

Industry/TSTF Standard Technical Specification Change Traveler

Change title of "Spent Fuel Assembly Storage" to "Spent Fuel Pool Storage"

Classification: 1) Correct Specifications

NUREGs Affected: 1430 1431 1432 1433 1434

Description:

Change title of "Spent Fuel Assembly Storage" to "Spent Fuel Pool Storage."

Justification:

The scope of this specification includes both new and spent fuel assemblies when the fuel assemblies are stored in the spent fuel storage pool. The restrictions on fuel pool regions apply to irradiated and unirradiated fuel assemblies as shown in the Figure referenced by the LCO. The change modifies the title of the specification to be consistent with the scope of the Specification and the associated Bases. Also, the LCO is revised to refer to "fuel assemblies" instead of "spent fuel assemblies."

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Revision History

OG Revision 0

Revision Status: Closed

Revision Proposed by Oconee

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 06-Nov-97

Owners Group Comments
ONS-007

Owners Group Resolution: Approved Date: 06-Nov-97

TSTF Review Information

TSTF Received Date: 06-Nov-97 Date Distributed for Review 15-Dec-97

OG Review Completed: BWO WOG CEOG BWROG

TSTF Comments:

Address the fact that the LCO should address new and spent fuel assemblies and expand to address the need to revise the title of the LCO and the appropriate Bases.

TSTF Resolution: Approved Date: 05-Feb-98

NRC Review Information

NRC Received Date: 09-May-98 NRC Reviewer:

NRC Comments:

7/16/98 - Even though the spent fuel assembly storage pool can store both new and spent fuel, the design, the postulated accidents, and the calculation of Keff are based on the spent fuel pool containing only spent fuel

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OG Revision 0**Revision Status: Closed**

assemblies. Since most plants normally have a separate pool or area for new fuel assembly storage, this specification was developed for only the spent fuel storage and not the new fuel storage or the plant area which contains both the new and spent fuel storage areas. Therefore, the staff believes that the title to BWOG STS 3.7.16, WOG STS 3.7.17, and CEOG STS 3.7.18, "Spent Fuel Assembly Storage" is correct and that the Bases changes are unacceptable. However, the staff does agree, based on Figure STS 3.7.16-1, that the STS LCO statement, as modified in the TSTF, is acceptable and would allow new fuel to be stored in the pool, which the current wording may not.

9/23/98 - TSTF agrees to revise per NRC comments.

9/24/98 - Revise TSTF-255 per NRC comments (rename LCO to "Spent Fuel Pool Storage". Delete the "Spent" and "irradiated" in the Bases.) Send to NRC by 11/2/98.

Final Resolution: Superseded by Revision

Final Resolution Date: 24-Sep-98

TSTF Revision 1**Revision Status: Active****Next Action: NRC**

Revision Proposed by TSTF

Revision Description:

Revised to incorporate NRC comments. Revised Description and Justification. Renamed LCO to "Spent Fuel Pool Storage". Deleted the "Spent" and "irradiated" in the Bases.

TSTF Review Information

TSTF Received Date: 24-Sep-98

Date Distributed for Review 24-Sep-98

OG Review Completed: BWOG WOG CEOG BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 24-Sep-98

Incorporation Into the NUREGs

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

3.7.16	Spent Fuel Assembly Storage	NUREG(s)- 1430 Only
	Change Description: Rename	
3.7.16 Bases	Spent Fuel Assembly Storage	NUREG(s)- 1430 Only
	Change Description: Rename	
Bkgnd 3.7.16 Bases	Spent Fuel Assembly Storage	NUREG(s)- 1430 Only
S/A 3.7.16 Bases	Spent Fuel Assembly Storage	NUREG(s)- 1430 Only
LCO 3.7.16	Spent Fuel Assembly Storage	NUREG(s)- 1430 Only

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3.7.17	Spent Fuel Assembly Storage Change Description: Rename	NUREG(s)- 1431 Only
3.7.17 Bases	Spent Fuel Assembly Storage Change Description: Rename	NUREG(s)- 1431 Only
LCO 3.7.17	Spent Fuel Assembly Storage	NUREG(s)- 1431 Only
3.7.18	Spent Fuel Assembly Storage Change Description: Rename	NUREG(s)- 1432 Only
3.7.18 Bases	Spent Fuel Assembly Storage Change Description: Rename	NUREG(s)- 1432 Only
Bkgnd 3.7.18 Bases	Spent Fuel Assembly Storage	NUREG(s)- 1432 Only
S/A 3.7.18 Bases	Spent Fuel Assembly Storage	NUREG(s)- 1432 Only
LCO 3.7.18	Spent Fuel Assembly Storage	NUREG(s)- 1432 Only

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3.7 PLANT SYSTEMS

3.7.16 Spent Fuel ~~Assembly~~ Storage

LCO 3.7.16 The combination of initial enrichment and burnup of each ~~spent~~ fuel assembly stored in [Region 2] shall be within the acceptable [burnup domain] of Figure 3.7.16-1 or in accordance with Specification 4.3.1.1.

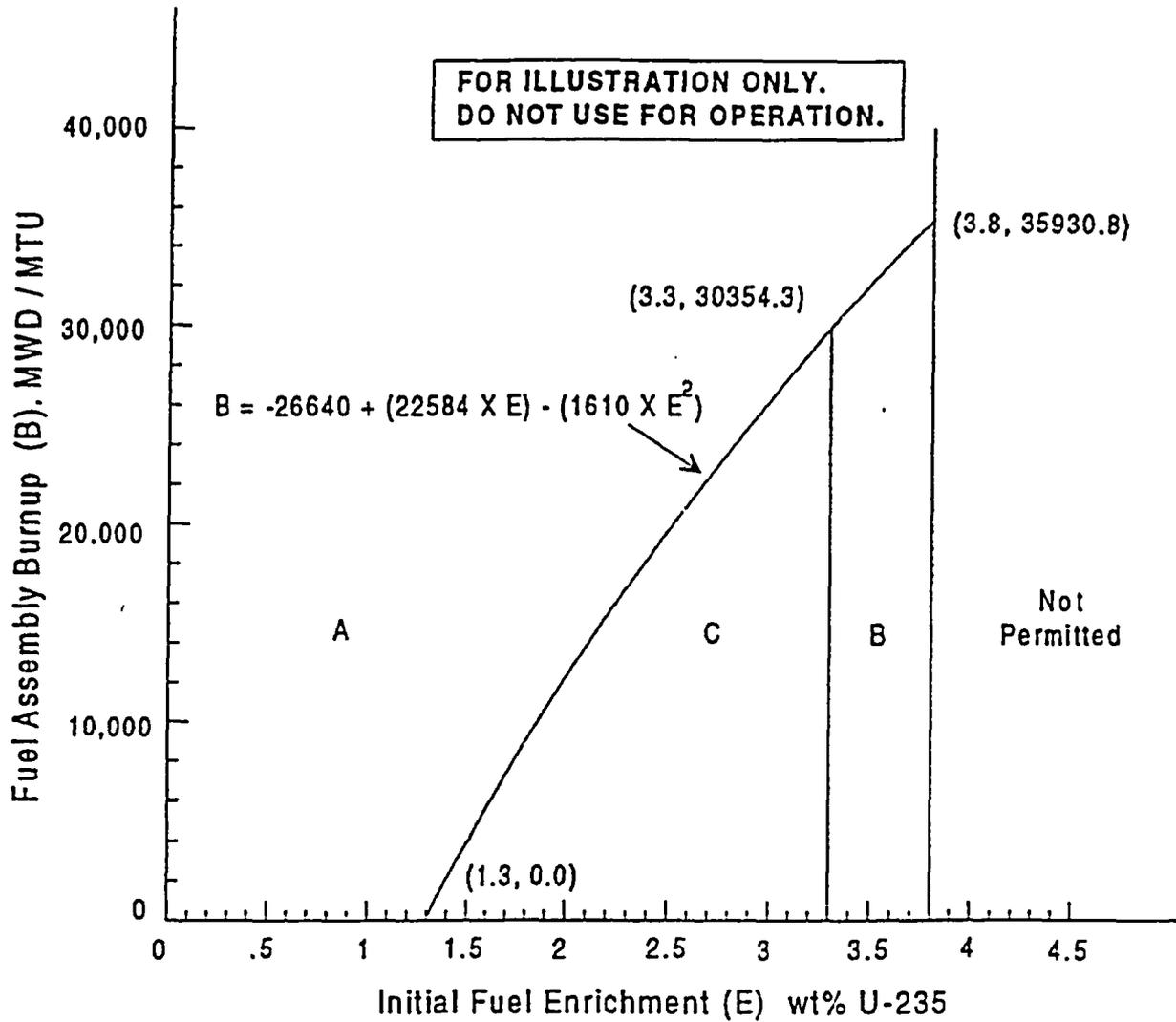
APPLICABILITY: Whenever any fuel assembly is stored in [Region 2] of the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 -----NOTE----- LCO 3.0.3 is not applicable. ----- Initiate action to move the noncomplying fuel assembly from [Region 2].	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.16.1 Verify by administrative means the initial enrichment and burnup of the fuel assembly is in accordance with Figure 3.7.16-1 or Specification 4.3.1.1.	Prior to storing the fuel assembly in [Region 2]



Category "A" Fuel - May be located anywhere within the storage racks.
 Category "B" Fuel - Shall only be located adjacent to Category "A" Fuel or water holes within the storage racks.
 Category "C" Fuel - Shall not be located adjacent to Category "B" Fuel.

Figure 3.7.16-1 (page 1 of 1)
 Burnup versus Enrichment Curve for
 Spent Fuel Storage Racks

Pool

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B 3.7 PLANT SYSTEMS

B 3.7.16 Spent Fuel Assembly Storage

BASES

BACKGROUND

The spent fuel storage facility is designed to store either new (nonirradiated) nuclear fuel assemblies, or burned (irradiated) fuel assemblies in a vertical configuration underwater. The storage pool is sized to store [735] ~~irradiated~~ fuel assemblies, which includes storage for [15] failed fuel containers. The spent fuel storage cells are installed in parallel rows with center to center spacing of [12 31/32] inches in one direction, and [13 3/16] inches in the other orthogonal direction. This spacing and "flux trap" construction, whereby the fuel assemblies are inserted into neutron absorbing stainless steel cans, is sufficient to maintain a k_{eff} of ≤ 0.95 for spent fuel of original enrichment of up to [3.3]%. However, as higher initial enrichment fuel assemblies are stored in the spent fuel pool, they must be stored in a checkerboard pattern taking into account fuel burnup to maintain a k_{eff} of 0.95 or less.

APPLICABLE
SAFETY ANALYSES

The spent fuel storage facility is designed for noncriticality by use of adequate spacing, and "flux trap" construction whereby the fuel assemblies are inserted into neutron absorbing stainless steel cans.

The spent fuel ~~assembly~~ ^{pool} storage satisfies Criterion 2 of the NRC Policy Statement.

LCO

The restrictions on the placement of fuel assemblies within the fuel pool, according to Figure [3.7.16-1] in the accompanying LCO, ensure that the k_{eff} of the spent fuel pool will always remain < 0.95 assuming the pool to be flooded with unborated water. The restrictions are consistent with the criticality safety analysis performed for the spent fuel pool, according to Figure [3.7.16-1]. Fuel assemblies not meeting the criteria of Figure [3.7.16-1] shall be stored in accordance with Specification 4.3.1.1.

(continued)

Pool

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BASES (continued)

APPLICABILITY This LCO applies whenever any fuel assembly is stored in [Region 2] of the spent fuel pool.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply.

When the configuration of fuel assemblies stored in the spent fuel pool is not in accordance with Figure [3.7.16-1], immediate action must be taken to make the necessary fuel assembly movement(s) to bring the configuration into compliance with Figure [3.7.16-1].

If moving irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operation. Therefore, in either case, inability to move fuel assemblies is not sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTS

SR 3.7.16.1

This SR verifies by administrative means that the initial enrichment and burnup of the fuel assembly is in accordance with Figure [3.7.16-1] in the accompanying LCO.

REFERENCES

None.

Pool

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3.7 PLANT SYSTEMS

3.7.17 Spent Fuel Assembly Storage

LCO 3.7.17 The combination of initial enrichment and burnup of each spent fuel assembly stored in [Region 2] shall be within the Acceptable [Burnup Domain] of Figure 3.7.17-1 or in accordance with Specification 4.3.1.1.

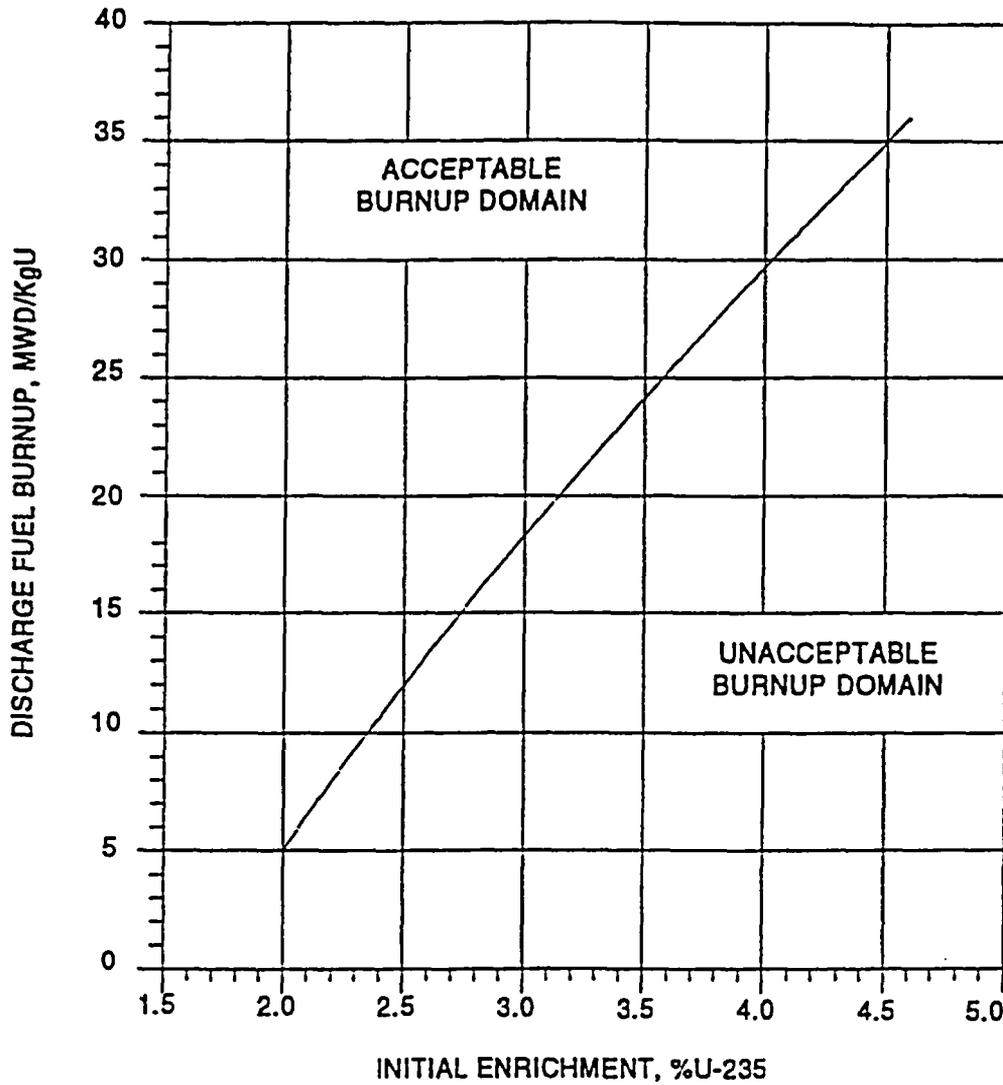
APPLICABILITY: Whenever any fuel assembly is stored in [Region 2] of the spent fuel storage pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 -----NOTE----- LCO 3.0.3 is not applicable. ----- Initiate action to move the noncomplying fuel assembly from [Region 2].	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.17.1 Verify by administrative means the initial enrichment and burnup of the fuel assembly is in accordance with Figure 3.7.17-1 or Specification 4.3.1.1.	Prior to storing the fuel assembly in [Region 2]



Not to be used for Operation.
For illustration purposes only.

Figure 3.7.17-1 (page 1 of 1)
Fuel Assembly Burnup Limits in Region 2

Pool

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B 3.7 PLANT SYSTEMS

B 3.7.17 Spent Fuel ~~Assembly~~ Storage

BASES

BACKGROUND

In the Maximum Density Rack (MDR) [(Refs. 1 and 2)] design, the spent fuel storage pool is divided into two separate and distinct regions which, for the purpose of criticality considerations, are considered as separate pools. [Region 1], with [336] storage positions, is designed to accommodate new fuel with a maximum enrichment of [4.65] wt% U-235, or spent fuel regardless of the discharge fuel burnup. [Region 2], with [2670] storage positions, is designed to accommodate fuel of various initial enrichments which have accumulated minimum burnups within the acceptable domain according to Figure 3.7.17-1, in the accompanying LCO. Fuel assemblies not meeting the criteria of Figure [3.7.17-1] shall be stored in accordance with paragraph 4.3.1.1 in Section 4.3, Fuel Storage.

The water in the spent fuel storage pool normally contains soluble boron, which results in large subcriticality margins under actual operating conditions. However, the NRC guidelines, based upon the accident condition in which all soluble poison is assumed to have been lost, specify that the limiting k_{eff} of 0.95 be evaluated in the absence of soluble boron. Hence, the design of both regions is based on the use of unborated water, which maintains each region in a subcritical condition during normal operation with the regions fully loaded. The double contingency principle discussed in ANSI N-16.1-1975 and the April 1978 NRC letter (Ref. 3) allows credit for soluble boron under other abnormal or accident conditions, since only a single accident need be considered at one time. For example, the most severe accident scenario is associated with the movement of fuel from [Region 1 to Region 2], and accidental misloading of a fuel assembly in [Region 2]. This could potentially increase the criticality of [Region 2]. To mitigate these postulated criticality related accidents, boron is dissolved in the pool water. Safe operation of the MDR with no movement of assemblies may therefore be achieved by controlling the location of each assembly in accordance with the accompanying LCO. Prior to movement of an assembly, it is necessary to perform SR 3.7.16.1.

(continued)

BASES (continued)

APPLICABLE
SAFETY ANALYSES

The hypothetical accidents can only take place during or as a result of the movement of an assembly (Ref. 4). For these accident occurrences, the presence of soluble boron in the spent fuel storage pool (controlled by LCO 3.7.16, "Fuel Storage Pool Boron Concentration") prevents criticality in both regions. By closely controlling the movement of each assembly and by checking the location of each assembly after movement, the time period for potential accidents may be limited to a small fraction of the total operating time. During the remaining time period with no potential for accidents, the operation may be under the auspices of the accompanying LCO.

The configuration of fuel assemblies in the fuel storage pool satisfies Criterion 2 of the NRC Policy Statement.

LCO

The restrictions on the placement of fuel assemblies within the spent fuel pool, in accordance with Figure 3.7.17-1, in the accompanying LCO, ensures the k_{eff} of the spent fuel storage pool will always remain < 0.95 , assuming the pool to be flooded with unborated water. Fuel assemblies not meeting the criteria of Figure [3.7.17-1] shall be stored in accordance with Specification 4.3.1.1 in Section 4.3.

APPLICABILITY

This LCO applies whenever any fuel assembly is stored in [Region 2] of the fuel storage pool.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply.

When the configuration of fuel assemblies stored in [Region 2] the spent fuel storage pool is not in accordance with Figure 3.7.17-1, or paragraph 4.3.1.1, the immediate action is to initiate action to make the necessary fuel assembly movement(s) to bring the configuration into compliance with Figure 3.7.17-1 or Specification 4.3.1.1.

(continued)

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BASES

ACTIONS

A.1 (continued)

If unable to move irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not be applicable. If unable to move irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the action is independent of reactor operation. Therefore, inability to move fuel assemblies is not sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTS

SR 3.7.17.1

This SR verifies by administrative means that the initial enrichment and burnup of the fuel assembly is in accordance with Figure [3.7.17-1] in the accompanying LCO. For fuel assemblies in the unacceptable range of Figure 3.7.17-1, performance of this SR will ensure compliance with Specification 4.3.1.1.

REFERENCES

1. Callaway FSAR, Appendix 9.1A, "The Maximum Density Rack (MDR) Design Concept."
 2. Description and Evaluation for Proposed Changes to Facility Operating Licenses DPR-39 and DPR-48 (Zion Power Station).
 3. Double contingency principle of ANSI N16.1-1975, as specified in the April 14, 1978 NRC letter (Section 1.2) and implied in the proposed revision to Regulatory Guide 1.13 (Section 1.4, Appendix A).
 4. FSAR, Section [15.7.4].
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Pool

3.7 PLANT SYSTEMS

3.7.18 Spent Fuel ~~Assembly~~ Storage

LCO 3.7.18 The combination of initial enrichment and burnup of each ~~spent~~ fuel assembly stored in [Region 2] shall be within the acceptable [burnup domain] of Figure 3.7.18-1 [or in accordance with Specification 4.3.1.1].

APPLICABILITY: Whenever any fuel assembly is stored in [Region 2] of the fuel storage pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 -----NOTE----- LCO 3.0.3 is not applicable. ----- Initiate action to move the noncomplying fuel assembly from [Region 2].	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.18.1 Verify by administrative means the initial enrichment and burnup of the fuel assembly is in accordance with Figure 3.7.18-1 or Specification 4.3.1.1.	Prior to storing the fuel assembly in [Region 2]

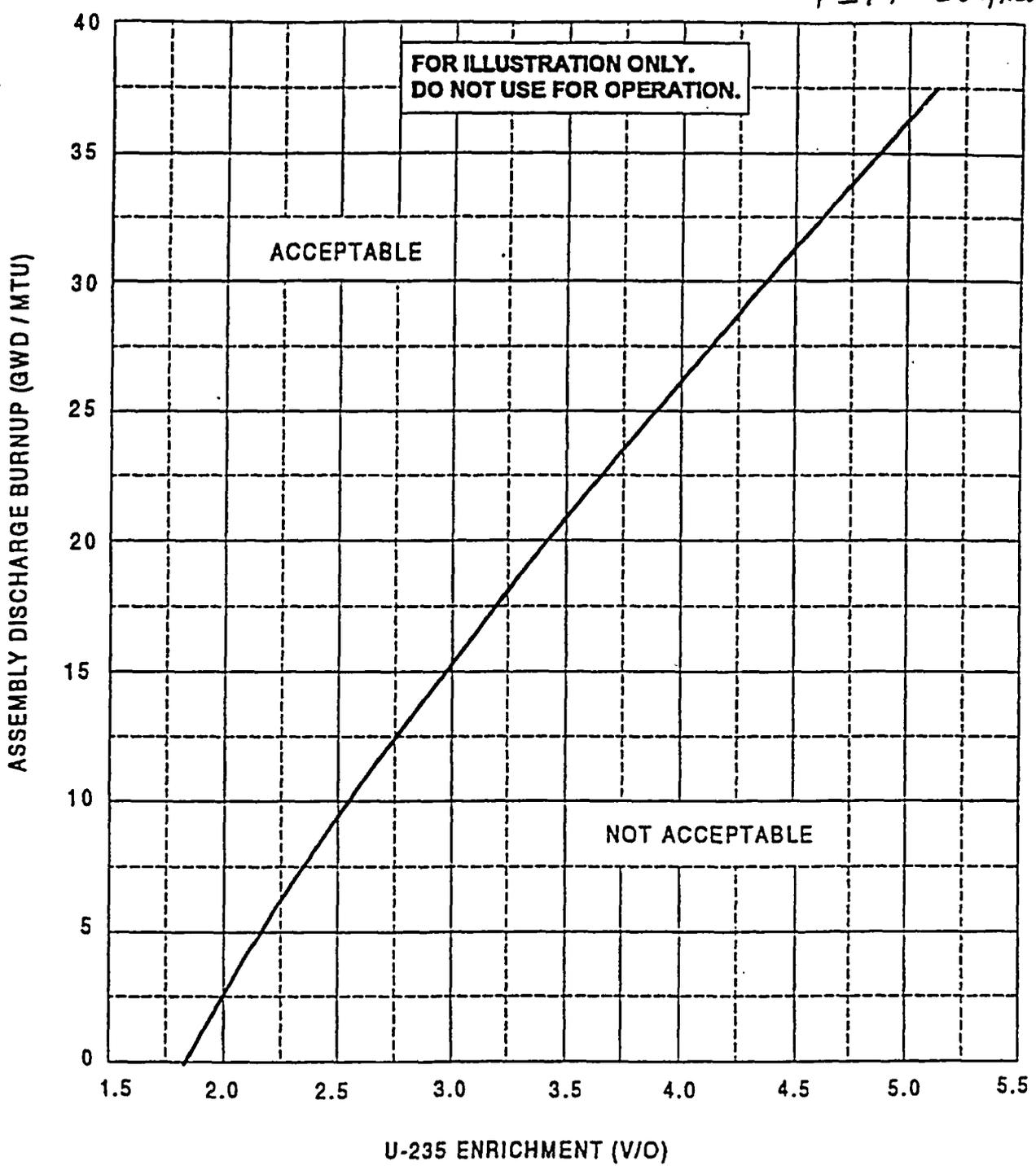


Figure 3.7.18-1 (page 1 of 1)
Discharge Burnup vs. Initial Enrichment for Region II Racks

B 3.7 PLANT SYSTEMS

B 3.7.18 Spent Fuel Assembly Storage

Spent Fuel Assembly Storage
B 3.7.18

Pool

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BASES

BACKGROUND

The spent fuel storage facility is designed to store either new (nonirradiated) nuclear fuel assemblies, or burned (irradiated) fuel assemblies in a vertical configuration underwater. The storage pool is sized to store [735] irradiated fuel assemblies, which includes storage for [15] failed fuel containers. The spent fuel storage cells are installed in parallel rows with center to center spacing of [12 31/32] inches in one direction, and [13 3/16] inches in the other orthogonal direction. This spacing and "flux trap" construction, whereby the fuel assemblies are inserted into neutron absorbing stainless steel cans, is sufficient to maintain a k_{eff} of ≤ 0.95 for spent fuel of original enrichment of up to [3.3]%. However, as higher initial enrichment fuel assemblies are stored in the spent fuel pool, they must be stored in a checkerboard pattern taking into account fuel burnup to maintain a k_{eff} of 0.95 or less.

APPLICABLE SAFETY ANALYSES

The spent fuel storage facility is designed for noncriticality by use of adequate spacing, and "flux trap" construction whereby the fuel assemblies are inserted into neutron absorbing stainless steel cans.

The spent fuel assembly pool storage satisfies Criterion 2 of the NRC Policy Statement.

LCO

The restrictions on the placement of fuel assemblies within the spent fuel pool, according to [Figure 3.7.18-1], in the accompanying LCO, ensures that the k_{eff} of the spent fuel pool will always remain < 0.95 assuming the pool to be flooded with unborated water. The restrictions are consistent with the criticality safety analysis performed for the spent fuel pool according to [Figure 3.7.18-1], in the accompanying LCO. Fuel assemblies not meeting the criteria of [Figure 3.7.18-1] shall be stored in accordance with Specification 4.3.1.1.

(continued)

BASES (continued)

APPLICABILITY This LCO applies whenever any fuel assembly is stored in [Region 2] of the spent fuel pool.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply.

When the configuration of fuel assemblies stored in [Region 2] the spent fuel pool is not in accordance with Figure [3.7.18-1], immediate action must be taken to make the necessary fuel assembly movement(s) to bring the configuration into compliance with Figure [3.7.18-1].

If moving irradiated fuel assemblies while in MOPE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operation. Therefore, in either case, inability to move fuel assemblies is not sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTS

SR 3.7.18.1

This SR verifies by administrative means that the initial enrichment and burnup of the fuel assembly is in accordance with Figure [3.7.18-1] in the accompanying LCO. For fuel assemblies in the unacceptable range of [Figure 3.7.18-1], performance of this SR will ensure compliance with Specification 4.3.1.1.

REFERENCES

None.
