2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 |
| 3.3 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 |
| 3.4 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 |
| 3.5 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 3.6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 3.7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 3.8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 3.9 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 4.0 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 4.1 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 4.2 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 4.3 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |

- not evaluated

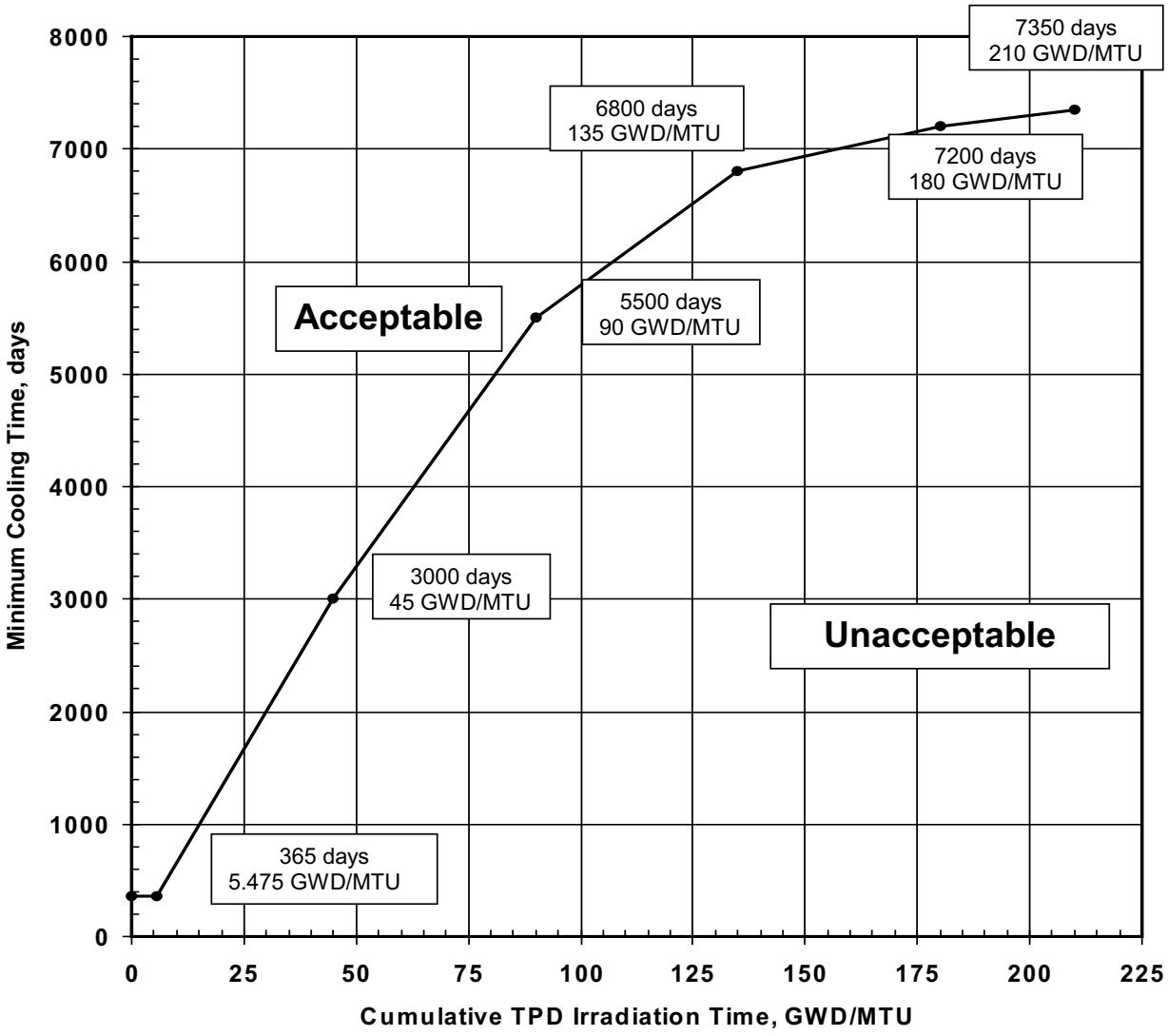
(1) Round actual value down to next lower tenth.
(2) Round actual value up to next higher Gwd/Mtu.

Figure 2.1-2
Cooling Time After Shutdown for Burnable Poison Rod Assemblies
In TN-32 Dry Storage Casks



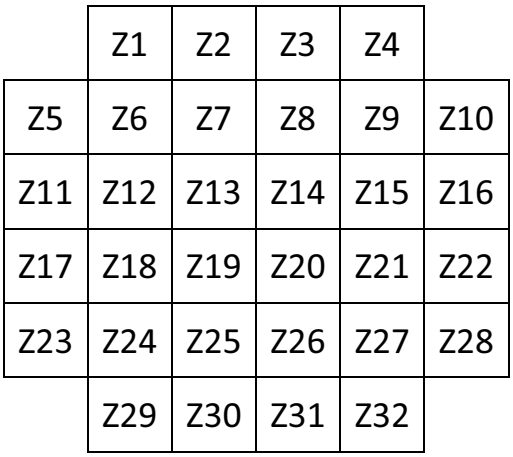

(The cumulative irradiation is taken to be the sum of the individual fuel assembly burnup values in which the BPRA was resident during in-core operation.)

Figure 2.1-3
Cooling Time After Shutdown for Thimble Plug Devices
In TN-32 Dry Storage Casks




(The cumulative irradiation is taken to be the sum of the individual fuel assembly burnup values in which the TPD was resident during in-core operation.)

Figure 2.1-4
Zone Heat Load Limits for TN-32B HBU Cask




| Zone No. | Heat Load Limit (W)[1] | Zone No. | Heat Load Limit (W)[1] |
|---|---|---|---|
| 1 | 960 | 17 | 1045 |
| 2 | 1047 | 18 | 1276 |
| 3 | 962 | 19 | 968 |
| 4 | 853 | 20 | 664 |
| 5 | 858 | 21 | 1280 |
| 6 | 1111 | 22 | 1010 |
| 7 | 1287 | 23 | 982 |
| 8 | 1263 | 24 | 963 |
| 9 | 1043 | 25 | 1278 |
| 10 | 853 | 26 | 1277 |
| 11 | 834 | 27 | 1061 |
| 12 | 1279 | 28 | 965 |
| 13 | 581 | 29 | 970 |
| 14 | 1115 | 30 | 1035 |
| 15 | 1267 | 31 | 977 |
| 16 | 1009 | 32 | 861 |
| **Total Heat Load (kW)** | | | **32.934** |

[1] Refer to Table 2.2-1 for decay heat calculation method to be used when making comparisons to limits

## 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

| | |
|---|---|
| LCO 3.0.1 | LCOs shall be met during specified conditions in the Applicability, except as provided in LCO 3.0.2. |
| LCO 3.0.2 | Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5.<br><br>If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated. |
| LCO 3.0.3 | Not applicable to an ISFSI |
| LCO 3.0.4 | When an LCO is not met, entry into a specified condition in the Applicability shall not be made except when the associated ACTIONS to be entered permit continued operation in the specified condition in the Applicability for an unlimited period of time. This Specification shall not prevent changes in specified conditions in the Applicability that are required to comply with ACTIONS or that are related to the unloading of an SSSC. |
| LCO 3.0.5 | Equipment removed from service or not in service in compliance with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate it meets the LCO or that other equipment meets the LCO. This is an exception to LCO 3.0.2 for the system returned to service under administrative control to perform the testing. |
| LCO 3.0.6 | Not applicable to an ISFSI |
| LCO 3.0.7 | Not applicable to an ISFSI |

## 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

SR 3.0.1

SRs shall be met during the specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on equipment or variables outside specified limits.

SR 3.0.2

The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met.

For Frequencies specified as "once," the above interval extension does not apply. If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this Specification are stated in the individual Specifications.

SR 3.0.3

If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is less. This delay period is permitted to allow performance of the Surveillance.

If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

When the Surveillance is performed within the delay period and the Surveillance is not met, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

## 3.0 SR APPLICABILITY

SR 3.0.4 Entry into a specified condition in the Applicability of an LCO shall not be made unless the LCO's Surveillances have been met within their specified Frequency. This provision shall not prevent entry into specified conditions in the Applicability that are required to comply with ACTIONS or that are related to the unloading of an SSSC.

## 3.1 SSSC INTEGRITY

### 3.1.1 SSSC Cavity Vacuum Drying Pressure

LCO 3.1.1 The SSSC cavity vacuum drying pressure shall meet the limit specified in Table 3-1 for the applicable SSSC design after isolation from the pumping system.

APPLICABILITY: During LOADING OPERATIONS.

ACTIONS

- - - - - - - - - - - - - - - - - - - - NOTE - - - - - - - - - - - - - - - - - - - -
Separate Condition entry is allowed for each SSSC.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC cavity vacuum drying pressure limit not met. | A.1 ----------NOTE-------- Action A.1 applies until helium is removed for subsequent operations. ---------- Achieve or maintain a helium environment of greater than 0.1 atms abs in the SSSC cavity. | 12 hours |
| | AND | |
| | A.2 Establish SSSC cavity vacuum drying pressure within limit. | 96 hours |
| B. Required Action A.1 and Associated Completion Time not met. | B.1 Remove all fuel assemblies from the SSSC. | 7 days |

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| C. Required Action A.2 and Associated Completion Time not met. | C.1 Remove all fuel assemblies from the SSSC. | 30 days |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.1.1 | Verify SSSC cavity vacuum drying pressure is within limit. | ------NOTE------<br>SR 3.0.2 is not applicable.<br>----------<br><br>Within 24 hours of completion of SSSC draining |

## 3.1 SSSC INTEGRITY

### 3.1.2 SSSC Helium Backfill Pressure

LCO 3.1.2 The SSSC helium backfill pressure shall meet the limit specified in Table 3-1 for the applicable SSSC design.

APPLICABILITY: During LOADING OPERATIONS.

ACTIONS

NOTE

Separate Condition entry is allowed for each SSSC.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC helium backfill pressure limit not met. | A.1 ---------NOTE--------- Action A.1 applies until helium is removed for subsequent operations. ---------- Achieve or maintain a helium environment of greater than 0.1 atms abs in the SSSC cavity. | 6 hours |
| | AND | |
| | A.2 Establish SSSC helium backfill pressure within limit. | 48 hours |
| B. Required Action A.1 and Associated Completion Time not met. | B.1 Remove all fuel assemblies from the SSSC. | 7 days |

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| C. Required Action A.2 and Associated Completion Time not met. | C.1 Remove all fuel assemblies from the SSSC. | 30 days |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.2.1 | Verify SSSC helium backfill pressure is within limit. | ------NOTE------<br>SR 3.0.2 is not applicable.<br>----------<br><br>Within 6 hours after verifying SSSC cavity vacuum drying pressure is within limit<br><br>AND<br><br>Within every 96 hours thereafter until LCO 3.1.3 is met |

## 3.1 SSSC INTEGRITY

### 3.1.3 SSSC Combined Helium Leak Rate

LCO 3.1.3 The SSSC combined helium leak rate for all closure seals and overpressure system shall not exceed the limit specified in Table 3-1 for the applicable SSSC design.

APPLICABILITY: During LOADING OPERATIONS.

ACTIONS

- - - - - - - - - - - - - - - - - - - - NOTE - - - - - - - - - - - - - - - - - - - -
Separate Condition entry is allowed for each SSSC.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC helium leak rate limit not met. | A.1 Establish SSSC helium leak rate within limit. | 48 hours |
| B. Required Action and Associated Completion Time not met. | B.1 Remove all fuel assemblies from the SSSC. | 30 days |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.3.1 | Verify SSSC combined helium leak rate is within limit. | ------NOTE------<br>SR 3.0.2 is not applicable.<br>----------<br><br>In accordance with Table 3-1, "SSSC Model-Dependent Limits" |

## 3.1 SSSC INTEGRITY

### 3.1.4 SSSC Interseal Pressure

LCO 3.1.4 The SSSC interseal pressure shall be maintained as specified in Table 3-1.

APPLICABILITY: During STORAGE OPERATIONS.

ACTIONS

NOTE

Separate Condition entry is allowed for each SSSC.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC interseal pressure not maintained. | A.1 Restore SSSC interseal pressure. | 7 days |
| B. Required Action and Associated Completion Time not met. | B.1 Remove all fuel assemblies from the SSSC. | 30 days |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.4.1 | Verify SSSC interseal pressure above limit specified in Table 3-1. | 7 days |
| SR 3.1.4.2 | Verify proper functioning of SSSC pressure monitoring device. | 36 months |

## 3.1 SSSC INTEGRITY

### 3.1.5 SSSC Maximum Lifting Height

LCO 3.1.5 The SSSC lifting height shall not exceed the limit in Table 3-1.

APPLICABILITY: During TRANSPORT OPERATIONS.

ACTIONS

NOTE

Separate Condition entry is allowed for each SSSC.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC lifting height higher than limit. | A.1 Initiate action to restore SSSC lifting height within limit. | Immediately |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.1.5.1 Verify SSSC lifting height within limit. | Prior to movement of SSSC with transporter |

## 3.2 SSSC CRITICALITY CONTROL

### 3.2.1 Dissolved Boron Concentration

LCO 3.2.1 The dissolved boron concentration of the spent fuel pool and of the water added to the cavity of an SSSC shall be within limits specified in Table 3-1.

APPLICABILITY: During LOADING OPERATIONS,
During UNLOADING OPERATIONS.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. Dissolved boron concentration limit not met. | A.1 Suspend loading of fuel assemblies into SSSC. | Immediately |
| | AND | |
| | A.2 Remove all fuel assemblies from SSSC. | 12 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.2.1.1 | Verify dissolved boron concentration limit in spent fuel pool water and water to be added to the SSSC cavity is met using two independent measurements. | Within 4 hours prior to commencing LOADING OPERATIONS<br><br>AND<br><br>48 hours thereafter while the SSSC is in the spent fuel pool. |
| SR 3.2.1.2 | Verify dissolved boron concentration limit in spent fuel pool water and water to be added to the SSSC cavity is met using two independent measurements. | Within 4 hours prior to flooding SSSC during UNLOADING OPERATIONS<br><br>AND<br><br>48 hours thereafter while the SSSC is in the spent fuel pool. |

## 3.3 SSSC RADIATION PROTECTION

### 3.3.1 SSSC Average Surface Dose Rates for TN-32 Casks

LCO 3.3.1 The average surface dose rates of each SSSC shall not exceed:

b. 218 mrem/hour (neutron + gamma) on the side; and

b. 58 mrem/hour (neutron + gamma) on the top.

APPLICABILITY: During LOADING OPERATIONS.

ACTIONS

- - - - - - - - - - - - - - - - - - - - NOTE - - - - - - - - - - - - - - - - - - - -
Separate Condition entry is allowed for each SSSC.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC average surface dose rate limits not met. | A.1 Administratively verify correct fuel loading.<br><br>AND<br><br>A.2 Perform analysis to verify compliance with the ISFSI offsite radiation protection requirements of 10 CFR Part 20 and 10 CFR Part 72. | 24 hours<br><br>Prior to TRANSPORT OPERATIONS |
| B. Required Action and Associated Completion Time not met. | B.1 Remove all fuel assemblies from the SSSC. | 7 days |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.3.1.1 | Verify average surface dose rates of SSSC containing fuel assemblies are within limits. | Prior to TRANSPORT OPERATIONS |

## 3.3 SSSC RADIATION PROTECTION

### 3.3.2 SSSC Average Surface Dose Rates for TN-32B HBU Cask

LCO 3.3.2 The average surface dose rates of each SSSC shall not exceed:

a. 218 mrem/hour (neutron + gamma) on the side; and

b. 96.1 mrem/hour (neutron + gamma) on the top.

APPLICABILITY: During LOADING OPERATIONS.

ACTIONS

- - - - - - - - - - - - - - - - - - - - NOTE - - - - - - - - - - - - - - - - - - - -
Separate Condition entry is allowed for each SSSC.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC average surface dose rate limits not met. | A.1 Administratively verify correct fuel loading.<br><br>AND<br><br>A.2 Perform analysis to verify compliance with the ISFSI offsite radiation protection requirements of 10 CFR Part 20 and 10 CFR Part 72. | 24 hours<br><br>Prior to TRANSPORT OPERATIONS |
| B. Required Action and Associated Completion Time not met. | B.1 Remove all fuel assemblies from the SSSC. | 7 days |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.3.2.1 | Verify average surface dose rates of SSSC containing fuel assemblies are within limits. | Prior to TRANSPORT OPERATIONS |

## 3.3 SSSC RADIATION PROTECTION

### 3.3.3 SSSC Surface Contamination

LCO 3.3.3 Removable contamination on the SSSC exterior surfaces shall 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 SSSC.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. SSSC removable surface contamination limits not met. | A.1 Restore SSSC removable surface contamination to within limits. | Prior to TRANSPORT OPERATIONS |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.3.3.1 | Verify that the removable contamination on exterior surfaces of SSSC containing fuel assemblies is within limits. | Prior to TRANSPORT OPERATIONS |

Table 3-1 (page 1 of 1)
SSSC Model-Dependent Limits

| SSSC MODEL | LIMITS |
|---|---|
| 1. TN-32 | |
| a. Cavity Vacuum Drying Pressure | ≤ 4 mbar held for 30 minutes |
| b. Helium Backfill Pressure | 2230 mbar ± 100 mbar |
| c. Combined Helium Leak Rate | ≤ $1.0 \times 10^{-5}$ mbar-liter/sec |
| d. SSSC Inter-seal Pressure | ≥ 3250 mbar |
| e. Dissolved Boron Concentration | ≥ 2500 ppm |
| f. Maximum Lifting Height | eighteen inches |
| g. Low Pressure Alarm Setting of SSSC Inter-Seal Pressure Monitoring Device | > 3250 mbar absolute |
| h. Frequency to Verify Surveillance Requirement 3.1.3.1 is Within Limit | 48 hours |
| 2. TN-32B HBU | |
| a. Cavity Vacuum Drying Pressure | ≤ 4 mbar held for 30 minutes |
| b. Helium Backfill Pressure | 2230 mbar ± 100 mbar |
| c. Combined Helium Leak Rate | ≤ $1.0 \times 10^{-5}$ mbar-liter/sec |
| d. SSSC Inter-seal Pressure | ≥ 3250 mbar |
| e. Dissolved Boron Concentration | ≥ 2500 ppm |
| f. Maximum Lifting Height | eighteen inches |
| g. Low Pressure Alarm Setting of SSSC Inter-Seal Pressure Monitoring Device | > 3250 mbar absolute |
| h. Frequency to Verify Surveillance Requirement 3.1.3.1 is Within Limit | 23 days |

# 4.0 DESIGN FEATURES

## 4.1 Site

### 4.1.1 Site Location

The North Anna ISFSI is located approximately 2000 feet southwest of the North Anna Power Station Units 1 and 2 protected area and within the boundaries of the North Anna site. The North Anna site is located in the north-central portion of Virginia in Louisa County and is approximately 40 miles north-northwest of Richmond, 36 miles east of Charlottesville; 22 miles southwest of Fredericksburg; and 70 miles southwest of Washington, D.C. The site is on a peninsula on the southern shore of Lake Anna at the end of State Route 700.

## 4.2 Storage Features

### 4.2.1 Storage Cask

The North Anna ISFSI is licensed to store spent fuel in the TN-32 dry storage cask and a single TN-32B HBU Dry Storage Cask.

### 4.2.2 Storage Capacity

The total storage capacity of the North Anna ISFSI is limited to 839.04 metric tons uranium.

### 4.2.3 Storage Pad

The North Anna ISFSI storage pad is reinforced concrete, with nominal dimensions of 224 feet x 32 feet x 2 feet thick with a 40-foot ramp on each end for vehicle access. The pad is designed to store 28 SSSCs arranged in two rows. The SSSCs in each row will be spaced a minimum of 14 feet apart center to center. Each row of SSSCs will be spaced a minimum of 14 feet apart center to center. For SSSCs whose heat load exceeds 27.1 KW the spacing shall be a minimum of 16 feet apart center to center. The facility will have up to three storage pads.

### 4.2.4 Criticality

The boron content of the SSSC basket poison material shall have a minimum areal density of 10 mg boron-10/$cm^2$. Fabrication testing to ensure the minimum areal density of the basket poison material is met is outlined in the North Anna ISFSI FSAR.

## 4.0 DESIGN FEATURES

### 4.2 Storage Features (continued)

#### 4.2.5 Helium Purity

The SSSC shall be filled with helium with a purity of at least 99.99%

#### 4.2.6 Special Requirements for TN-32 - Thermal Testing

Each contractor authorized by the licensee to complete final assembly of the TN-32 SSSC body shall verify the heat transfer performance of a single SSSC. This test shall be performed prior to the first loading of any SSSC assembled by that contractor with a heat load greater than 27.1 kilowatts. A letter report summarizing the test performed, measured temperature data, and the calculated results of the test shall be submitted to the NRC in accordance with 10 CFR 72.4 at least 30 days prior to the use of a SSSC loaded with a heat load greater than 27.1 kilowatts. Proposed modifications to the fabrication process shall be evaluated for their potential to impact the heat transfer performance of the SSSC body. If the modification could result in adverse impact to the heat transfer performance of the SSSC body, the heat transfer performance of the modified SSSC shall be verified by an additional thermal test, prior to loading the first modified SSSC with a heat load greater than 27.1 kilowatts. The results of additional thermal tests shall be retained in accordance with 10 CFR 72.80.

# 5.0 ADMINISTRATIVE CONTROLS

## 5.1 Responsibility

5.1.1 The plant manager shall be responsible for overall ISFSI operation and shall delegate in writing the succession to this responsibility during his absence.

The plant manager or his designee shall approve, prior to implementation, each proposed test, experiment or modification to systems or equipment that affects nuclear safety.

# 5.0 ADMINISTRATIVE CONTROLS

## 5.2 Organization

### 5.2.1 Onsite and Offsite Organizations

Onsite and offsite organizations shall be established for facility operation and corporate management, respectively. The onsite and offsite organizations shall include the positions for activities affecting safety of the ISFSI.

a. Lines of authority, responsibility, and communication shall be defined and established throughout highest management levels, intermediate levels, and all operating organization positions. These relationships shall be documented and updated, as appropriate, in organization charts, functional descriptions of departmental responsibilities and relationships, and job descriptions for key personnel positions, or in equivalent forms of documentation. These requirements shall be documented in the Quality Assurance Program. The plant-specific titles of those personnel fulfilling the responsibilities of the positions delineated in these Technical Specifications shall be maintained in appropriate administrative documents;

b. The plant manager shall be responsible for overall safe operation of the facility and shall have control over those onsite activities necessary for safe operation and maintenance of the facility;

c. The responsible corporate executive shall have corporate responsibility for overall facility nuclear safety and shall take any measures needed to ensure acceptable performance of the staff in operating, maintaining, and providing technical support to the facility to ensure nuclear safety; and

d. The individuals who train the operating staff, carry out health physics, or perform quality assurance functions may report to the appropriate onsite manager; however, these individuals shall have sufficient organizational freedom to ensure their independence from operating pressures.

# 5.0 ADMINISTRATIVE CONTROLS

## 5.3 Facility Staff Qualifications

5.3.1 Each member of the facility staff shall meet or exceed the minimum qualifications as specified in the Quality Assurance Program.

# 5.0 ADMINISTRATIVE CONTROLS

## 5.4 Procedures

5.4.1 Written procedures shall be established, implemented, and maintained covering the following activities:

a. Administrative controls;

b. Routine ISFSI operations;

c. Alarm and annunciator response;

d. Emergency operations;

e. Design control and facility change or modification;

f. Control of surveillances and tests;

g. Control of special processes;

h. Maintenance;

i. Health physics, including ALARA practices;

j. Special nuclear material accountability;

k. Quality assurance, inspection, and audits;

l. Physical security and safeguards;

m. Records management;

n. Reporting; and

o. All programs specified in Specification 5.5.

The above procedures may be common with the North Anna Power Station procedures provided that all ISFSI requirements are met.

# 5.0 ADMINISTRATIVE CONTROLS

## 5.5 Programs

The following programs shall be established, implemented, and maintained.

### 5.5.1 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases of these Technical Specifications.

a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews.

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not involve either of the following:

   1. A change in the TS incorporated in the license; or

   2. A change to the SAR or Bases that involves an unreviewed safety question, a significant increase in occupational exposure, or a significant unreviewed environmental impact as defined in 10 CFR 72.48.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the SAR.

d. Proposed changes that meet the criteria of 5.5.1.b above shall be reviewed and approved by the NRC prior to implementation. Changes to the Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 72.48(b)(2).

## 5.5 Programs

### 5.5.2 Radioactive Effluent Control Program

This program implements the requirements of 10 CFR 72.44(d).

a. The North Anna ISFSI does not create any radioactive materials or have any radioactive waste treatment systems. Therefore, specific operating procedures for the control of radioactive effluents are not required. Specifications 3.1.3, SSSC Helium Leak Rate, and 3.1.4, SSSC Seal Integrity, provide assurance that there are essentially no radioactive effluents from the ISFSI.

b. This program includes an environmental monitoring program. The North Anna ISFSI may be included in the environmental monitoring program for North Anna Power Station.

c. An annual report shall be submitted pursuant to 10 CFR 72.44(d)(3) specifying the quantity of each of the principal radionuclides released to the environment in liquid and in gaseous effluents during the previous calendar year of operation. A schedule exemption for submitting this report by May 1 of each year was granted in the license.