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TS 6.18.d

TMI-20-012

April 13, 2020

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Three Mile Island Nuclear Station, Unit 1
Renewed Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Submittal of Changes to Technical Specifications Bases

In accordance with the requirements of Three Mile Island Nuclear Station (TMI), Unit 1, Technical Specification 6.18.d, Exelon Generation Company, LLC, hereby submits a complete updated copy of the TMI, Unit 1, Technical Specifications (TS) Bases, which includes the related TS. The enclosed Bases include changes through the date of this letter.

If you have any questions or require further information, please contact Frank J. Mascitelli at 610-765-5512.

Respectfully,

D. P. Helker

David P. Helker
Sr. Manager, Licensing
Exelon Generation Company, LLC

Enclosure: Three Mile Island Nuclear Station, Unit 1, Technical Specifications Bases

cc: w/o Enclosure
USNRC Administrator, Region I
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SECTION 3.0

LIMITING CONDITIONS FOR OPERATION

3/4. LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

3/4.0 GENERAL ACTION REQUIREMENTS AND SURVEILLANCE REQUIREMENT APPLICABILITY

3.0.1 LCOs shall be met during the specified conditions in the TS, except as provided in 3.0.2.

3.0.2 Upon discovery of a failure to meet an LCO, the required actions of the associated Conditions shall be met.

If the LCO is met or is no longer applicable prior to expiration of the specified completion time(s), completion of the required action(s) is not required, unless otherwise stated.

4.0.1 Surveillance requirements shall be met during the specified conditions in the applicability for individual LCOs, unless otherwise stated in the surveillance requirements. 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 4.0.2.

4.0.2 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 greater. This delay period is permitted to allow performance of the Surveillance. The delay period is only applicable when there is a reasonable expectation the surveillance will be met when performed.

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.

4.0.3 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.

BASES

LCO 3.0.1 and LCO 3.0.2, and SR 4.0.1 through SR 4.0.3 delineate the actions to be taken for circumstances not directly provided for in the action requirements of individual specifications and whose occurrence would violate the intent of the specification.

LCO 3.0.1 establishes the applicability statement within each individual specification as the requirement for when the LCO is required to be met (i.e., when the facility is in the specified conditions of the applicability statement of each Specification).

LCO 3.0.2 establishes that upon discovery of a failure to meet an LCO, the associated actions shall be met. The completion time of each required action for an ACTIONS condition is applicable from the point in time that an actions condition is entered. The required actions establish those remedial measures that must be taken within specified completion times when the requirements of an LCO are not met. This specification establishes that completion of the required actions within the specified completion times constitutes compliance with a specification.

Completing the required actions is not required when an LCO is met or is no longer applicable, unless otherwise stated in the individual specifications.

SR 4.0.1 establishes the requirement that SRs must be met during the specified conditions in the SRs for which the requirements of the LCO apply, unless otherwise specified in the individual SRs. This specification is to ensure that surveillances are performed in order to verify that facility conditions are within specified limits. Failure to meet a surveillance within the specified frequency constitutes a failure to meet an LCO.

Variables are assumed to be within limits when the associated SRs have been met. Nothing in this Specification, however, is to be construed as implying that variables are within limits when the requirements of the surveillance(s) are known not to be met between required surveillance performances.

Surveillances do not have to be performed when the unit is in a specified condition for which the requirements of the associated LCO are not applicable, unless otherwise specified. Unplanned events may satisfy the requirements (including applicable acceptance criteria) for a given SR. In this case, the unplanned event may be credited as fulfilling the performance of the SR. This allowance includes those SRs whose performance is normally precluded in a given specified condition.

Surveillances, including surveillances invoked by LCO required actions, do not have to be performed on inoperable equipment because the actions define the remedial measures that apply. Surveillances have to be met and performed in accordance with the specified frequency, prior to returning equipment to OPERABLE status.

SR 4.0.2 establishes the flexibility to defer declaring affected equipment inoperable or an affected variable outside the specified limits when a surveillance has not been performed within the specified frequency. A delay period of up to 24 hours or up to the limit of the specified frequency, whichever is greater, applies from the point in time that it is discovered that the required surveillance has not been performed in accordance with Surveillance Requirement 4.0.2 and not at the time that the specified frequency was not met.

The delay period provides an adequate time to perform surveillances that have been missed. This delay period permits the performance of a surveillance before complying with required actions or other remedial measures that might preclude performance of the surveillance.

The basis for this delay period includes consideration of facility conditions, adequate planning, availability of personnel, the time required to perform the surveillance, the safety significance of the delay in completing the required surveillance, and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the requirements.

SR 4.0.2 is only applicable if there is a reasonable expectation the associated variables are within limits, and it is expected that the Surveillance will be met when performed. Many factors should be considered, such as the period of time since the Surveillance was last performed, or whether the Surveillance, or a portion thereof, has ever been performed, and any other indications, tests, or activities that might support the expectation that the Surveillance will be met when performed. The rigor of determining whether there is a reasonable expectation a Surveillance will be met when performed should increase based on the length of time since the last performance of the Surveillance. If the Surveillance has been performed recently, a review of the Surveillance history and equipment performance may be sufficient to support a reasonable expectation that the Surveillance will be met when performed. For Surveillances that have not been performed for a long period or that have never been performed, a rigorous evaluation based on objective evidence should provide a high degree of confidence that the equipment is OPERABLE. The evaluation should be documented in sufficient detail to allow a knowledgeable individual to understand the basis for the determination.

Failure to comply with specified surveillance frequencies is expected to be an infrequent occurrence. Use of the delay period established by Surveillance Standard 4.0.2 is a flexibility which is not intended to be used repeatedly to extend surveillance intervals. While up to 24 hours or the limit of the specified frequency is provided to perform the missed surveillance, it is expected that the missed surveillance will be performed at the first reasonable opportunity. If a surveillance is not completed within the allowed delay period, then the variable is considered outside the specified limits and the completion times of the required actions for the applicable LCO conditions begin immediately upon expiration of the delay period. If a surveillance is failed within the delay period, then the variable is outside the specified limits and the completion times of the required actions for the applicable LCO conditions begin immediately upon failure of the surveillance.

Completion of the surveillance within the delay period allowed by this specification, or within the completion time of the actions, restores compliance.

SR 4.0.3 permits a 25% extension of the interval specified in the frequency. This extension facilitates Surveillance scheduling and considers facility conditions that may not be suitable for conducting the Surveillance (e.g., other ongoing surveillance or maintenance activities).

The 25% extension does not significantly degrade the reliability that results from performing the Surveillance at its specified Frequency. This is based on the recognition that the most probable result of any Surveillance is the verification of conformance with the SRs.

3/4.1 HANDLING AND STORAGE OF IRRADIATED FUEL IN THE SPENT FUEL POOL

3/4.1.1 SPENT FUEL POOL WATER LEVEL

Applicability

Applies to the minimum level of water in the Spent Fuel Pool during handling of irradiated fuel in the Spent Fuel Pool.

Objective

Ensures that assumptions of Fuel Handling Accident are maintained during handling of irradiated fuel in the Spent Fuel Pool.

Specification

3.1.1.1 Maintain Spent Fuel Pool level greater than 342'4" elevation.

3.1.1.2 With Spent Fuel Pool level less than 342'4" elevation, immediately suspend handling of irradiated fuel in the Spent Fuel Pool.

SURVEILLANCE REQUIREMENTS

4.1.1.1 Verify Spent Fuel Pool level greater than or equal to 342'4" elevation every 7 days.

Bases

The top of fuel is at the 319'4" elevation. The FHA analysis assumes 23' of water above the fuel assemblies. This dictates a minimum elevation of water in the Spent Fuel Pool of 342'4". This specification provides the controls to ensure the assumptions of the accident analysis while fuel handling evolutions are in progress. This specification will have a SR 4.1.1.1 that will verify the Spent Fuel Pool water level on a frequency of 7 days.

The water contained in the spent fuel pool provides a medium for removal of decay heat from the stored fuel elements, normally via the spent fuel cooling system. The spent fuel pool water also provides shielding to reduce the general area radiation dose during both spent fuel handling and storage. The resultant 2-hour dose to a person at the exclusion area boundary and the 30-day dose at the low population zone are much less than 10 CFR 50.67 limits.

LCO 3.1.1.2 requires that when the water level in the SFP is lower than the required level, the movement of irradiated fuel assemblies in the SFP is to be "immediately" suspended. "Immediately" as used in this completion time means the required action should be pursued without delay and in a controlled manner, such that the suspension of this activity shall not preclude completion of movement of an irradiated fuel assembly to a safe position. This effectively precludes a spent fuel handling accident from occurring in the SFP when the level is below the required elevation.

Although maintaining adequate spent fuel pool water level is essential to both decay heat removal and shielding effectiveness, the Technical Specification minimum water level limit is based upon maintaining the pool's iodine retention-effectiveness consistent with that assumed

in the evaluation of the Post Permanent Shutdown FHA analysis. The Post Permanent Shutdown FHA analysis assumes that a minimum of 23 feet of water is maintained above the stored fuel. This assumption allows the use of the pool iodine decontamination factor of 200 used in the associated offsite dose calculation.

3/4.1.2 SPENT FUEL POOL BORON CONCENTRATION

Applicability

Applies to the minimum boron concentration in the Spent Fuel Pool during storage and handling of irradiated fuel in the Spent Fuel Pool.

Objective

Ensures that assumptions of Storage Limitations are maintained to prevent inadvertent criticality in the Spent Fuel Pool.

Specification

3.1.2.1 Maintain Spent Fuel Pool boron concentration greater than or equal to 600 ppm.

3.1.2.2 With Spent Fuel Pool boron concentration less than 600 ppm, immediately suspend handling of irradiated fuel in the Spent Fuel Pool and immediately restore boron concentration per 3.1.2.1.

SURVEILLANCE REQUIREMENTS

4.1.2.1 Verify Spent Fuel Pool boron concentration greater than or equal to 600 ppm every 7 days.

Bases

The acceptance criteria for the fuel storage pool criticality analyses is that a keff of < 0.95 must be maintained for all postulated events. The storage racks are capable of maintaining this keff with unborated pool water at a temperature yielding the highest reactivity (assuming the storage restrictions of LCO 3.1.3 are met). Most abnormal storage locations will not result in an increase in the keff of the racks. However, it is possible to postulate events, such as the mis-loading of an assembly with a burnup and enrichment combination outside the acceptable area in Figure 3.1.3-1 and 3.1.3-2, or dropping an assembly between the pool wall and the fuel racks, which could lead to an increase in reactivity. For such events, credit is taken for the presence of boron in the pool water since the NRC does not require the assumption of two unlikely, independent, concurrent events to ensure protection against a criticality accident (double contingency principle). The reduction in keff, caused by the boron more than offsets the reactivity addition caused by credible accidents. This specification will have a Surveillance Requirement SR 4.1.2.1 that will verify the Spent Fuel Pool Boron on a frequency of 7 days.

LCO 3.1.2.2 requires that when the SFP boron concentration is less than 600 ppm, the movement of irradiated fuel assemblies in the SFP is to be "immediately" suspended. "Immediately" as used in this completion time means the required action should be pursued without delay and in a controlled manner, such that the suspension of this activity shall not preclude completion of movement of an irradiated fuel assembly to a safe position. This effectively precludes a spent fuel handling accident from occurring in the SFP when the boron concentration is below the required level.

3/4.1.3 SPENT FUEL ASSEMBLY STORAGE

Applicability

Applies whenever any fuel assembly is stored in Storage Pool A or Storage Pool B of the Spent Fuel Pool.

Objective

Ensures that assumptions of Storage Limitations are maintained to prevent inadvertent criticality in the Spent Fuel Pool.

Specification

3.1.3.1 The combination of initial enrichment and burnup of each spent fuel assembly stored in Storage Pool A and Storage Pool B, shall be within the acceptable region of Figure 3.1.3-1 or 3.1.3-2.

3.1.3.2 When requirement of 3.1.3.1 is not met, immediately initiate action to move the noncomplying fuel assembly to an acceptable configuration.

SURVEILLANCE REQUIREMENTS

4.1.3.1 Verify by administrative means the initial enrichment and burnup of the fuel assembly is in accordance with Figure 3.1.3-1 or Figure 3.1.3-2 prior to storing irradiated spent fuel in the Spent Fuel Pool A or Spent Fuel Pool B.

Bases

The function of the spent fuel storage racks is to support safety analyses and protect spent fuel assemblies from the time they are placed in the pool until they are shipped offsite. The spent fuel assembly storage LCO was derived from the need to establish limiting conditions on fuel storage to assure sufficient safety margin exists to prevent inadvertent criticality. The spent fuel assemblies are stored entirely underwater in a configuration that has been shown to result in a reactivity of less than or equal to 0.95 under worse case conditions. The spent fuel assembly enrichment requirements in this LCO are required to ensure inadvertent criticality does not occur in the spent fuel pool. Inadvertent criticality within the fuel storage area could result in offsite radiation doses exceeding 10 CFR 50.67 limits.

LCO 3.1.3.2 requires that when LCO 3.1.3.1 is not met, "immediately" initiate action to move the noncomplying fuel assembly to an acceptable configuration. "Immediately" as used in this completion time means the required action should be pursued without delay and in a controlled manner, to reestablish the safety margins to prevent an inadvertent criticality.

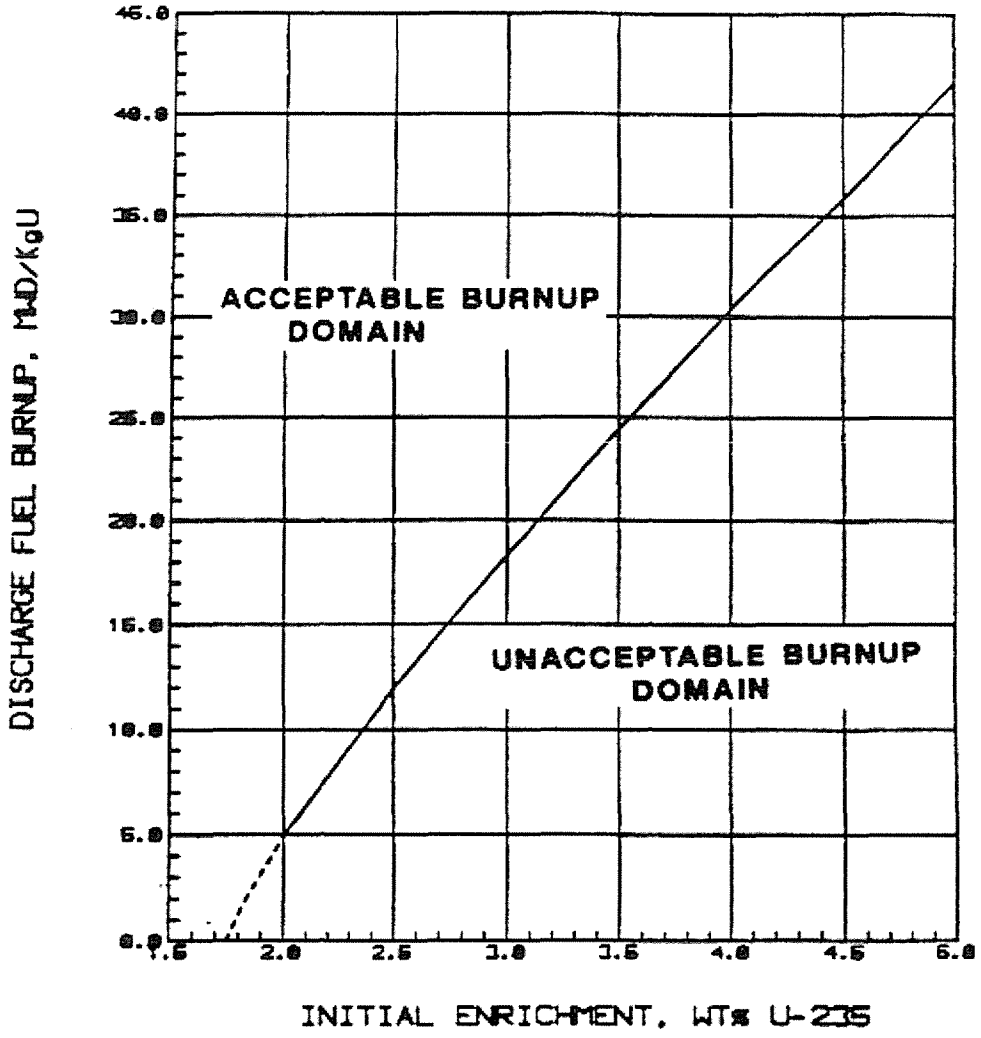


Figure 3.1.3-1
Minimum Burnup Requirements for Fuel in Region II of the Pool A Storage Racks

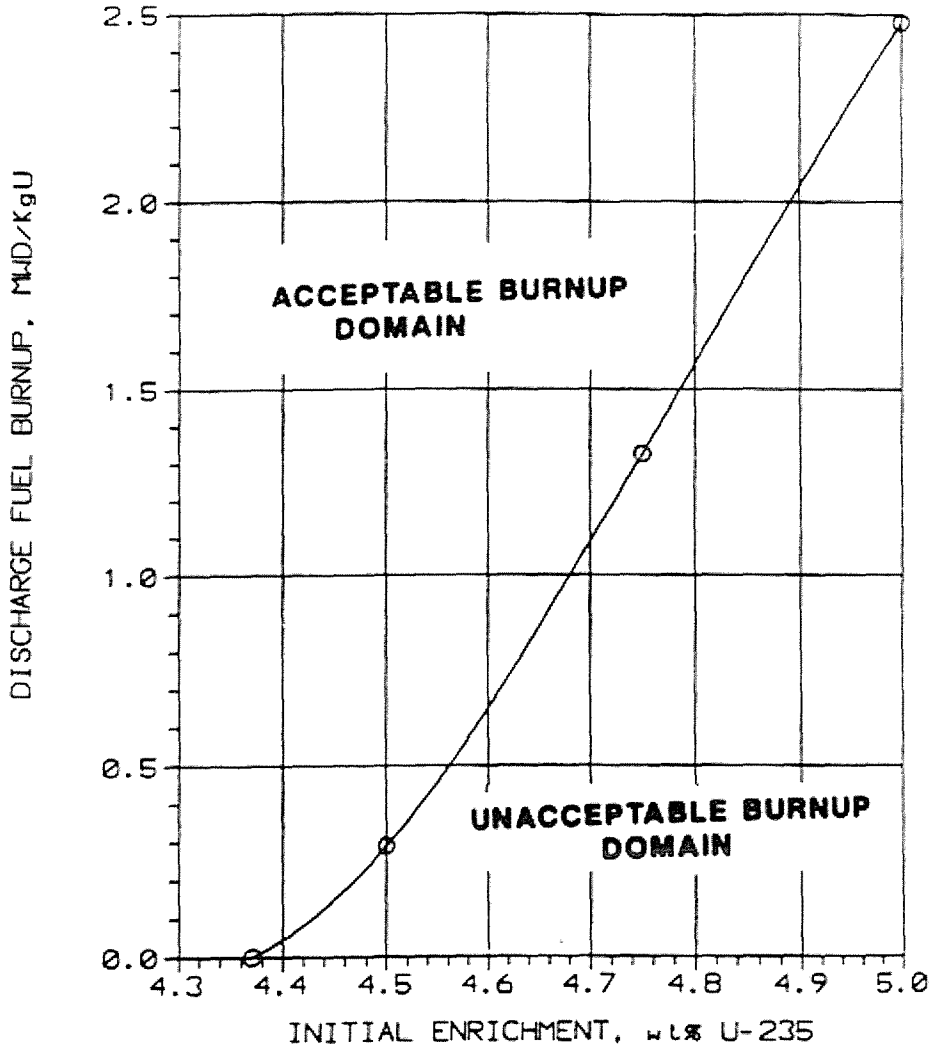


Figure 3.1.3-2
Minimum Burnup Requirements for Fuel in the Pool B Storage Racks

3/4.1.4 HANDLING OF IRRADIATED FUEL WITH THE FUEL HANDLING BUILDING CRANE

Applicability

Applies to the operation of the fuel handling building crane when within the confines of Unit 1 and there is any spent fuel in storage in the Unit 1 fuel handling building.

Objective

To define the lift conditions and allowable areas of travel when loads to be lifted and transported with the fuel handling building crane are in excess of 15 tons or between 1.5 tons and 15 tons or consist of irradiated fuel elements.

Specification

3.1.4.1 Spent fuel elements having less than 120 days for decay of their irradiated fuel shall not be loaded into a spent fuel transfer cask in the shipping cask area.

3.1.4.2 The key operated travel interlock system for automatically limiting the travel area of the fuel handling building crane shall be imposed whenever loads in excess of 15 tons are to be lifted and transported with the exception of fuel handling bridge maintenance.

3.1.4.3 The lowest surface of all loads in excess of 15 tons shall be administratively limited to an elevation one foot or less above the concrete surface at the nominal 348 ft-0 in. elevation in the fuel handling building.

3.1.4.4 Loads in excess of hook capacity shall not be lifted, except for load testing.

3.1.4.5 Following modifications or repairs to any of the load bearing members, the crane shall be subjected to a test lift of 125 percent of its rated load.

3.1.4.6 Administrative controls shall require the use of an approved procedure with an identified safe load path for loads in excess of 3,000 lbs. handled above the Spent Fuel Pool Operating Floor (348' elevation).

3.1.4.7 During transfer of the cask to and from the cask loading pit, the cask will be restricted to the transfer path shown in Figure 3.1.4-1. Administrative controls will be used to ensure that all lateral movements of the cask are performed at slow bridge and trolley speeds. During this transfer the cask lifting yoke shall be oriented in the East-West direction.

Bases

This specification will limit activity releases to unrestricted areas resulting from damage to spent fuel stored in the spent fuel storage pools in the postulated event of the dropping of a heavy load from the fuel handling building crane. A Fuel Handling accident analysis was performed assuming that the cask and its entire contents of ten fuel assemblies are sufficiently damaged as a result of dropping the cask, to allow the escape of all noble gases and iodine in the gap (Reference 1). This release was assumed to be directly to the atmosphere and to occur instantaneously. The site boundary doses resulting from this accident are 5.25 R whole body and 1.02 R to thyroid, and are within the limits specified in 10 CFR 100.

Specification 3.1.4.1 requires that spent fuel, having less than 120 days decay post-irradiation, not be loaded in a spent fuel transfer cask in order to ensure that the doses resulting from a highly improbable spent fuel transfer cask drop would be within those calculated above.

Specification 3.1.4.2 requires the key operated interlock system, which automatically limits the travel area of the fuel handling crane while it is lifting and transporting the spent fuel shipping cask, to be imposed whenever loads in excess of 15 tons are to be lifted and transported while there is any spent fuel in storage in the spent fuel storage pools in Unit 1. This automatically ensures that these heavy loads travel in areas where, in the unlikely event of a load drop accident, there would be no possibility of this event resulting in any damage to the spent fuel stored in the pools, any unacceptable structural damage to the spent fuel pool structure, or damage to redundant trains of safety related components. The shipping cask area is designed to withstand the drop of the spent fuel shipping cask from the 349 ft-0 in. elevation without unacceptable damage to the spent fuel pool structure (Reference 2).

Specification 3.1.4.3 ensures that the lowest surface of any heavy load never gets higher than one foot above the concrete surface of the 348 ft-0 in. elevation in the fuel handling building (nominal elevation 349 ft-0 in.) thereby keeping any impact force from an unlikely load drop accident within acceptable limits.

Specification 3.1.4.4 ensures that the proper capacity crane hook is used for lifting and transporting loads thus reducing the probability of a load drop accident.

Following modification or repairs, specification 3.1.4.5 confirms the load rating of the crane.

Specification 3.1.4.6 imposes administrative limits on handling loads weighing in excess of 3000 lbs. to minimize the potential for heavy loads, if dropped, to impact irradiated fuel in the spent fuel pool, or to impact redundant safe shutdown equipment. The safe load path shall follow, to the extent practical, structural floor members, beams, etc., such that if the load is dropped, the structure is

more likely to withstand the impact. Handling loads of less than 3000 lbs. without these restrictions is acceptable because the consequences of dropping loads in this weight range are comparable to those produced by the fuel handling accident considered in the FSAR and found acceptable.

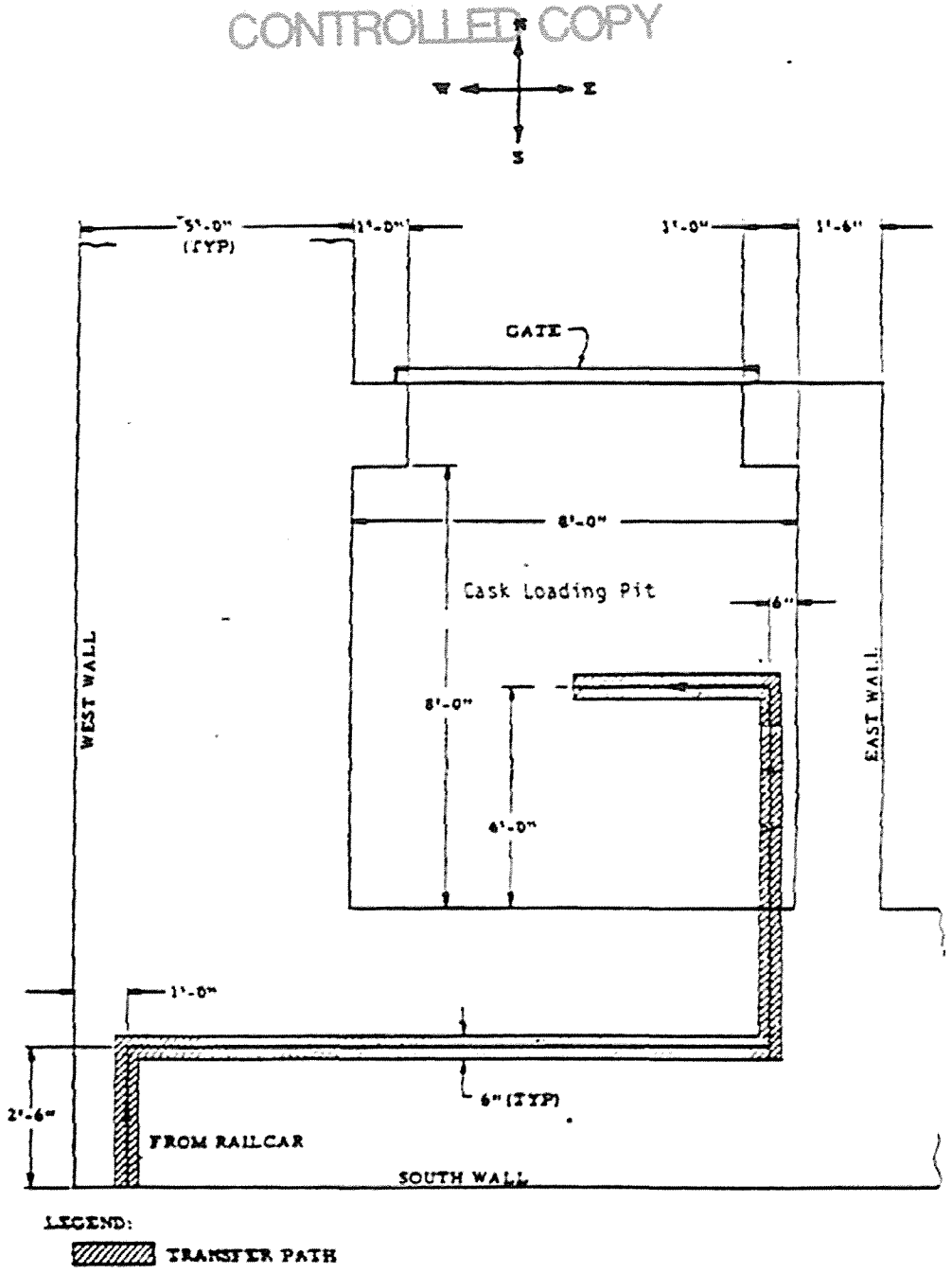
Specification 3.1.4.7 in combination with 3.1.4.3 ensures the spent fuel cask is handled in a manner consistent with the load drop analysis (Reference 3).

References

(1) UFSAR, Section 14.2.2.1 - "Fuel Handling Accident"

(2) UFSAR, Section 14.2.2.8 - "Fuel Cask Drop Accident"

(3) GPU Evaluation of Heavy Load Handling Operations at TMI-1 February 21, 1984, as transmitted to the NRC in GPUN Letter No. 5211 84 2013.



TRANSFER PATH TO AND FROM CASK LOADING PIT
(EL. 348"-0")
FIGURE 3.1.4-1