Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802
Tel 479-858-3110

Jeremy G. Browning
Vice President - Operations
Arkansas Nuclear One

2CAN061302

June 18, 2013

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

SUBJECT: License Amendment Request - Supplemental
Technical Specification (TS) Change Related to Revised Fuel Assembly Drop Analysis and Adoption of TSTF-51, TSTF-272, TSTF-286, and TSTF-471
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCES:

1. Entergy letter dated April 4, 2012, *License Amendment Request – Technical Specification (TS) Change Related to Revised Fuel Assembly Drop Analysis and Adoption of TSTF-51, TSTF-272, TSTF-286, and TSTF-471* (2CAN041201) (ML12096A022) (TAC No. ME8348)

2. NRC email dated May 10, 2012, *Proposed License Amendment Request to Technical Specification (TS) Change Related to Revised Fuel Assembly Drop Analysis and Adoption of TSTF-51, TSTF-272, TSTF-286, and TSTF-471* (ML121310562)

3. Entergy letter dated July 9, 2012, *License Amendment Request – Supplemental - Technical Specification (TS) Change Related to Revised Fuel Assembly Drop Analysis and Adoption of TSTF-51, TSTF-272, TSTF-286, and TSTF-471* (2CAN071201) (ML12192A089) (TAC No. ME8348)

4. NRC email dated June 12, 2013, *Request for Additional Information – Proposed License Amendment Request to Technical Specification (TS) Change Related to Revised Fuel Assembly Drop Analysis and Adoption of TSTF-51, TSTF-272, TSTF-286, and TSTF-471* (TAC No. ME8348)

Dear Sir or Madam:

With regard to Reference 1, Entergy Operations, Inc. (Entergy) submitted a request to amend the Technical Specifications (TSs) for Arkansas Nuclear One, Unit 2 (ANO-2) related to a revised fuel assembly drop analysis and adoption of NRC-approved Technical Specification Task Force (TSTF) Standard Technical Specification Change Travelers TSTF-51, TSTF-272, TSTF-286, and TSTF-471. By email dated May 10, 2012 (Reference 2), the NRC accepted the proposed amendment for review and notified Entergy of supplemental information that would be necessary for the NRC to complete the overall review of the Reference 1 submittal. Entergy submitted the requested supplemental information in letter dated July 9, 2012 (Reference 3).

By email dated June 12, 2013 (Reference 4), the NRC identified minor changes needed to complete the review process as listed below. The NRC also requested that all of Attachment 1 of the Reference 3 letter be resubmitted and all the TS pages be resubmitted, in order for this final supplement to represent a complete package. Attachment 1 of this submittal meets this objective and includes all changes associated with the following list. Attachment 2 provides a copy of all TS and TS Bases markups, and Attachment 3 provides a copy of all TS clean (revised) pages. For completeness, the list of regulatory commitments previously submitted is included in Attachment 4. Therefore, this supplemental letter supersedes previously submitted information in the Reference 1 and Reference 3 letters in their entirety.

Entergy's response to each item listed below includes a reference to the Attachment 1 page numbers and TSs that are affected, if any.

1. The Limiting Condition for Operation (LCO) and Applicability of standard TS 3.9.1, *Boron Concentration*, can apply to both the refueling canal and refueling cavity while operating in Mode 6; however, the licensee's submittal lists only the refueling canal. The licensee should add reference to the refueling cavity or provide justification for this difference.

   Response

   Entergy has opted to add "refueling cavity" to the subject LCO and Applicability; therefore, no further discussion of differences is required. A revised TS 3.9.1 markup page is included in Attachment 2 and a revised (clean) page is included in Attachment 3 of this letter. The TS excerpt markup on Page 18 of Attachment 1 has been revised accordingly.

2. ANO TS 3.9.2, associated with required source range neutron flux monitors while operating in Mode 6, continues to include the term "core alterations" in Surveillance Requirement (SR) 4.9.2.c. TSTF-51 and TSTF-471 remove the definition of "core alterations" and the use of this term throughout the TSs. The licensee should remove this term for SR 4.9.2.

   Response

   Entergy has removed the "core alterations" term from SR 4.9.2.c. Because the SR requires performance of a channel functional test on the required source range neutron flux monitor *"within 8 hours prior to the initial start of core alterations,"* Entergy is replacing the "core alterations" phrase with:

   > *the movement of recently irradiated fuel assemblies or the movement of new fuel assemblies over recently irradiated fuel assemblies*

This is consistent with other TS changes associated with TSTF-51 and TSF-471 in the Reference 1 and 3 letters where “core alterations” is replaced with an applicability that relates directly to the movement of fuel. The fuel movement wording selected meets the intent of the standard (improved) technical specifications (ITS) contained in NUREG 1432, “Standard Technical Specifications – Combustion Engineering Plants” and the revised fuel handling accident (FHA) analysis subject to this letter. A revised TS 3.9.2 markup page is included in Attachment 2 and a revised (clean) page is included in Attachment 3 of this letter. Pages 24 (new Difference Item 4) and 26 (TS excerpt markup) of Attachment 1 have been revised accordingly.

3. The phrase “in the reactor vessel / refueling canal” is added at the end of the Action associated with ANO TS 3.8.2.2, AC Distribution – Shutdown; however, TSTF-286 does not add this phrase. Please provide justification for this additional phrase or delete the phrase in its entirety.

<u>Response</u>

Entergy has removed the phrase “in the reactor vessel / refueling canal” from the TS 3.8.2.2 Action statement. A revised TS 3.8.2.2 markup page is included in Attachment 2 and a revised (clean) page is included in Attachment 3 of this letter. The TS excerpt markup on Page 22 of Attachment 1 has been revised accordingly.

4. ANO TS Applicability statements in TSs 3.8.1.2, 3.8.2.2, and 3.8.2.4, do not contain reference to the movement of irradiated fuel, but refer only to Modes 5 and 6. However, the Actions associated with these ANO TSs require cessation of fuel movement. Attachment 1, Page 12, of the Reference 3 supplemental letter provides information related to this difference, but is unclear. Please provide further explanation for this difference or add the appropriate reference to fuel movement in the respective TS Applicability statements.

<u>Response</u>

TSs 3.8.1.2, 3.8.2.2, and 3.8.2.4 are associated with Modes 5 and 6 AC/DC power sources and distribution systems. As stated in Attachment 1, Page 12, Item 4 of the Reference 3 supplemental letter, TSTF-51 did not add a reference to fuel movement in the Applicability statements of the associated TSs, but added the term “recently” to the already existing fuel movement references. Therefore, no attempt was made to adopt the standard Applicability statement. Nevertheless, Entergy agrees that the addition of the fuel movement reference to these Applicability statements is appropriate in order to improve consistency with the ITS.

This addition will require the subject power sources and distribution systems to be operable when moving irradiated fuel and, therefore, is a more restrictive change; however, the TSTF-51 term “recently” is not adopted into the applicability statements and is removed from the proposed TS 3.8.1.2, 3.8.2.2, and 3.8.2.4 Action statements (Reference 3). Omission of this term is necessary because these power sources support operability of the Control Room Emergency Ventilation System (CREVS). CREVS operability is required to mitigate the Control Room Operator dose consequences following a FHA. As discussed in Attachment 1, Page 13, Item 11 of the Reference 3 supplemental letter, CREVS operability is required regardless of the time since shutdown of the reactor, as it relates to the movement of irradiated fuel and the definition of "recently" irradiated fuel (for ANO-2, "recently" irradiated fuel is that fuel which has not achieved at least 100 hours of radioactive decay since shutdown of the reactor).

In addition to the above, the associated Applicability statements are also modified consistent with the other TS Applicability modifications contained in the Reference 1 and Reference 3 letters in relation to resolving the non-conservative TSs associated with the revised FHA analysis:

ITS *During movement of [recently] irradiated fuel assemblies.*

ANO *During movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.*

The adoption of the reference to the movement of irradiated fuel in the aforementioned TS Applicability statements is consistent with the ITS. The omission of the term "recently" as it applies to irradiated fuel assemblies within these TSs is consistent with the intent of TSTF-51. The difference between ITS and ANO wording ensures the TS remains conservative in light of the revised FHA analysis described in the Reference 1 and Reference 3 letters. Therefore, the proposed change is acceptable. Revised TS 3.8.1.2, 3.8.2.2, and 3.8.2.4 markup pages, along with revised TS Bases markup pages, are included in Attachment 2 and revised (clean) pages of these specifications are included in Attachment 3 of this letter. Page 12 (revised Difference Item 4) and Pages 14 and 15 (TS excerpt markups) of Attachment 1 have been revised accordingly.

5. ANO-2 TS 3.9.1 states, in part, that the boron concentration of the "reactor coolant" and refueling canal be maintained (emphasis added). For consistency, consider revising "reactor coolant" to "reactor coolant system."

<u>Response</u>

The "system" term has been added to the subject TS. Entergy considers this an editorial change. A revised TS 3.9.1 markup page is included in Attachment 2 and a revised (clean) page is included in Attachment 3 of this letter. No change was required to the associated TS Bases. The TS excerpt markup in Attachment 1, Page 31, of this submittal has been revised accordingly.

6. On page 24 of 41, Attachment 1, of the July 9, 2012, letter, the second sentence of the "summary" paragraph refers to TSTF-286. However, this section of the letter appears to be associated with TSTF-471. Please state whether the reference to TSTF-286 is correct, and if so, provide an explanation regarding TSTF-286 application to this section of the letter.

<u>Response</u>

The reference to TSTF-286 in the subject paragraph is incorrect and should reference TSTF-471. The "summary" paragraph on Page 24 of Attachment 1 has been revised accordingly.

7. Difference Item 2 on Page 17, Attachment 1, of the July 9, 2012, letter states that the TS Bases inserts for TSTF-272 would not be adopted. The inserts should be adopted or further explanation provided, justifying the omission of these inserts.

   <u>Response</u>

   Entergy concurs with the adoption of the TSTF-272 Bases inserts associated with TS 3.9.1, Boron Concentration. This results in TSTF-272 Difference Item 2 being deleted in its entirety. Attachment 1, Page 17, of submittal has been revised accordingly. A revised TS 3.9.1 Bases markup page is included in Attachment 2.

8. The TS Table 3.3-6 excerpt markup on Page 14, Attachment 1, of the July 9, 2012, letter does not illustrate replacing the word "and" with the word "the" as is the case in the associated TS markup and clean pages contained in Attachments 2 and 3 of the subject letter. Please correct the excerpt markup accordingly.

   <u>Response</u>

   The subject excerpt has been corrected. The TS excerpt markup on Page 14 of Attachment 1 has been revised accordingly.

9. On page 5 of 41, Attachment 1, of the July 9, 2012, letter, a parenthetical statement in the center of the pages states the "and" in Note 5 of Table 4.3-3 is changed to "or" to be consistent with the related CREVS TS 3.7.6.1 Applicability. However, the TS excerpt markup on this page, nor the TS markup and clean pages provided in Attachments 2 and 3 of the submittal contain this word replacement. Please correct this discrepancy.

   <u>Response</u>

   A revised TS Table 4.3-3, markup page is included in Attachment 2 and a revised (clean) page is included in Attachment 3 of this letter. The TS excerpt markup on Page 5 of Attachment 1 has been revised accordingly.

10. The Application as well as the Supplement, starting on Page 4 of 41, lists the ANO-2 TS that are changed by the FHA. However, TS 3.8.1.2 is not listed. Please correct this discrepancy.

    <u>Response</u>

    TS 3.8.1.2 does not contain a reference to fuel movement and, therefore, no FHA change is shown at this juncture in the letter. However, the FHA-related wording is added to this specification during the deletion of the "Core Alterations" term under TSTF-51 (see Attachment 1, Page 14). Based on this information, Entergy believes no change is required to the submittal in regard to this observation.

Entergy has reviewed the proposed TS Bases changes submitted in the Reference 1 and 3 letters associated with the above TSs and concluded no additional changes are necessary with respect to the TS Bases other than described above.

No change in the commitments included in Attachment 5 of the Reference 3 letter (and repeated in Attachment 4 of this supplement) is being made. In addition, the changes incorporated by this supplemental letter have no impact on the no significant hazards consideration (NSHC) included in Attachment 1 of the Reference 3 letter.

In accordance with 10 CFR 50.91(b)(1), a copy of this application and the NSHC is being provided to the designated Arkansas state official.

If you have any questions or require additional information, please contact Stephenie Pyle at 479-858-4704.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on June 18, 2013.

Sincerely,

ORIGINAL SIGNED BY DALE E. JAMES FOR JEREMY G. BROWNING

JGB/dbb

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Markup of Technical Specification Pages and Technical Specification Bases Pages (Bases pages submitted for information only)
3. Revised (clean) Technical Specification Pages
4. List of Regulatory Commitments

cc: Mr. Arthur T. Howell
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

NRC Senior Resident Inspector
Arkansas Nuclear One
P. O. Box 310
London, AR 72847

U. S. Nuclear Regulatory Commission
Attn: Mr. Kaly Kalyanam
MS O-8B1
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Mr. Bernard R. Bevill
Arkansas Department of Health
Radiation Control Section
4815 West Markham Street
Slot #30
Little Rock, AR 72205

Attachment 1

2CAN061302

Analysis of Proposed Technical Specification Change

1.0 INTRODUCTION

This letter is a request to amend Technical Specifications (TSs) associated with Renewed Operating License NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2).

The proposed amendment affects various TS requirements in support of a revised fuel assembly drop analysis performed for ANO-2, similar to revised analyses performed at the San Onofre and Waterford 3 nuclear generating stations. The proposed amendment also adopts NRC-approved Technical Specification Task Force (TSTF) Standard Technical Specification Change Travelers TSTF-51, TSTF-272, TSTF-268, and TSTF-471.

During review of the TS changes necessary to support the aforementioned analysis and TSTFs, several unrelated enhancements or corrections were identified and are included in this submittal. Administrative and/or editorial errors noted during the review are also corrected (in relation to the TS pages affected by the aforementioned proposed changes).

Reference 6 provides a summary of a meeting where Entergy Operations, Inc. (Entergy) provided an overview of this submittal to members of the NRC staff. The NRC provided comments with regard to the Entergy presentation. The comments are included below with a corresponding *italicized* Entergy response or cross-reference.

- The NRC staff questioned whether the licensee should change the wording of the revised TS 3.7.6.1 (and elsewhere) Applicability, "...during movement of irradiated fuel assemblies or movement of any fuel assembly over irradiated fuel assemblies," to envelope other possible loads (such as “dummy” assemblies). *This is discussed in the “Fuel Handling Accident section below. Entergy has concluded that other loads need not be addressed in the TSs.*

- The NRC staff questioned the clarity of the amendment request description for TS 3.4.1.3 whether Mode 6 Reactor Coolant System (RCS) flow conditions were effectively addressed elsewhere. *Entergy has eliminated this proposed change from the submittal.*

- The NRC staff suggested the site closely compare deleted Surveillance Requirement (SR) 4.1.1.3 and the accommodating changes proposed for SR 4.1.1.3.4 with regard to minimum RCS flowrates. *Entergy has eliminated this proposed change from the submittal.*

- The NRC staff noted challenges in bundling TSTFs whereby an inadequacy in the submittal of one TSTF could hold back the approval of other TSTFs or cause undue complexity in generating a "No Significant Hazards Consideration" pursuant to paragraph 50.91 of Title 10 of the Code of Federal Regulations (10 CFR) Part 50. *Due to the number of changes included in this amendment, a slight deviation from the standard format for license amendments is utilized. Proposed changes would normally be described in one section, background information provided in another section, and a technical analysis for each change provided in a third section. Strict adherence to this format would create difficulty with regard to assessing all the information for a particular change. Therefore, each change is individually listed for the aforementioned FHA analysis and TSTFs, with its description, background, and technical analysis included immediately thereafter. In addition, Entergy has eliminated proposed changes from the submittal which acted to better align the custom ANO-2 TSs with the improved standard version (NUREG 1432). This includes elimination of* *proposed TS deletions and relocations. Entergy believes the structure of the submittal and the elimination of several proposed changes will better support efficient NRC review of the remaining changes.*

- ANO-2 is a non-improved TS (ITS) plant. As such, changes, such as TSTFs as well as the non-TSTF related changes, must be justified on their own merits. A reason such as a specific ANO-2 TS requirement does not exist in the ITS, may not provide a valid justification for deleting/relocating that requirement. *A detailed discussion and justification for each TSTF proposed for adoption is included in this submittal. As discussed above, Entergy has eliminated non-TSTF changes related to deleting/relocating TS requirements from the submittal.*

A markup of the affected TS pages is included in Attachment 2 of this submittal. An information-only markup of the ANO-2 TS Bases is included in Attachment 3 of this submittal. A clean (revised) version of the affected TS pages is included in Attachment 4 of this submittal. The TS Bases will be revised in conjunction with implementation of this amendment in accordance with TS 6.5.14, "Technical Specification (TS) Bases Control Program" (reference Attachment 5).

2.0/3.0/4.0 DESCRIPTION AND ASSESSMENT / BACKGROUND / TECHNICAL ANALYSIS

FUEL HANDLING ACCIDENT

The revised fuel handling accident (FHA) analysis assumes damage to both the dropped fuel assembly and the impacted fuel assembly. Therefore, TS conditions and/or applicability must be revised to include the movement of any fuel assembly (new or irradiated fuel) over irradiated fuel assemblies. The proposed amendment addresses the ANO-2 revised fuel assembly drop analysis based on the recently approved use of Alternate Source Term (AST). The reanalysis of a fuel drop (and resultant damage to fuel rods) considered the weight of other components beyond the fuel assembly itself (hoist grapple, control rods, etc.) in accordance with NRC Regulatory Guide (RG) 1.183.

Westinghouse performed a revised FHA analysis for ANO-2. The calculation and results were provided in the proposed ANO-2 amendment to adopt the use of AST. As presented in the ANO-2 AST amendment request, Attachment 3, Section 2.2 (Reference 1), the original FHA analysis assumed failure of 60 fuel rods in a single fuel assembly. The revised analysis assumes the failure of all fuel rods in two assemblies (472 rods). The revised calculation was provided in Attachment 2 to a supplemental letter associated with the aforementioned AST amendment request (Reference 2). The NRC Safety Evaluation Report (SER), Section 3.3.2 (Reference 3), discusses the revised analysis.

This event consists of the drop of a single fuel assembly either in the Spent Fuel Pool (SFP) area of the Auxiliary Building or inside the Containment Building. The FHA is described in Section 15.1.23 of the ANO-2 Safety Analysis Report (SAR), which previously specified that 60 fuel rods in a single fuel assembly are conservatively considered damaged during the event (the actual results indicated no fuel damage). Conservative reanalysis of fuel damage, with the additional weight of a grapple and Control Element Assembly (CEA), indicates that failure of two fuel assemblies, both the dropped assembly and the impacted assembly, is possible. Therefore, the ANO-2 FHA analysis now assumes failure of all rods in two irradiated fuel assemblies (472 fuel rods).

Currently, most affected TSs are applicable “during the movement of irradiated fuel.” Because the FHA analysis now assumes failure of the impacted assembly in addition to the dropped assembly, the associated TSs and TS Bases are revised to include the movement of new fuel assemblies also, when being moved over irradiated fuel assemblies seated in the SFP or reactor pressure vessel.

Note that some TS “applicability” statements are included or repeated in Actions, Notes, or Surveillance Requirements (SRs). Therefore, the list of affected TSs includes all areas of the associated TS that contains the phrase “during movement of irradiated fuel” or similar. The applicability statements, regardless of their location with the individual TS, are revised to state:

“during the movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies”

The revised wording accounts for the possibility of incurring fuel damage should a fuel assembly (new or irradiated) drop, impacting an irradiated fuel assembly seated in the SFP or reactor pressure vessel. This change was not previously required because the retired FHA analysis only assumed damage to the dropped assembly (no damage occurred to the fuel assembly seated in the SFP or reactor pressure vessel).

To determine the appropriate TS applicability wording that would accommodate the revised FHA analysis, Entergy considered other loads that could travel over irradiated fuel assemblies. As stated above, while the previous analysis conservatively assumed 60 fuel rods were damaged following an FHA, the actual results indicated no fuel damage, based on an assembly weight of approximately 1451 lbs (the fuel assembly design used today weighs approximately 1419 lbs). Both the previous and revised analyses assume a vertical drop of a long slender object impacting directly onto an assembly seated in the core or the SFP, with the revised analysis adding the weight of the grapple and a CEA. Based on the previous analysis, any similar object weighing less than approximately 1451 lbs is bounded by the previous analysis and is not expected to cause fuel damage.

The revised analysis provided by Westinghouse evaluated a non-fuel load drop of 2000 lbs. The load was considered either of long slender geometry or cube geometry. The analysis concluded that fuel damage would only occur if the load remained vertical and the energy from the load drop was transferred to a single assembly. Even so, only the fuel rods in the impacted assembly since the “dropped” load did not involve fuel (236 fuel rods, one half of that assumed in the revised offsite dose analysis). Note that loads greater than 2000 lbs are prohibited from being suspended or traveling over fuel assemblies.

The following information was considered to determine whether “other load” drops need be considered in the TSs proper:

1. The FHA (drop analysis) as addressed in the TSs has historically only considered fuel assemblies. Attempting to address "unknown" loads would be difficult and could insert ambiguity into the TSs. In addition, the TS Bases would have to contain a wealth of information to interpret the TS, virtually placing the TS itself under licensee control.

2. No "heavy load" (between 1400-2000 lbs) was identified during a review of common loads transported over fuel seated in the core or the SFP. Note that the “dummy” assembly at ANO-2 weighs less than 1000 lbs.

3. Any such load would have to be within a specific weight range and slender enough to impact only one seated fuel assembly (the revised analysis indicates impact over two seated assemblies or any rotation or horizontal drop of the load would not damage fuel)

4. The 'load drop' (not fuel drop) analysis indicates the drop must be vertical and assumes no loss of kinetic energy due to impact with water surface or buoyancy.

5. The load drop analysis does not credit any cushioning of the impact by the upper end fittings on the seated assembly nor from the upper portion of the fuel storage racks in the SFP.

6. Administrative procedures work to limit movement of any object over the fuel, both for load drop concerns and also to comply with foreign material exclusion processes. Procedure OP 1005.002, "Control of Heavy Loads," complies with NUREG-0612 (Control of Heavy Loads at Nuclear Power Plants) and prohibits any load > 2000 lbs over fuel (and other safety related equipment). The procedure also lists the weight of 36 Containment Building and 60 SFP area loads that routinely are moved (mostly during outage). Only one (the SFP work platform) is in the above weight range, but is a horizontal structure. Individual procedures, such as OP 2402.079 which controls the Containment Building Polar Crane, establish safe load paths and "no fly" zones for all loads. For example, "no-fly" zones in the Containment Building include the area directly over the reactor vessel and over the south piping penetration area (where safety related piping is located).

7. ANO-2 provided response to NRC Bulletin 96-02 regarding control of such loads in letter dated May 17, 1996 (0CAN059606). The NRC did not list ANO-2 as a plant with open issues in its summary of responses (NRC letter dated April 27, 1998, 0CNA049826). ANO also continues to track and maintain compliance with several NRC commitments with regard to such loads.

8. As stated above, the previous fuel drop analysis indicated no fuel damage occurred (although 60 fuel rods were conservatively assumed to fail, but only of the "dropped" assembly).

Based on the above, Entergy believes the drop of "other loads" (non-fuel loads) need not be addressed in the associated TS applicabilities. The following are excerpts from individual TSs changed in support of the revised fuel drop analysis. A markup of the entire TS page for each individual TS listed below is included in Attachment 2.

Table 3.3-6, Page 3/4 3-25

b. Control Room Ventilation Intake Duct Monitors	2	Note 2	$\leq$ 2 x background	$10 - 10^6$ cpm	17,20,21

Note 2 – MODES 1, 2, 3, 4, and during movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

Table 3.3-6, Page 3/4 3-26

ACTION 16 – With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, complete the following:

a. If performing CORE ALTERATIONS or moving irradiated fuel assemblies or moving new fuel assemblies over irradiated fuel assemblies within the reactor building, secure the containment purge system or suspend CORE ALTERATIONS and movement of irradiated fuel assemblies and movement of new fuel assemblies over irradiated fuel assemblies within the Containment Building.

ACTION 21 - During movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies with one or two channels inoperable, immediately place one OPERABLE CREVS train in the emergency recirculation mode or immediately suspend the movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

Table 4.3-3, Page 3/4 3-27

b.	Control Room Ventilation Intake Duct Monitors	S	R	M Note 6	Note 5

Note 5 – MODES 1, 2, 3, 4, or~~and~~ during movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

(Note that the “and” is changed to “or” to be consistent with the TS applicability statement for Control Room Ventilation (TS 3.7.6.1). This is an administrative change and has not change the monitoring requirements.)

TS 3.7.6.1, Page 3/4 7-17

3.7.6.1 Two independent control room emergency ventilation and air conditioning systems shall be OPERABLE. (Note 1)

APPLICABILITY: MODES 1, 2, 3, 4, or during movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

TS 3.7.6.1, Page 3/4 7-17a

During MovementHandling of Irradiated Fuel Assemblies or Movement of New Fuel Assemblies over Irradiated Fuel Assemblies

f. With one CREACS inoperable, restore the inoperable system to OPERABLE status within 30 days or immediately place the OPERABLE system in operation; otherwise, suspend all activities involving the movementhandling of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

g. With one CREVS inoperable, restore the inoperable system to OPERABLE status within 7 days or immediately place the control room in the emergency recirc mode of operation; otherwise, suspend all activities involving the movementhandling of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

h. With one CREVS inoperable for reasons other than ACTION d and one CREACS inoperable:

   3. otherwise, suspend all activities involving the movementhandling of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

i. With both CREACS inoperable, immediately suspend all activities involving the movementhandling of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

j. With both CREVS inoperable or with one or more CREVS inoperable due to an inoperable CRE boundary, immediately suspend all activities involving the movementhandling of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

TS 3.8.2.2, Page 3/4 8-7

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE:

ACTION:

With less than the above complement of A.C. busses OPERABLE and energized, immediately suspend core alterations, the movement of irradiated fuel assemblies, the movement of new fuel assemblies over irradiated fuel assemblies, and any operations involving positive reactivity additions.

TS 3.8.2.4, Page 3/4 8-10

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

ACTION:

With less than the above complement of D.C. equipment and bus OPERABLE, immediately suspend core alterations, the movement of irradiated fuel assemblies, the movement of new fuel assemblies over irradiated fuel assemblies, and any operations involving positive reactivity additions.

TS 3.9.4, Page 3/4 9-4

3.9.4 The containment building penetrations shall be in the following status:

APPLICABILITY: During CORE ALTERATIONS or movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies within the containment.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies in the containment. The provisions of Specification 3.0.3 are not applicable.

4.9.4.1 Each of the above required containment penetrations shall be determined to be in its above required conditions within 72 hours prior to the start of and at least once per 7 days during CORE ALTERATIONS or movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies in the containment.

Based on the above, Entergy has concluded that the proposed change to the FHA-related TSs discussed above is necessary and effectively ensures that refueling operations are limited to conditions that support acceptable Control Room and offsite dose impacts should a FHA occur at ANO-2.

Adoption of TSTFs

In addition to the above, the following NRC-approved TSTFs are proposed for adoption:

TSTF#	Rev.	Title	Approval Date	ADAMS Reference
51	2	Revise Containment Requirements During Handling Irradiated Fuel and Core Alterations	11/01/1999	ML993190284
272	1	Refueling Boron Concentration Clarification	12/21/1999	ML993630256
286	2	Operations Involving Positive Reactivity Additions	03/20/2000	ML003730788*
471	1	Eliminate use of term Core Alterations in Actions and Notes	12/07/2006	ML062860320

*Letter notifying the Nuclear Energy Institute (NEI) dated July 6, 2000.

Because ANO-2 has not converted the TSs to the ITS format, an explanation of minor wording differences between the changes proposed and the original TSTF markups is appropriate. Entergy does not considered such changes to be deviations from the TSTF because they act only to accommodate the difference in format between the ANO-2 TSs and ITS, and the difference in TS usage rules between the two TS types. Any differences that may be considered deviations are specifically designated as such in the discussion of each proposed TSTF adoption.

The following comparison illustrates the overlap of affected TS pages between the revised FHA analysis and the proposed TSTF adoptions. The indicated overlap is also a result of affected pages included in each TSTF as compared to the ANO-2 TSs, a non-ITS plant, and key word searches related to the each TSTF. Some TSs required change in relation to a TSTF or the revised FHA analysis, although there would not have appeared to be a direct impact. For example, an ANO-2 TS may have referred to “Core Alterations” which would require change under TSTF-51 or TSTF-471 (replacing the term with “the movement of recently irradiated fuel”). The change under the TSTF would then require the wording to modified to that needed in support of the revised FHA analysis. In these cases, the demarcation in the following table is enclosed in parenthesis.

	Revised FHA Analysis	TSTF-51	TSTF-272	TSTF-286	TSTF-471
TS 3.1.1.3 RCS Dilution Flow Rate				(X)	
TS 3.3.3.1 Radiation Monitoring	X	X			(X)
TS 3.4.1.2 RCS Loops – Mode 3				X	
TS 3.4.1.3 RCS Loops – Modes 4/5				X	
TS 3.7.6.1 Control Room Emergency Ventilation	X				
TS 3.8.1.2 AC Power – Shutdown	(X)	X		X	X
TS 3.8.2.2 AC Dist. – Shutdown	X	X		X	X
TS 3.8.2.4 DC Power – Shutdown	X	X		X	X
TS 3.9.1 Boron Concentration – Mode 6			X		X
TS 3.9.2 Source Range Flux Instrumentation				X	X
TS 3.9.4 Containment Penetrations	X	X			
TS 3.9.5 Refueling Communications	(X)	(X)			
TS 3.9.8.1 SDC Loops		(X)		X	
TS 3.9.9 Refueling Water Level		X			

TSTF-51, REVISION 2

In the pressurized water reactor (PWR) ITS NUREGs (NUREG-1430, -1431, and -1432), the defined term “Core Alterations” appeared in the Actions and Surveillance Notes of less than ten specifications. The term is not used in any ITS Applicability statements and only occurs in the old ANO-2 custom TS Applicability for Containment Penetrations (shutdown) and personnel communication requirements during fuel handling in the Containment Building. Suspending core alterations (as opposed to suspending the movement of fuel assemblies) has no effect on the initial conditions or mitigation of any Design Basis Accident (DBA) or transient. These requirements apply an operational burden with no corresponding safety benefit. Therefore, this TSTF removed the use of the defined term “Core Alterations” from the TSs. This TSTF was approved for industry adoption on November 1, 1999 (Adams Accession No. ML993190284).

The ANO-2 TSs define “core alterations: as:

> *CORE ALTERATION shall be the movement or manipulation of any fuel, sources, or reactivity control components within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATION shall not preclude completion of movement of a component to a safe conservative position.*

Core Alterations take place during Mode 6 (refueling operation). There are three accidents considered during Mode 6: 1) a FHA, 2) a boron dilution event, and 3) failure of the Shutdown Cooling (SDC) loop.

The analysis for a FHA conservatively assumes that a fuel assembly is dropped during fuel handling activities in the Containment Building or the SFP area of the Auxiliary Building. Interlocks and procedural/administrative controls make such an event highly unlikely. However, if an assembly were damaged (i.e., one or more fuel rods damaged), the accumulated fission product gases and iodines in the fuel element gap would be released to the surrounding water. Release of solid fission products from the fuel would be negligible because of the low fuel temperature that exists in Mode 6, which greatly limits diffusion. There are no mitigation actions credited in the analysis to reduce the FHA offsite dose consequences. The Control Room Emergency Ventilation System (CREVS) provides protection for Control Room operators during all previously evaluated accidents and is required by TSs to be operable during the movement of fuel assemblies. Therefore, suspending “Core Alterations” does not prevent a FHA and is not credited to mitigate a FHA. In addition, manipulation of non-fuel core components (CEAs, incore instruments, etc.) is not assumed to cause failure of the fuel clad. TS required boron concentration during Mode 6 provides sufficient Shutdown Margin (SDM) to permit all CEAs to be removed from the core. Based on the above, the “Core Alterations” term serves no significant purpose with regard to the FHA-related margin of safety.

A boron dilution event is initiated by a dilution source that results in the boron concentration approaching or dropping below the value required to maintain TS required SDM. This event is mitigated by stopping the dilution. The suspension of core alterations has no significant effect on restoration of the TS required SDM. In addition, the location or movement of core components or fuel assemblies does not affect the initiation of, or mitigation of, a boron dilution event. Note that the boron dilution event is considered unlikely for ANO-2 due to the significant period of time for operator detection and response before SDM would be significantly challenged (reference ANO-2 SAR Section 15.1.4.3). Based on the above, the deletion of the “Core Alterations” term will not have a significant impact on the margin of safety associated with a boron dilution event.

In accordance with procedures, a loss of SDC requires cessation of all refueling activities once any suspended fuel assembly has been placed in a safe condition. However, the loss of SDC and subsequent potential heat-up of the RCS has minimal impact on core reactivity and, therefore, is unrelated to Core Alterations, especially core component manipulations other than movement of fuel assemblies. TS 3.9.8.1 (SDC) requires positive reactivity additions to be secured when no SDC loop is in operation, with the exception that SDC may be secured for up to 1 hour per 8 hour period without cessation of core alterations. Based on the significant boron concentration present in the RCS during Mode 6 operation, core component or fuel assembly manipulation with or without SDC would have little effect on overall core reactivity with regard to maintaining sufficient SDM. In light of required corrective actions taken upon a loss of SDC and because a loss of SDC has minimal impact on core reactivity, the deletion of the "Core Alterations" has no significant effect in relation to this event.

Because the initial conditions assumptions in the safety analyses for a FHA, boron dilution event, and loss of SDC event will continue to be met, the scenarios wherein these accidents could occur, and the required operability of the associated systems, are not reduced by the deletion of "Core Alterations" term.

TSTF-51 also changed the applicability of several specifications from "during the movement of irradiated fuel" to "during the movement of *recently* irradiated fuel." Most plants, including ANO-2, performed revised offsite dose analyses associated with a FHA in the 1990s and discovered offsite dose remained acceptable for a FHA that occurred long after reactor shutdown. For ANO-2, the decay time necessary to result in acceptable dose limits upon a FHA assuming no containment and no filtration is 100 hours after shutdown. Because of these re-analyses, TSTF-51 permits plants to insert the term "recently" in appropriate TS Applicabilities, which would permit associated TS equipment to be inoperable during the movement of fuel provided the decay time requirement had been met. However, based on the revised FHA discussed previously, the dose consequences are not acceptable with regard to Control Room personnel following the 100-hour period. Therefore, Entergy is not adopting this portion of the TSTF for TS associated with Control Room radiation monitoring or Control Room ventilation systems.

A NRC reviewer's note contained in TSTF-51 requires adoption of two commitments: 1) a commitment to maintain the ability to close containment building penetrations following a FHA, and 2) a commitment to maximize availability of radiation monitoring and ventilation systems that can aid in mitigating the offsite dose consequences following a FHA. In accordance with the TSTF, Entergy is adopting these commitments (see Attachment 5).

Explanation of Differences or Deviations

1. The "Core Alterations" term does not exist in the TS Applicability associated with ANO-2 Containment Purge and CREVS radiation monitors (Table 3.3-6); therefore, deletion of the term was unnecessary. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

2. ITS 3.3.10 and 3.7.14, related to Fuel Handling Area Ventilation and Radiation Monitoring, do not exist in the ANO-2 TSs and, therefore, subsequent changes are not applicable. Applicable ANO-2 fuel handling area TSs were relocated to the Technical Requirements Manual (TRM) following approval of ANO-2 TS Amendment 274, dated February 4, 2008. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

3. The TSTF makes changes to the TS Bases associated with Containment Isolation Valves in Modes 1, 2, 3, and 4 (ANO-2 TS 3.6.3.1). The ANO-2 TS and associated Bases have no reference to fuel movement. Therefore, no changes are proposed for the associated ANO-2 TS Bases. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

4. The TSTF makes changes to the TS and TS Bases associated with AC/DC Sources/Distribution requirements for shutdown conditions (ANO-2 TSs 3.8.1.2, 3.8.2.2, and 3.8.2.4). The ANO-2 TS and associated Bases contain no reference to fuel movement, but does refer to Core Alterations. The “Core Alternations” term was deleted by TSTF-471 (discussed later in this submittal). However, the deletion of this term was acceptable because the TS already referred to the movement of irradiated fuel. Therefore, Entergy is revising the TS and associated TS Bases to be consistent with the intent of TSTF-51, TSTF-471, and the ITS by revising the Applicability statements of all three specifications and the Action statement of TS 3.8.1.2 to reference the movement of irradiated fuel, including the wording necessary to account for the revised FHA analysis discussed previously (the Action statements for TSs 3.8.2.2 and 3.8.2.4 already contain necessary references). Currently, these TS only require AC/DC source/distribution system operability in Modes 5 and 6, with no reference to the movement of irradiated fuel.

   The addition of this new Applicability will require the subject power sources and distribution systems to be operable when moving irradiated fuel and, therefore, is a more restrictive change; however, the TSTF-51 term “recently” is not adopted into the Applicability or Action statements of TSs 3.8.1.2, 3.8.2.2, and 3.8.2.4. Omission of this term is necessary because these power sources support operability of the Control Room Emergency Ventilation System (CREVS). CREVS operability is required to mitigate the Control Room Operator dose consequences following a fuel handling accident (FHA). As discussed in this Attachment, Page 13, Item 11, CREVS operability is required regardless of the time since shutdown of the reactor, as it relates to the movement of irradiated fuel and the definition of “recently” irradiated fuel (for ANO-2, “recently” irradiated fuel is that fuel which has not achieved at least 100 hours of radioactive decay since shutdown of the reactor). Entergy considers this change to be in compliance with the TSTFs, the ITS, and the revised ANO FHA analysis.

5. ITS 3.8.8, related to inverter operability in Modes 5 and 6, does not exist in the ANO-2 TSs and, therefore, subsequent changes are not applicable. While inverters are controlled administratively at ANO-2, an uninterruptible power supply (the major purpose of inverters) is not required to prevent or mitigate a FHA, boron dilution event, of loss of SDC event. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

6. The “Core Alterations” term normally found in the TS Applicability and Actions is repeated in the SR associated with Containment Building Penetrations controls during Mode 6 (ANO-2 TS 3.9.4). Therefore, the “Core Alterations” term is likewise deleted from the SR, consistent with the intent of the TSTF. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

7. ANO-2 TS 3.9.5 requires direct communications between the Control Room and refueling station during Core Alterations. This specification was not included in the development of the original version of the ITS and, therefore, TSTF-51 does not identify the specification as requiring change.

The requirement to maintain direct communication with the Control Room during the Core Alterations is intended to minimize the response time should a FHA accident or other event occur. The NRC's May 9, 1988, Split Report, which depicted those TSs to be retained in the ITS (when developed) and those TSs which could be relocated to licensee-controlled documents, recommended this TS for relocation in that it did not meet any of the four criterion of 10 CFR 50.36. While Entergy is not currently proposing to relocate this specification, the use of "Core Alterations" term is replaced with the proposed fuel handling wording associated with the revised FHA analysis previously discussed in the submittal. Therefore, direct communications will continue to be required during the movement of fuel assemblies in the Containment Building. Because the NRC previously concluded that this specification did not meet the criteria for inclusion in the TSs and because replacing the "Core Alterations" term with fuel handling restrictions, Entergy believes the intent of the TSTF is maintained. In addition, direct communications is not credited in preventing or mitigating a FHA for ANO-2. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF, since the specification no longer existed in the ITS at the time of TSTF-51 development.

8. The "Core Alterations" term was not contained within SDC related specification in the ITS and, therefore, TSTF-51 does not include changes to SDC specifications. However, ANO-2 TS 3.9.8.1 contains one use of the term in Action b. This Action permits SDC to be secured for 1 hour during an 8-hour period provided no Core Alterations are in progress. The ITS, consistent with actions associated with a loss of SDC, prohibits a reduction in RCS boron concentration that would violate SDM requirements when SDC is secured per this exception. Entergy proposes to adopt the ITS Action requirement and remove the "Core Alterations" term, consistent with TSTF-51 and TSTF-286 (TSTF-286 is discussed later in this submittal). As stated previously, Core Alterations has no appreciable impact on the margin to safety during loss of SDC events. Therefore, adopting the ITS Action and deleting the "Core Alterations" term from Action b is appropriate. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF, since the equivalent Action in the ITS did not address Core Alterations at the time of TSTF-51 development.

9. Instead of referring to "Core Alterations," ANO-2 TS 3.9.9 associated with refueling canal level combines fuel movement and "the movement of CEAs" in the Applicability, Action, and Surveillance, along with the exception of operations involving the coupling of CEAs. TSTF-51 deletes this exception along with the "Core Alterations" term. Entergy is deleting the exception and the reference to CEAs, which was part of the previous definition of the "Core Alterations" term. As stated previously, suspending Core Alterations is not relied upon to prevent or mitigate a Mode 6 accident or event. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

10. The ANO-2 TS Bases do not contain the level of detail found in the ITS or the TSTF-51 markup. The ANO-2 TS Bases have been updated to capture the critical aspects of the TSTF markup, but no attempt was made to mirror the TSTF Bases due to formatting and content differences. Because this information is an operator aid and cannot change the actual TS requirements, Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

11. The term “recently” as it refers to the movement of irradiated fuel is not adopted in the ANO-2 TSs associated with Control Room radiation monitoring or Control Room ventilation systems, as proposed in TSTF-51. The revised FHA analysis indicates that the dose consequences to Control Room personnel would not be within acceptable limits following a FHA, even if the FHA occurred more than 100 hours after reactor shutdown. As a result, TS requirements associated with the Control Room radiation monitoring and Control Room ventilation systems will remain applicable during the movement of fuel regardless of the decay time that may have passed. The TSTF specifically states that the “recently” term may only be adopted in those cases where the resultant dose consequences are within acceptable limits; therefore, for ANO-2, this term cannot be adopted where radiological dose to Control Room personnel is involved. While this presents a difference from the TSTF, omitting this term is considered a more restrictive change than that permitted by the subject TSTF and is in compliance with the restrictions denoted in the TSTF.

Summary

Based on the above, the proposed changes meet the intent of TSTF-51 or otherwise have been shown to not have a significant impact on any margin of safety. The following are excerpts from individual TSs changed in support of the TSTF-51 related changes. A markup of the entire TS page for each individual TS listed below is included in Attachment 2.

Table 3.3-6, Page 3/4 3-26 (ITS 3.3.8 and 3.3.9)

ACTION 16 – With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, complete the following:

a. If ~~performing CORE ALTERATIONS or~~ moving recently irradiated fuel within the reactor building, secure the containment purge system or suspend ~~CORE ALTERATIONS and~~the movement of recently irradiated fuel within the reactor building.

TS 3.8.1.2, Page 3/4 8-5 (ITS 3.8.2)

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend ~~all operations involving~~ the movement of irradiated fuel assemblies~~CORE ALTERATIONS~~, the movement of new fuel assemblies over irradiated fuel assemblies, ~~or~~and positive reactivity changes.

TS 3.8.2.2, Page 3/4 8-7 (ITS 3.8.10)

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE:

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

TS 3.8.2.4, Page 3/4 8-10 (ITS 3.8.5)

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

TS 3.9.4, Page 3/4 9-4 (ITS 3.9.3)

3.9.4 The containment building penetrations shall be in the following status:

APPLICABILITY: During ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel within the containment.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel in the containment. The provisions of Specification 3.0.3 are not applicable.

4.9.4.1 Each of the above required containment penetrations shall be determined to be in its above required conditions within 72 hours prior to the start of and at least once per 7 days during ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel in the containment.

TS 3.9.5, Page 3/4 9-6 (ITS – not applicable)

3.9.5 Direct communications shall be maintained between the control room and personnel at the refueling station.

APPLICABILITY: During ~~CORE ALTERATIONS~~ movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel.

ACTION:

When direct communications between the control room and personnel at the refueling station cannot be maintained, suspend movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel~~all CORE ALTERATIONS~~. The provisions of Specification 3.0.3 are not applicable.

TS 3.9.5, Page 3/4 9-6 (*continued*)

4.9.5 Direct communications between the control room and personnel at the refueling station shall be demonstrated within one hour prior to the start of and at least once per 12 hours during movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel~~CORE ALTERATIONS~~.

TS 3.9.8.1, Page 3/4 9-9 (ITS 3.9.4 and 3.9.5)

3.9.8.1 At least one shutdown cooling loop shall be in operation.

ACTION:

b. The shutdown cooling loop may be removed from operation for up to 1 hour per 8 hour period provided no operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.9.1~~during the performance of CORE ALTERATIONS~~.

TS 3.9.9, Page 3/4 9-10 (ITS 3.9.6)

3.9.9 At least 23 feet of water shall be maintained over the top of irradiated fuel assemblies seated within the reactor pressure vessel.

APPLICABILITY: During movement of fuel assemblies ~~or CEAs~~ within the reactor pressure vessel while in MODE 6~~, except during latching and unlatching of CEAs~~.

ACTION:

With the requirements of the above specification not satisfied, suspend all operations involving movement of fuel assemblies ~~or CEAs~~ within the pressure vessel. The provisions of Specification 3.0.3 are not applicable.

4.9.9 The water level shall be determined to be at least its minimum required depth within 2 hours prior to the start of and at least once per 24 hours thereafter during movement of fuel assemblies ~~or CEAs~~.

TSTF-272, REVISION 1

This TSTF was approved for industry adoption on December 21, 1999 (Adams Accession No. ML993630256).

This TSTF corrected a deficiency in Refueling Boron TS 3.9.1. This specification limits the boron concentration of the RCS and the refueling canal during refueling to ensure that the reactor remains subcritical while in Mode 6. However, with the reactor vessel head installed, no potential for dilution of the RCS via common communication with the refueling canal exists. In this condition, it is not necessary to place a limit on the boron concentration in the refueling canal. The Applicability is revised with a Note which states that the limits only apply to the refueling canal and the refueling cavity when those volumes are in communication with the RCS. This change is consistent with the intent of the specification and eliminates restrictions that have no impact on nuclear or personnel safety.

The NRC approved similar changes for Millstone 2 in TS Amendment 263 via NRC SER dated January 11, 2002 (reference Adams Accession No. ML013440338).

Explanation of Differences or Deviations

1. The current Applicability Note in ANO-2 TS 3.9.1 states:

   The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removed.

   The current Limiting Condition for Operation (LCO) for TS 3.9.1 includes the following phrase:

   With the reactor vessel head unbolted or removed…

   These statements are nothing more than a repeat of the TS Definition of Mode 6. From Section 1 of the ANO-2 TS (Definitions), Table 1.1 states:

6	*REFUELING***	*≤ 0.95 0*	*≤ 140°F*

   *** Reactor vessel head unbolted or removed and fuel in the vessel.*

   No other Mode 6 related specifications in the ANO-2 TSs or the ITS include this redundant information. Therefore, the current TS 3.9.1 Applicability Note is replaced with the Note from TSTF-272. In addition, the similar phrase in the LCO of TS 3.9.1 is deleted. Entergy's adoption of the TSTF-272 Note is in accordance with the TSTF. The deletion of redundant information is an administrative change and in no way changes the current requirements of the specification.

Based on the above, ANO-2 meets the intent of TSTF-272, Revision 1, and adoption of the TSTF is justified. The following are excerpts from individual TSs changed in support of the TSTF-272 related changes. A markup of the entire TS page for each individual TS listed below is included in Attachment 2.

TS 3.9.1, Page 3/4 9-1 (ITS 3.9.1)

3.9.1 ~~With the reactor vessel head unbolted or removed, T~~The boron concentration of the reactor coolant, ~~and~~ the refueling canal, and the reactor cavity shall be maintained uniform and sufficient to ensure that the more restrictive of following reactivity conditions is met:

a. Either a K_{eff} of 0.95 or less, which includes a 1% $\Delta k/k$ conservative allowance for uncertainties, or

b. A boron concentration of $\geq$ 2500 ppm, which includes a 50 ppm conservative allowance for uncertainties.

APPLICABILITY: MODE 6*.

---

* ~~The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removed~~Only applicable to the refueling canal and reactor cavity when connected to the RCS.

TSTF-286, REVISION 2

This TSTF was approved for industry adoption on March 20, 2000. Note, however, that the reference letter to NEI was dated July 6, 2000 (Adams Accession No. ML003730788). During the development of ITS Revision 3, the NRC requested that the template wording "cause introduction into the RCS, coolant with" be changed to "cause introduction of coolant into the RCS with." This request has been adopted in the ANO-2 TS adoption of this TSTF.

This TSTF addressed LCOs and Actions related to positive reactivity additions to the RCS. The purpose of the TSTF was to permit operators to control RCS inventory and temperature while maintaining positive control of core reactivity. Therefore, most related TSs removed requirements that prevented "positive reactivity addition" or "reduction in boron concentration" in lieu of a more generic requirement that ensured SDM would be maintained during RCS inventory or temperature adjustments.

TSTF-286, Revision 2, allows licensees to revise the plant TS LCO Actions and Notes that require suspension of operations involving positive reactivity additions or preclude reduction in boron concentration by placing a limit on positive reactivity addition to within the TS-required SDM limit. TSTF-286 thus provides the flexibility necessary for continued safe reactor operations, while also limiting any potential for excessive positive reactivity addition to the core. During conditions in which these Actions may be required, various activities for unit operation must be continued to maintain RCS inventory and control RCS temperature. The activities that involve inventory makeup from sources with boron concentrations less than the current RCS concentration (i.e., boron dilution) need not be precluded in the TSs provided the required SDM is maintained for the worst-case overall effect on the core. Note that an unexpected boron dilution event is considered unlikely for ANO-2 due to the significant period of time for operator detection and response before SDM would be significantly challenged (reference ANO-2 SAR Section 15.1.4.3).

Explanation of Differences or Deviations

1. With regard to ANO-2 TS Table 3.3-6, Table 4.3-3, and Table 3.3-1 associated with CREVS radiation monitoring and Logarithmic Power, no requirement related to positive reactivity additions exists. Therefore, no changes associated with this TSTF are necessary for these tables. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

2. The ANO-2 TS Bases do not contain the level of detail found in the ITS or the TSTF-286 markup. The ANO-2 TS Bases have been updated to capture the critical aspects of the TSTF markup, but no attempt was made to mirror the TSTF Bases due to formatting and content differences.

   For example, TSTF Bases Insert 4 is adopted in the ANO-2 TS Bases associated with RCS cooling loops; however, no other changes are adopted for these Bases. Likewise, TSTF Bases Insert 6 is adopted and Bases Inserts 7 and 8 are omitted with regard to changes to the ANO-2 TS Bases associated with electrical power sources and distribution systems. TSTF Bases Insert 11 is adopted and Bases Insert 9 is omitted with regard to changes to the ANO-2 TS Bases associated with Source Range monitors. Finally, TSTF Bases Insert 11 is adopted and Bases Inserts 9 and 10 are omitted with regard to changes to the ANO-2 TS Bases associated with SDC. The Bases inserts are extracted from the TSTF markup and included below for ease of review.

   Insert 4 Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

   Insert 5 introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1

   Insert 6 that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

   Insert 7 that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6)

   Insert 8 Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

Insert 9 introduction of coolant into the RCS with boron concentration less than required to meet the minimum boron concentration of LCO 3.9.1

Insert 10 with coolant at boron concentrations less than required to assure the RCS boron concentration is maintained

Insert 11 Suspending positive reactivity additions that could result in failure to meet the minimum boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.

Because this information is an operator aid and cannot change the actual TS requirements, Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF, in light of the significant differences between the Bases.

3. With regard to TSs associated with RCS cooling loops, the SDM reference in the TSTF is changed to the correct ANO-2 reference during TSTF adoption for these TSs (ANO-2 TS 3.4.1.2 and TS 3.4.1.3). Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

4. ITS 3.8.8, related to inverters, does not exist in the ANO-2 TSs and, therefore, subsequent changes are not applicable. While inverters are controlled administratively at ANO-2, an uninterruptible power supply (the major purpose of inverters) is not required to prevent or mitigate a FHA. This fact further establishes the minimal impact of not applying changes to the ANO-2 inverter administrative controls. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

5. With regard to ANO-2 TS 3.9.8.2 associated with SDC system operability with refueling canal level < 23' above the fuel seated in the reactor pressure vessel, no requirement related to positive reactivity additions exists. TSTF-286 Insert 4 was intended to prevent consequential boron dilutions when this LCO is not met. However, this is achieved by ANO-2 TS 3.9.8.1 which requires at least one SDC loop to be in service at all times in Mode 6, regardless of refueling canal level. TSTF-286 changes have been adopted into TS 3.9.8.1 such that the intent of TSTF-286 Insert 4 is met. Therefore, no changes associated with this TSTF are necessary for ANO-2 TS 3.9.8.2. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

Summary

Based on the above, ANO-2 meets the intent of TSTF-286, Revision 2, and adoption of the TSTF is justified. The following are excerpts from individual TSs changed in support of the TSTF-286 related changes. A markup of the entire TS page for each individual TS listed below is included in Attachment 2.

TS 3.1.1.3, Page 3/4 1-4 (ITS – not applicable)

3.1.1.3 The flow rate of reactor coolant through the reactor coolant system shall be ≥ 2000 gpm whenever a reduction in Reactor Coolant System boron concentration is being made.

ACTION:

With the flow rate of reactor coolant through the reactor coolant system < 2000 gpm, immediately suspend all operations that would cause introduction of coolant into the RCS withinvolving a reduction in boron concentration less than that required to meet the minimum required boron concentration of LCO 3.1.1.1, LCO 3.1.1.2, or LCO 3.9.1, as applicableof the Reactor Coolant System.

TS 3.4.1.2, Page 3/4 4-2 (ITS 3.4.5)

3.4.1.2 a. The reactor coolant loops listed below shall be in operable:

ACTION:

b. With no reactor coolant loop in operation, suspend all operations that would causeinvolving introduction of coolant into the RCS witha reduction in boron concentration less than required to meet SDM of LCO 3.1.1.1of the Reactor Coolant System and immediately initiate corrective action to return the required loop to operation.

* All reactor coolant pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause introduction of coolant into the RCSdilution of the reactor coolant withsystem boron concentration less than required to meet SDM of LCO 3.1.1.1, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

TS 3.4.1.3, Page 3/4 4-2a (ITS 3.4.6, 3.4.7, 3.4.8)

3.4.1.3 a. At least two of the coolant loops listed below shall be OPERABLE:

ACTION:

b. With no coolant loop in operation, suspend all operations that would causeinvolving a reduction introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.1 or LCO 3.1.1.2, as applicable,of the Reactor Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

* All reactor coolant pumps and decay heat removal pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause introduction of coolant intodilution of the RCSreactor coolant system with boron concentration less than required to meet SDM of LCO 3.1.1.1 or LCO 3.1.1.2, as applicable, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

TS 3.8.1.2, Page 3/4 8-5 (ITS 3.8.2)

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, suspend all operations involving CORE ALTERATIONS or operations involving positive reactivity additions that could result in loss of required SDM or boron concentration~~changes~~.

TS 3.8.2.2, Page 3/4 8-7 (ITS 3.8.10)

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE:

ACTION:

With less than the above complement of A.C. busses OPERABLE and energized, immediately suspend core alterations, the movement of irradiated fuel assemblies, and ~~any~~ operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

TS 3.8.2.4, Page 3/4 8-10 (ITS 3.8.5)

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

ACTION:

With less than the above complement of D.C. equipment and bus OPERABLE, immediately suspend core alterations, the movement of irradiated fuel assemblies, and ~~any~~ operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

TS 3.9.2, Page 3/4 9-2 (ITS 3.9.2)

3.9.2 As a minimum, two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

ACTION:

a. With one of the above required monitors inoperable, immediately suspend ~~all~~ operations ~~involving~~ CORE ALTERATIONS or that would cause introduction of coolant into the RCS with~~positive reactivity~~ boron concentration less than required to meet the boron concentration of LCO 3.9.1~~changes~~.

<u>TS 3.9.8.1, Page 3/4 9-9</u> (ITS 3.9.4, 3.9.5)

3.9.8.1 At least one shutdown cooling loop shall be in operation.

<u>ACTION</u>:

a. With less than one shutdown cooling loop in operation, except as provided in b. below, suspend ~~all~~ operations involving an increase in the reactor decay heat load or <u>that would cause introduction of coolant into the RCS with</u>~~a reduction in~~ boron concentration <u>less than required to meet the boron concentration of LCO 3.9.1</u>~~of the Reactor Coolant System~~. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

<u>TSTF-471, REVISION 1</u>

This TSTF was approved for industry adoption on December 7, 2006 (Adams Accession No. ML062860320).

This TSTF corrected an oversight related to implementation of TSTF-51 above. TSTF-51 was intended to delete any reference to the term “Core Alterations” in the TSs. Following TSTF-51 implementation, the industry noted other places in the TSs where the term continued to exist. Therefore, TSTF-471 was written to eliminate these remaining references. The basis for this change is equivalent to the discussion of core alterations included under TSTF-51 above. The NRC approved this change for Calvert Cliffs in TS Amendment 279 via NRC SER dated September 21, 2006 (Adams Accession No. ML062350447).

The proposed TS change regarding the elimination of the “Core Alterations” term from TSs facilitates refueling operations during Mode 6 and provides operational flexibility during core alterations activities. Since the requirements to suspend the movement of irradiated fuel assemblies within the Containment Building will remain, the elimination of TS Actions such as “suspend Core Alterations,” and other references to “Core Alterations” has no effect on the initial conditions or mitigation of any design accident or transient.

Explanation of Differences or Deviations

1. With regard to ANO-2 TS Table 4.3-3 associated with Containment Purge and Ventilation system radiation monitoring, no reference to “Core Alterations” or “movement of irradiated fuel” exists. However, it is important for certain requirements to be met when moving irradiated fuel. TSTF-471 deleted the “Core Alterations” term and retained the ITS reference to the “movement of irradiated fuel” from the Channel Functional Test. Therefore, Entergy proposes to adopt the reference to “movement of irradiated fuel” to ensure test requirements are met when the potential for a FHA exists. Note that TSTF-51 nor TSTF-471 added the “recently” term to this test requirement. Because Table 3.3-3 requires channel operability only when moving “recently” irradiated fuel, Entergy proposes to include this term in Note 3 of Table 4.3-3 to be consistent with the operability requirements of the channel. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

2. ITS 3.8.8, related to inverters, does not exist in the ANO-2 TSs and, therefore, subsequent changes are not applicable. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

3. With regard to ANO-2 TS 3.9.2 Bases associated with Source Range monitors, no reference to "Core Alterations" exists. Therefore, no changes associated with this TSTF are necessary for the Bases. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

4. ANO-2 SR 4.9.2 contains reference to "Core Alterations." Neither the ITS or TSTF-471 contain this reference in the associated SRs. For consistency with the intent of TSTF-51 and TSTF-471, the SR 4.9.2 reference to "Core Alterations" is replaced with reference to the movement of fuel. The selected wording meets the intent of the FHA analysis subject to this letter. Entergy considers this to be a minor difference between the TSTF and the ANO-2 TS adoption of the TSTF.

Summary

Based on the above, ANO-2 meets the intent of TSTF-471, Revision 1, and adoption of the TSTF is justified. The following are excerpts from individual TSs changed in support of the TSTF-471 related changes. A markup of the entire TS page for each individual TS listed below is included in Attachment 2.

<u>TS 1.12, Page 1-3</u> (ITS 1.1 - Definitions)

~~CORE ALTERATION~~

~~1.12 CORE ALTERATION shall be the movement or manipulation of any fuel, sources, or reactivity control components within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATION shall not preclude completion of movement of a component to a safe conservative position.~~

<u>Table 4.3-3, Page 3/4 3-27</u>

a.	Containment Purge and Exhaust Isolation	Note 2	R	Note 3	Note 5 & 6

Note 3 – Within 31 days prior to initiating containment purge operations and<u>,</u> at least once per 31 days during containment purge operations<u> when moving recently irradiated fuel assemblies or moving new fuel assemblies over recently irradiated fuel assemblies</u>.

TS 3.8.1.2, Page 3/4 8-5 (ITS 3.8.2)

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, suspend all operations involving ~~CORE ALTERATIONS or~~ positive reactivity changes.

TS 3.8.2.2, Page 3/4 8-7 (ITS 3.8.10)

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE:

With less than the above complement of A.C. busses OPERABLE and energized, immediately suspend ~~core alterations,~~ the movement of irradiated fuel assemblies~~,~~ and any operations involving positive reactivity additions.

TS 3.8.2.4, Page 3/4 8-10 (ITS 3.8.5)

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

ACTION:

With less than the above complement of D.C. equipment and bus OPERABLE, immediately suspend ~~core alterations,~~ the movement of irradiated fuel assemblies~~,~~ and any operations involving positive reactivity additions.

TS 3.9.1, Page 3/4 9-1 (ITS 3.9.1)

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving ~~CORE ALTERATIONS or~~ positive reactivity changes and initiate and continue boration at ≥ 40 gpm of ≥ 2500 ppm boric acid solution until K_{eff} is reduced to ≤ 0.95 or the boron concentration is restored to ≥ 2500 ppm, whichever is the more restrictive. The provisions of Specification 3.0.3 are not applicable.

TS 3.9.2, Page 3/4 9-2 (ITS 3.9.2)

3.9.2 As a minimum, two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

ACTION:

a. With one of the above required monitors inoperable, immediately suspend all operations involving ~~CORE ALTERATIONS or~~ positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.9.2.c A CHANNEL FUNCTIONAL TEST within 8 hours prior to the initial start of the movement of recently irradiated fuel assemblies or the movement of new fuel assemblies over recently irradiated fuel assemblies~~CORE ALTERATIONS~~.

Administrative/Editorial/Miscellaneous Changes

Table 3.3-6 and 4.3-3 Radiation Monitoring Instrumentation

In reference to ANO-2 TS Table 3.3-6, Item 2a, a new Note 3 is proposed that clarifies the original intent of the TS requirements for radiation monitoring and automatic isolation of the Containment Purge system. Currently the TS requires operability of these features in Modes 5 and 6. However, the Containment Purge system is not always in operation. As written, the TS would require the radiation monitoring and isolation capability to remain operable even when the Containment Purge system is secured. The addition of Note 3 specifies that operability is required only during 1) Containment Purge operations, or 2) ongoing Containment Building continuous ventilation operations when moving recently irradiated fuel assemblies or moving new fuel assemblies over irradiated fuel assemblies in the Containment Building, consistent with the revised FHA and TSTF-51.

Likewise, the “Modes in which Surveillance Required” for testing of these features depicted in Table 4.3-3 is revised from the current “Modes 5 and 6”, to “in accordance with applicable Notes” associated with each required test. In conjunction with this change, the Channel Calibration is revised with the addition of a new Note 7, which ensures the calibration is completed prior to purge operations during a refueling outage. Current wording would allow this test to be performed anytime during a refueling outage, even after Containment Purge operations are completed. The new Note 7 requires the calibration to be performed within 31 days *prior* to initiating a Containment purge, consistent with the requirement for the Channel Functional Test. Entergy believes this more-restrictive change better meets the intent of ensuring appropriate operability of the necessary features prior to relying on these features to perform their necessary function.

Notes 2 and 3 of Table 4.4-3 are revised to clearly differentiate between “purge” and “continuous ventilation” modes of operation with regard to Containment Purge ventilation system and radiation instrumentation. The once per 12-hour Channel Check and once per 31-day Channel Functional Test should be associated with continuous ventilation operations, since purge operations only occur once in an outage and normally last no more than an hour or two. Both notes still require a Channel Check and Channel Functional Test within 8 hours or 31 days prior to initiating a purge, respectively. A "purge" is treated as a potential radioactive release, much like gaseous and liquid release from radioactive holding tanks at the facility. Once the purge is complete, the Containment Building atmosphere is free from appreciable amounts of radioactivity and the ventilation system may be continuously operated thereafter for human comfort purposes. Since an FHA or other event involving radiological release could occur when operating in the continuous ventilation mode, it is appropriate to maintain operability of the associated radiation monitoring instrumentation until the system is secured. The aforementioned changes will ensure the instrumentation is verified to remain operable at set intervals.

Based on the above, Entergy believes the proposed changes ensure proper and conservative application of the subject TSs and is, therefore, justified. The following are excerpts from individual TSs changed in this regard. A markup of the entire TS page for each individual TS listed below is included in Attachment 2.

Table 3.3-6, Page 3/4 3-25

a.	Containment Purge and Exhaust Isolation	1	~~5 & 6~~ Note 3	≤ 2 x background	$10 - 10^6$ cpm	16

Note 3 – Applicable during:

a. PURGE of the Containment Building or,

b. Containment Building continuous ventilation operations when moving recently irradiated fuel assemblies or moving new fuel assemblies over recently irradiated fuel assemblies in the Containment Building.

Table 4.3-3, Page 3/4 3-27

a.	Containment Purge and Exhaust Isolation	Note 2	R Note 7	Note 3	~~5 & 6~~ In accordance with applicable Notes

Note 2 – Within 8 hours prior to initiating containment purge operations and at least once per 12 hours during containment purge or continuous ventilation operations.

Note 3 – Within 31 days prior to initiating containment purge operations and at least once per 31 days during cont~~a~~inuous~~ment~~ ventilating~~purge~~ operation.

Note 7 – Once every 18 months within 31 days prior to initiating Containment PURGE operations.

TS 3.9.9 Water Level – Reactor Vessel

With regard to reactor vessel water level, the phrase “elevation corresponding to the” top of irradiated fuel is added to the LCO. This ensures that proper water level is established prior to initiating refueling of the reactor core following a defueled condition. At this point in an outage, there is no fuel in the core and, based on current LCO wording, verifying 23 feet of water “above fuel in the core” would not be possible. The addition of the aforementioned phrase removes ambiguity in this regard. Entergy considers this change to be an enhancement. The following is an excerpt from individual TS changed in this regard. A markup of the entire TS page is included in Attachment 2.

TS 3.9.9, Page 3/4 9-10

3.9.9 At least 23 feet of water shall be maintained over the elevation corresponding to the top of irradiated fuel assemblies seated within the reactor pressure vessel.

TS 3.1.1.3 Boron Dilution

Because TSTF 286 (above) utilizes the acronym “RCS” in lieu of “reactor coolant system,” TS 3.1.1.3 use of the “reactor coolant system” phrase is replaced with “RCS” following its definition in the LCO. This change is administrative in nature. The following is an excerpt from individual TS changed in this regard. A markup of the entire TS page is included in Attachment 2. Note that “Reactor Coolant System” in the below Action is shown deleted under TSTF 286 adoption above.

TS 3.1.1.3, Page 3/4 1-4

3.1.1.3 The flow rate of reactor coolant through the R~~r~~eactor C~~c~~oolant S~~s~~ystem (RCS) shall be ≥ 2000 gpm whenever a reduction in R~~eactor~~ C~~oolant~~ S~~ystem~~ boron concentration is being made.

ACTION:

With the flow rate of reactor coolant through the RCS~~reactor coolant system~~ < 2000 gpm, immediately suspend all operations involving a reduction in boron concentration of the Reactor Coolant System.

4.1.1.3 The flow rate of reactor coolant through the reactor coolant system shall be determined to be ≥ 2000 gpm within one hour prior to the start of and at least once per hour during a reduction in the R~~eactor~~ C~~oolant~~ S~~ystem~~ boron concentration by either:

b. Verifying that at least one low pressure safety injection pump or containment spray pump is in operation as a shutdown cooling pump and supplying ≥ 2000 gpm through the RCS~~reactor coolant system~~.

Table 3.3-6 and 4.3-3 Radiation Monitoring Instrumentation

Table 3.3-6 Actions 16a, 16b, and 16c, and Notes 2 and 3 of Table 4.4-3 are revised to capitalize noun names and/or TS definitions. Wording is added such as “the Containment Building” to enhance sentence clarity. The ending phrase “in the Containment Building” is also adopted for the Containment Purge radiation monitor functional test, consistent with the ITS, which ensures the channel requirements are appropriately associated with the movement of fuel within the Containment Building. These changes are administrative in nature.

Action 16c is further revised to delete the specific ODCM Limitation reference, which is currently incorrect. This level of detail is not necessary to properly apply the Action. Deletion of this excessive detail removes the licensee burden of requesting a change to the TS when indexing changes are made to the ODCM. This change is administrative in nature.

In addition to the above, TS Page 3/4 3-28 is blank and is, therefore, deleted. A Note is added to page 3/4 3-27 footer stating that the next page is 3/4 3-36. This change is administrative in nature.

The following are excerpts from individual TSs changed in this regard. A markup of the entire TS pages is included in Attachment 2.

Table 3.3-6, Page 3/4 3-26

ACTION 16 – With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, complete the following:

a. If performing CORE ALTERATIONS or moving irradiated fuel within the Containment~~reactor~~ B~~b~~uilding, secure the C~~c~~ontainment P~~p~~urge S~~s~~ystem or suspend CORE ALTERATIONS and movement of irradiated fuel within the Containment~~reactor~~ B~~b~~uilding.

b. If a C~~c~~ontainment PURGE is in progress, secure the C~~c~~ontainment P~~p~~urge S~~s~~ystem.

c. If continuously ventilating the Containment Building, verify the associated SPING monitor operable or perform the applicable ACTION(s)~~S~~ of the Offsite Dose Calculation Manual~~, Appendix 2, Table 2.2-1~~;~~,~~ otherwise~~r~~, secure the C~~c~~ontainment P~~p~~urge S~~s~~ystem.

Table 4.4-3, Page 3/4 3-27

Note 2 – Within 8 hours prior to initiating C~~c~~ontainment PURGE~~purge~~ operations and at least once per 12 hours during C~~c~~ontainment PURGE~~purge~~ operations.

Note 3 – Within 31 days prior to initiating C~~c~~ontainment PURGE~~purge~~ operations and at least once per 31 days during containment purge operations in the Containment Building.

Next page is 3/4 3-36

Blank, Page 3/4 3-28

~~THIS PAGE INTENTIONALLY LEFT BLANK~~
~~(Next page is 3/4 3-36)~~

~~ARKANSAS – UNIT 2 3/4 3-28 Amendment No. 53,134,151,163,191~~

TS 3.4.1.2 RCS – Hot Standby

The term "operable" is now capitalized in the RCS cooling loops TS for Mode 3. This is a TS defined term. All defined terms are capitalized throughout the TSs. In addition, the term "in" is deleted from the LCO statement. The presence of this term is an editorial error. Entergy considers this change to be administrative. The following is an excerpt from individual TS changed in this regard. A markup of the entire TS page is included in Attachment 2.

TS 3.4.1.2, Page 3/4 4-2

3.4.1.2 a. The reactor coolant loops listed below shall be ~~in~~ OPERABLE~~operable~~:

ACTION:

a. With less than the above required reactor coolant loops OPERABLE~~operable~~, restore the required loops to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

TS 3.8.2.2 A.C. Distribution – Shutdown

The phrase "and energized" is removed from the Action associated with this TS. A bus that is de-energized cannot be performing its specified safety function and, therefore, cannot be operable. This phrase does not appear in the other shutdown electrical specifications or the ITS. Entergy considers this change administrative in nature in that the specified safety function of the required equipment is unchanged by removal of this phrase. The following is an excerpt from individual TS changed in this regard. A markup of the entire TS page is included in Attachment 2.

TS 3.8.2.2, Page 3/4 8-7

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE:

ACTION:

With less than the above complement of A.C. busses OPERABLE~~ and energized~~, immediately suspend core alterations, the movement of irradiated fuel assemblies, and any operations involving positive reactivity additions.

TS 3.9.1 Boron Concentration

For consistency with other ANO-2 TSs and the ITS, reference to "reactor coolant" in the TS 3.9.1 LCO is revised to "reactor coolant system" (emphasis added). This change is administrative in nature. The following is an excerpt from individual TS changed in this regard. A markup of the entire TS page is included in Attachment 2.

TS 3.9.1, Page 3/4 9-4

3.9.1 With the reactor vessel head unbolted or removed, the boron concentration of the reactor coolant system and the refueling canal shall be maintained uniform and sufficient to ensure that the more restrictive of following reactivity conditions is met:

TS 3.9.4 Containment Building Penetration

The term "containment" in the Applicability, Action, and Surveillance of this specification is changed to "Containment Building." This change is administrative in nature. The following is an excerpt from individual TS changed in this regard. A markup of the entire TS page is included in Attachment 2.

TS 3.9.4, Page 3/4 9-4

APPLICABILITY: During CORE ALTERATIONS or movement of irradiated fuel within the C~~c~~ontainment Building.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or movement of irradiated fuel in the C~~c~~ontainment Building. The provisions of Specification 3.0.3 are not applicable.

4.9.4.1 Each of the above required containment penetrations shall be determined to be in its above required conditions within 72 hours prior to the start of and at least once per 7 days during CORE ALTERATIONS or movement of irradiated fuel in the C~~c~~ontainment Building.

TS 3.9.9 Water Level – Reactor Vessel

The movement of fuel "within the reactor vessel" contained in the Applicability and Action of this specification is revised to "within the Containment Building." This reference is also added to the Surveillance Requirement. The required water level should be met even when fuel is being moved in other areas of the refueling canal, not just in the reactor vessel. In addition, the phrase "while in Mode 6" is deleted from the Applicability since fuel assemblies cannot be accessed within the reactor until Mode 6 has been achieved (reference TS Definition for Mode 6 which in part states "reactor vessel head removed"). Therefore, referencing this mode of operation in the Applicability is redundant. Entergy considers these changes to be enhancements. The following is an excerpt from individual TS changed in this regard. A markup of the entire TS page is included in Attachment 2.

TS 3.9.9, Page 3/4 9-10

APPLICABILITY: During movement of fuel assemblies or CEAs within the Containment Buildingthe reactor pressure vessel while in MODE 6, except during latching and unlatching of CEAs.

ACTION:

With the requirements of the above specification not satisfied, suspend all operations involving movement of fuel assemblies or CEAs within the Containment Buildingthe pressure vessel. The provisions of Specification 3.0.3 are not applicable.

4.9.9 The water level shall be determined to be at least its minimum required depth within 2 hours prior to the start of and at least once per 24 hours thereafter during movement of fuel assemblies within the Containment Building or CEAs.

Conclusion

The proposed changes are consistent with the referenced TSTFs, the ITS, the aforementioned NRC Split Report, and/or the revised FHA analysis. Therefore, Entergy has concluded that the proposed changes are acceptable. A markup of the proposed TS changes in their entirety is included in Attachment 2 of this submittal and a clean (revised) version of the affected TS pages included in Attachment 4.

An information-only markup of the TS Bases is provided in Attachment 3 of this submittal. The affected TS Bases will be revised in accordance with 10 CFR 50.59 upon approval of this amendment request. This is considered a commitment as included in Attachment 5 of this submittal.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

A change is proposed to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs) and TS Bases to adopt several previously approved travelers associated with NUREG-1432, Revision 3.1, "Standard Technical Specifications – Combustion Engineering Plants," and revise applicable TSs in accordance with the current ANO-2 Fuel Handling Accident (FHA) analysis recently accepted by the NRC. Administrative changes are also proposed to correct errors, remove ambiguity, or otherwise enhance TS wording.

1. With regard to the FHA analysis, applicable TSs are revised to include the movement of new or irradiated fuel assemblies, as opposed to the current requirements which only place limitations on the movement of irradiated fuel assemblies. The previous analysis assumed a dropped assembly would result in damage only to the dropped assembly itself and not to the assembly that is seated in the core or Spent Fuel Pool (SFP). The new analysis accounts for the additional weight of a Control Element Assembly (CEA) and the grapple used to lift the assembly. Based on the new analysis, both the dropped assembly and the impacted assembly seated in the core or SFP are assumed to be damaged during a FHA. This is a more restrictive change.

2. Technical Specification Task Force (TSTF) traveler TSTF-51, Revision 2, and TSTF-471, Revision 1 are adopted, which delete the "core alterations" term used throughout the TSs in favor of limiting operations directly related to the movement of fuel. "Core alterations" refers to the manipulation of any fuel, sources, or reactivity control components within the reactor vessel with the vessel head removed and fuel in the vessel. However, only the manipulation of fuel assemblies can lead to a FHA. Due to the extremely high boron concentration of the RCS required by TSs in Mode 6, manipulation of other core components cannot result in an event involving unacceptable reactivity conditions which in turn may lead to dose consequences to the public. Placing restrictions on the manipulation of fuel assemblies provides an acceptable margin of safety in this regard; therefore, the core alterations term is deleted and/or replaced to refer only to the manipulation of fuel assemblies. While this change is less restrictive, the FHA results, as previously accepted by the NRC, are unchanged by adoption of this TSTF. In addition, this change has no appreciable impact on other shutdown events such as a boron dilution event or loss of shutdown cooling (SDC) event.

   TSTF-51 also defines "recently" irradiated fuel and inserts this term into TSs that contain references to the movement of irradiated fuel. For ANO-2, recently irradiated fuel is that fuel which has been part of a critical core within the previous 100 hours. The purpose of the TSTF in this regard was to remove unnecessary restrictions following sufficient radioactive decay of the fuel since the dose consequences of a FHA after this period would be limited to within 10 CFR 50.67 limits. Note, however, that this allowance is not being adopted for TSs associated with Control Room radiation monitoring or Control Room ventilation systems because the 100-hour decay time is not sufficient to limit Control Room doses to within General Design Criterion (GDC) 19 limits.

3. TSTF-272, Revision 1, is adopted to clarify that Reactor Coolant System (RCS) boron limitations are applicable to the refueling canal when the refueling canal is connected to the RCS. Currently, the boron limitations only apply to the water in the RCS (piping and reactor vessel). Changes associated with this TSTF ensure the same limitations are applied to the water in the refueling canal when the water in the RCS is in direct communication with the water in the refueling canal (i.e., reactor vessel head removed and refueling canal filled). This is a more restrictive change.

4. TSTF-286, Revision 2, is adopted to permit RCS inventory and temperature control provided any reduction in boron concentration maintains the Shutdown Margin (SDM) limits required by other specifications. Current TS wording could limit or prevent operators from maintaining control or RCS inventory or temperature without violating the associated TS, especially when the TS requires all positive reactivity conditions to be ceased. This TSTF revises wording to permit minor reactivity changes provided the SDM requirements of associated TSs are maintained at all times. While this change is less restrictive, maintaining SDM requirements continues to ensure an acceptable margin of safety during shutdown operations.

5. TSs associated with Containment Purge and Control Room Ventilation radiation monitoring, RCS cooling loops (shutdown), electrical power sources, refueling boron, and refueling water level are revised to correct errors, remove ambiguity, or enhance the clarity of the TS requirements.

a. Radiation instrumentation requirements associated with the Containment Purge system is revised to be required only when the system is in operation. In addition, required Surveillance tests are revised to ensure testing is performed prior to system use at the beginning of each applicable plant outage (current wording would permit test performance anytime during the outage). Finally, the Surveillance wording is revised to ensure required tests are continued post-Purge, if the system is used for continuously ventilating the Containment Building. Overall, these changes are neutral or more restrictive.

b. Other changes correct typographical errors or add additional clarity to ensure the original intent of the specifications continues to be met. These changes are considered neutral.

Entergy Operations, Inc. (Entergy) has evaluated whether or not a significant hazards consideration is involved with the proposed changes by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below. Each of the five items described above is addressed individually under each of the three standards.

1. Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

Revised FHA

Response: No

TS changes associated with the FHA analysis ensure the initial assumptions of the FHA are maintained and, therefore, act to minimize the consequences of an accident by ensuring TS required features are operable during the movement of fuel assemblies. The FHA analysis was recently accepted by the NRC during adoption of Alternate Source Terms for ANO-2. The probability of a fuel assembly drop (or any load drop) is unchanged by the revised analysis. Therefore, the revised FHA does not involve a significant increase in the probability of an accident previously evaluated.

The FHA analysis was recently accepted by the NRC during adoption of Alternate Source Terms for ANO-2. In addition, Entergy has reviewed station procedures and controls in order to verify that no other loads, other than a new or irradiated fuel assembly, need be addressed with regard to a FHA (i.e., no other known load carried over irradiated fuel assemblies exists which would be expected to cause fuel damage if dropped). The proposed TS changes simply ensure required systems will be operable during operations that could lead to an FHA. Based on the above, the proposed FHA-related changes to the TSs do not result in a significant increase in the consequences of an accident previously evaluated.

TSTF-51 and TSTF 471

Response: No

The only design basis accident assumed for ANO-2 related to the proposed changes is the FHA. The boron dilution event is evaluated, but considered an unlikely event due to the time available for operator response and the administrative controls that permit early detection of the event. The loss of SDC event has little relationship and minimal impact with regard to a FHA. TSTF-51 and TSTF-471 simply replace the use of the previously defined “core alterations” term with requirements associated with the movement of fuel assemblies, since the drop of a fuel assembly is the only event that could reasonably lead to an FHA or a significant challenge to the plant. In addition, TSTF-51 reduces restrictions following sufficient radioactive decay of fuel assemblies since the consequence of a FHA following this decay period would remain within 10 CFR 50.67 limits. Note that this allowance is not adopted for Control Room ventilation or radiation monitoring systems (governed under GDC 19).

The removal of all references to “core alterations” in favor of restrictions associated with the movement of fuel assemblies eliminates current restrictions associated with the manipulation of other core components (i.e., sources or reactivity control components within the core) since such manipulation cannot result in an FHA, boron dilution event, or loss of SDC. In addition, manipulation of these other components cannot present a significant challenge to SDM because the TS required RCS boron concentration for Mode 6 operation provides substantial margin to criticality.

Changes associated with TSTF-51 and TSTF-471, as adopted, do not modify limitations in such a way that the consequences of an FHA would be greater than that assumed in the FHA analysis (i.e., 10 CFR 50.67 and GDC 19 limitations are not exceeded following a FHA).

Based on the above, the proposed changes associated with the adoption of TSTF-51 and TSTF-471 do not result in a significant increase in the probability or consequences of an accident previously evaluated.

TSTF-272

Response: No

Changes associated with TSTF-272 simply place additional restrictions on Mode 6 operations by ensuring the boron concentration of the water in the refueling canal meets the same TS limits required for the RCS when the RCS is in direct hydraulic communication with the refueling canal (i.e., reactor vessel head removed and refueling canal filled). These changes are unrelated to any accident initiator and further prohibit any challenge to the fuel in the reactor vessel by ensure sufficient boron concentration is maintained during Mode 6 operations. Therefore, these changes do not result in a significant increase in the probability or consequences of an accident previously evaluated.

TSTF-286

Response: No

Changes associated with TSTF-286 permit operator control of RCS inventory and temperature when certain TS requirements are not met, provide the overall required SDM of the RCS is maintained. The activities that involve inventory makeup from sources with boron concentrations less than the current RCS concentration (i.e., boron dilution) need not be precluded in the TSs provided the required SDM is maintained for the worst-case overall effect on the core. Note that an unexpected boron dilution event is considered unlikely for ANO-2 due to the significant period of time for operator detection and response before SDM would be significantly challenged (reference ANO-2 SAR Section 15.1.4.3). In addition, while a boron dilution event is evaluated in the safety analysis, the only “accident” assumed for ANO-2 during Mode 6 operations is the FHA. Permitting RCS inventory and temperature adjustments is unrelated to any assumptions associated with a FHA. Therefore, these changes do not result in a significant increase in the probability an accident (or a boron dilution event) previously evaluated. Because an unexpected boron dilution event provides sufficient opportunity for detection and recovery, the proposed changes associated with TSTF-286 likewise do not result in a significant increase in the consequences of an accident (or boron dilution event) previously evaluated.

Administrative/Editorial/Miscellaneous Changes

Response: No

Enhancements and administrative changes proposed for specifications affected by the above revised FHA or TSTF adoptions are unrelated to any accident initiator. Administrative changes likewise cannot impact the consequences of any accident previously evaluated.

Enhancements associated with the Containment Purge system radiation instrumentation ensure Surveillance testing is performed when the system is in service, regardless if an actual Purge is taking place. In addition, the proposed changes ensure appropriate testing is performed prior to placing the system in service each refueling outage. The proposed changes are neutral or more restrictive and, therefore, cannot increase the consequences of an accident previously evaluated.

Based on the above, the proposed changes do not represent a significant increase in the probability or consequences of an accident previously evaluated.

2. Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

Revised FHA

Response: No

TS changes associated with the revised FHA involve no physical changes to the plant. These changes act to ensure required SSCs are operable when moving irradiated fuel assemblies or new fuel assemblies over irradiated fuel assemblies to limit any Control Room or offsite dose consequences to within acceptable limits. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

TSTF-51 and TSTF 471

Response: No

TS changes associated with the adoption of these TSTFs involve no physical changes to the plant. The removal of all references to "core alterations" in favor of restrictions associated with the movement of fuel assemblies eliminates current restrictions associated with the manipulation of other core components (i.e., sources or reactivity control components within the core). Such manipulations cannot result in an FHA, boron dilution event, or loss of SDC. In addition, such manipulations cannot result in an appreciable change in core reactivity due to the high RCS boron concentration required during refueling operations by the TSs. TSTF-51 changes associated with a reduction in restrictions following sufficient radioactive decay of fuel assemblies are not considered accident precursors. The proposed changes do not introduce a new accident initiator, accident precursor, or accident-related malfunction mechanism. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

TSTF-272

Response: No

Changes associated with TSTF-272 place additional restrictions on Mode 6 operations by ensuring the boron concentration of the water in the refueling canal meets the same TS limits required for the RCS when the RCS is in direct hydraulic communication with the refueling canal (i.e., reactor vessel head removed and refueling canal filled). These changes are unrelated to any accident initiator and further prohibit any challenge to the fuel in the reactor vessel by ensure sufficient boron concentration is maintained during Mode 6 operations. The proposed changes do not introduce a new accident initiator, accident precursor, or accident-related malfunction mechanism. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

TSTF-286

Response: No

Changes associated with TSTF-286 permit operator control of RCS inventory and temperature when certain TS requirements are not met, provide the overall required SDM of the RCS is maintained. No physical plant changes are related to these TS changes. The only accident or event that could be affected by this change is the boron dilution event, which has been previously evaluated. The proposed changes do not introduce a new accident initiator, accident precursor, or accident-related malfunction mechanism. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Administrative/Editorial/Miscellaneous Changes

Response: No

Enhancements and administrative changes proposed for specifications affected by the above revised FHA or TSTF adoptions are unrelated to any accident initiator and involve no physical changes to the plant.

Enhancements associated with the Containment Purge system radiation instrumentation ensure Surveillance testing is performed when the system is in service, regardless if an actual Purge is taking place. In addition, the proposed changes ensure appropriate testing is performed prior to placing the system in service each refueling outage.

The proposed changes do not introduce a new accident initiator, accident precursor, or accident-related malfunction mechanism. Based on the above, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

Revised FHA

Response: No

TS changes associated with the revised FHA act to ensure required SSCs are operable when moving irradiated fuel assemblies or new fuel assemblies over irradiated fuel assemblies to limit any Control Room or offsite dose consequences to within acceptable limits. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

TSTF-51 and TSTF 471

Response: No

The removal of all references to “core alterations” in favor of restrictions associated with the movement of fuel assemblies eliminates current restrictions associated with the manipulation of other core components (i.e., sources or reactivity control components within the core). Such manipulations cannot result in an FHA, boron dilution event, or loss of SDC. In addition, such manipulations cannot result in an appreciable change in core reactivity due to the high RCS boron concentration required during refueling operations by the TSs. TSTF-51 also reduces restrictions following sufficient radioactive decay of fuel assemblies since the consequence of a FHA following this decay period would remain within 10 CFR 50.67 limits. Note that this allowance is not adopted for Control Room ventilation or radiation monitoring systems (governed under GDC 19). Changes associated with TSTF-51 and TSTF-471, as adopted, do not modify limitations in such a way that the consequences of an FHA would be greater than that assumed in the FHA analysis (i.e., 10 CFR 50.67 and GDC 19 limitations are not exceeded following a FHA). Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

TSTF-272

Response: No

Changes associated with TSTF-272 place additional restrictions on Mode 6 operations by ensuring the boron concentration of the water in the refueling canal meets the same TS limits required for the RCS when the RCS is in direct hydraulic communication with the refueling canal (i.e., reactor vessel head removed and refueling canal filled). These changes are more restrictive than the current specification and therefore do not involve a significant reduction in a margin of safety.

TSTF-286

Response: No

Changes associated with TSTF-286 permit operator control of RCS inventory and temperature when certain TS requirements are not met, provide the overall required SDM of the RCS is maintained. The only accident or event that could be affected by this change is the boron dilution event, which has been previously evaluated. While the margin between existing boron concentration and that required to meet SDM requirements may be reduced, margin is gained by permitting operators to take corrective action to maintain RCS inventory and temperature within limits during periods when such operations are otherwise prohibited. While not quantifiable, the changes associated with TSTF-286 have a general balanced effect in relation to the margin of safety. Because an unexpected boron dilution event provides sufficient opportunity for detection and recovery, the proposed changes associated with TSTF-286 do not involve a significant reduction in a margin of safety.

Administrative/Editorial/Miscellaneous Changes

Response: No

Enhancements and administrative changes proposed for specifications affected by the above revised FHA or TSTF adoptions are unrelated to any accident initiator or mitigation strategy. Enhancements associated with the Containment Purge system radiation instrumentation ensure Surveillance testing is performed when the system is in service, regardless if an actual Purge is taking place. In addition, the proposed changes ensure appropriate testing is performed prior to placing the system in service each refueling outage. Based on the above, these proposed changes do not involve a significant reduction in a margin of safety.

5.2 Applicable Regulatory Requirements / Criteria

10 CFR Part 50, Appendix A, GDC 17 requires onsite electric power systems be provided with sufficient capacity and capability to assure that (1) specified acceptable fuel design limits (SAFDLs) and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

GDC 19 provides requirements for maintaining a habitable control room and includes limitations on radiological dose that may be received by control room operators.

In accordance with GDC 26, GDC 28, and GDC 29, reactivity shall be controllable, such that subcriticality is maintained under cold conditions and SAFDLs are not exceeded during normal operation and anticipated operational occurrences.

GDC 41 requires containment atmosphere cleanup systems to control fission products, hydrogen, oxygen, and other substances which may be released into the reactor containment shall be provided as necessary to reduce, consistent with the functioning of other associated systems, the concentration and quality of fission products released to the environment following postulated accidents, and to control the concentration of hydrogen or oxygen and other substances in the containment atmosphere following postulated accidents to assure that containment integrity is maintained.

GDC 61 requires that the fuel storage and handling systems be designed to assure adequate safety under normal and postulated accident conditions.

GDC 64 requires the means for monitoring the reactor containment atmosphere effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents.

The acceptance limits for offsite radiation exposure are contained in 10 CFR 50.67 and NRC Regulatory Guide (RG) 1.183.

RG 1.183, Revision 0, provides assumptions used for evaluating the potential radiological consequences of a FHA in the SFP area. The SFP / refueling canal level limitation is such that sufficient iodine activity would be retained to limit offsite doses from the accident to within 10 CFR 50.67 limits.

Summary

The proposed TS changes do not result in a failure to meet or comply with any of the above regulatory requirements. The TS changes associated with the FHA analysis, TSTF-51, and TSTF-471, as adopted, continue to ensure 10 CFR 50.67 and GDC 19 dose consequences remain within limits. With regard to TSTF-272, the associated TS changes ensure required boron concentration is met for volumes of water in direct communication with the RCS (e.g., the refueling canal). With regard to TSTF-286, by limiting the positive reactivity addition to the required SDM, the initial boron concentration assumed for the safety analysis and the analysis results for boron dilution events remain valid, providing reasonable assurance that the SAFDLs are not exceeded.

Administrative changes and proposed enhancements to TSs associated with boron dilution, Containment Building Purge radiation monitoring, RCS cooling loops (shutdown), electrical power sources, Containment Building penetrations, and refueling water level correct errors, remove ambiguity, provide enhanced clarity, or otherwise provided added confidence that the intent of the affected TS requirements is met. These changes do no affect compliance with the aforementioned regulations.

Therefore, based on the considerations discussed above:

1) There is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner;

2) Such activities will be conducted in compliance with the Commission's regulations; and

3) Issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

In conclusion, Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the TSs, and do not affect conformance with any GDC differently than described in the ANO-2 SAR.

6.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. Entergy letter dated March 31, 2010, *License Amendment Request – Technical Specification Changes and Analyses Relating to Use of Alternative Source Term* (2CAN031001) (ML100910241)

2. Entergy letter dated June 23, 2010, *License Amendment Request – Technical Specification Changes and Analyses Relating to Use of Alternative Source Term – Supplemental Information* (2CAN061004) (ML102000199)

3. NRC Safety Evaluation Report dated April 26, 2011, *Arkansas Nuclear One, Unit No. 2 – Issuance of Amendment RE: Use of Alternate Source Term* (TAC No. ME 3678) (2CNA041102) (ML110980197)

4. Entergy letter dated May 19, 1995, *Technical Specification Change Request Concerning Open Containment Personnel Airlock During Core Alternations* (0CAN059503)

5. NRC Safety Evaluation Report dated September 28, 1995, *Issuance of Amendment No. 166 to Facility Operating License No. NPF-6 – Arkansas Nuclear One, Unit No. 2* (TAC No. M92150) (2CNA099506) (ML021560393)

6. NRC letter dated November 1, 2011, *Summary of October 5, 2011, Meeting with Entergy Operations, Inc., on Pre-submittal License Amendment Request for Changes due to Revised Fuel Handling Accident Analysis along with Adoption of TSTF-51, TSF-272, TSTF-286, TSTF-471, and Relocation/Deletion of Non-Improved Technical Specification (ITS) Shutdown Technical Specifications* (2CNA111101) (TAC No. ME6887)

7. Waterford 3 letter dated April 13, 2011, *License Amendment Request to Revise the Technical Specifications Based Upon Revised Fuel Handling Accident Analysis* (W3F1-2010-0009) (ML11105A131)

Attachment 2

2CAN061302

Markup of Technical Specification Pages and Technical Specification Bases Pages
(Bases pages submitted for information only)

CHANNEL FUNCTIONAL TEST

1.11 A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels – The injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions.

b. Bistable channels – The injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

c. Digital computer channels – The exercising of the digital computer hardware using diagnostic programs and the injection of simulated process data into the channel to verify OPERABILITY.

~~CORE ALTERATION~~

~~1.12 CORE ALTERATION shall be the movement or manipulation of any fuel, sources, or reactivity control components within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATION shall not preclude completion of movement of a component to a safe conservative position.~~

SHUTDOWN MARGIN

1.13 SHUTDOWN MARGIN shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming all control element assemblies are fully inserted except for the single assembly of highest reactivity worth which is assumed to be fully withdrawn.

IDENTIFIED LEAKAGE

1.14 IDENTIFIED LEAKAGE shall be:

a. Leakage (except controlled leakage) into closed systems, such as pump seal or valve packing leaks that are captured, and conducted to a sump or collecting tank, or

b. Leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be PRESSURE BOUNDARY LEAKAGE, or

c. Reactor coolant system leakage through a steam generator to the secondary system (primary to secondary leakage).

REACTIVITY CONTROL SYSTEMS

BORON DILUTION

LIMITING CONDITION FOR OPERATION

3.1.1.3 The flow rate of reactor coolant through the Rreactor Ccoolant Ssystem (RCS) shall be ≥ 2000 gpm whenever a reduction in Reactor Coolant System boron concentration is being made.

APPLICABILITY: ALL MODES.

ACTION:

With the flow rate of reactor coolant through the RCSreactor coolant system < 2000 gpm, immediately suspend all operations that would cause introduction of coolant into the RCS withinvolving a reduction in boron concentration less than that required to meet the minimum required boron concentration of LCO 3.1.1.1, LCO 3.1.1.2, or LCO 3.9.1, as applicableof the Reactor Coolant System.

SURVEILLANCE REQUIREMENTS

4.1.1.3 The flow rate of reactor coolant through the reactor coolant system shall be determined to be ≥ 2000 gpm within one hour prior to the start of and at least once per hour during a reduction in the Reactor Coolant System boron concentration by either:

a. Verifying at least one reactor coolant pump is in operation, or

b. Verifying that at least one low pressure safety injection pump or containment spray pump is in operation as a shutdown cooling pump and supplying ≥ 2000 gpm through the RCSreactor coolant system.

<u>TABLE 3.3-6</u>

<u>RADIATION MONITORING INSTRUMENTATION</u>

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1. AREA MONITORS					
a. Spent Fuel Pool Area Monitor	1	Note 1	≤ 1.5 x 10^{-2} R/hr	10^{-4} – 10^{1} R/hr	13
b. Containment High Range	2	1, 2, 3, & 4	Not Applicable	1 – 10^{7} R/hr	18
2. PROCESS MONITORS					
a. Containment Purge and Exhaust Isolation	1	~~5 & 6~~Note 3	≤ 2 x background	10 – 10^{6} cpm	16
b. Control Room Ventilation Intake Duct Monitors	2	Note 2	≤ 2 x background	10 – 10^{6} cpm	17,20,21
c. Main Steam Line Radiation Monitors	1/Steam Line	1, 2, 3, & 4	Not Applicable	10^{-1} – 10^{4} mR/hr	19

Note 1 – With fuel in the spent fuel pool or building.

Note 2 – MODES 1, 2, 3, 4, and during movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

Note 3 – Applicable during:

a. PURGE of the Containment Building or,

b. Containment Building continuous ventilation operations when moving irradiated fuel assemblies or moving new fuel assemblies over irradiated fuel assemblies in the Containment Building.

TABLE 3.3-6 (Continued)

TABLE NOTATION

ACTION 13 – With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

ACTION 16 – With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, complete the following:

a. If ~~performing CORE ALTERATIONS or~~ moving recently irradiated fuel assemblies or moving new fuel assemblies over recently irradiated fuel assemblies within the Containment~~reactor~~ B~~b~~uilding, secure the C~~c~~ontainment P~~p~~urge S~~s~~ystem or suspend ~~CORE ALTERATIONS and~~ the movement of recently irradiated fuel assemblies and movement of new fuel assemblies over recently irradiated fuel assemblies within the Containment~~reactor~~ B~~b~~uilding.

b. If a C~~c~~ontainment PURGE is in progress, secure the C~~c~~ontainment P~~p~~urge S~~s~~ystem.

c. If continuously ventilating the Containment Building, verify the associated SPING monitor operable or perform the applicable ACTION(s)~~S~~ of the Offsite Dose Calculation Manual~~, Appendix 2, Table 2.2-1~~;~~,~~ otherwise~~r~~, secure the C~~c~~ontainment P~~p~~urge S~~s~~ystem.

ACTION 17 – In MODE 1, 2, 3, or 4, with no channels OPERABLE, within 1 hour initiate and maintain operation of the control room emergency ventilation system (CREVS) in the recirculation mode of operation or be in HOT STANDBY within the next 6 hours and COLD SHUTDOWN in the following 30 hours.

ACTION 18 – With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, (1) either restore the inoperable channel to OPERABLE status within 7 days or (2) prepare and submit a Special Report to the NRC within 30 days following the event, outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the system to OPERABLE status. With both channels inoperable, initiate alternate methods of monitoring the containment radiation level within 72 hours in addition to the actions described above.

ACTION 19 – With the number of OPERABLE Channels less than required by the Minimum Channels OPERABLE requirements, initiate the preplanned alternate method of monitoring the appropriate parameter(s), within 72 hours, and:

1) either restore the inoperable Channel(s) to OPERABLE status within 7 days of the event, or

2) prepare and submit a Special Report to the NRC within 14 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

ACTION 20 – In MODE 1, 2, 3, or 4 with the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, within 7 days restore the inoperable channel to OPERABLE status or initiate and maintain the CREVS in the recirculation mode of operation. Otherwise, be in HOT STANDBY within the next 6 hours and COLD SHUTDOWN in the following 30 hours.

ACTION 21 - During movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies with one or two channels inoperable, immediately place one OPERABLE CREVS train in the emergency recirculation mode or immediately suspend the movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

TABLE 4.3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. AREA MONITORS				
a. Spent Fuel Pool Area Monitor	S	R	M	Note 1
b. Containment High Range	S	R Note 4	M	1, 2, 3, & 4
2. PROCESS MONITORS				
a. Containment Purge and Exhaust Isolation	Note 2	R Note 7	Note 3	In accordance with applicable Notes5 & 6
b. Control Room Ventilation Intake Duct Monitors	S	R	M Note 6	Note 5
c. Main Steam Line Radiation Monitors	S	R	M	1, 2, 3, & 4

Note 1 – With fuel in the spent fuel pool or building.

Note 2 – Within 8 hours prior to initiating Ccontainment PURGEpurge operations and at least once per 12 hours during Ccontainment PURGEpurge or continuous ventilation operations.

Note 3 – Within 31 days prior to initiating Ccontainment PURGEpurge operations and, at least once per 31 days during containuousment ventilatingpurge operations when moving recently irradiated fuel assemblies or moving new fuel assemblies over recently irradiated fuel assemblies in the Containment Building.

Note 4 – Acceptable criteria for calibration are provided in Table II.F.1-3 of NUREG-0737.

Note 5 – MODES 1, 2, 3, 4, orand during movementhandling of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

Note 6 - When the Control Room Ventilation Intake Duct Monitor is placed in an inoperable status solely for performance of this Surveillance, entry into associated ACTIONS may be delayed up to 3 hours.

Note 7 – Once every 18 months within 31 days prior to initiating Containment PURGE operations.

Next page is 3/4 3-36

THIS PAGE INTENTIONALLY LEFT BLANK
(Next page is 3/4 3-36)

HOT STANDBY

LIMITING CONDITION FOR OPERATION

3.4.1.2 a. The reactor coolant loops listed below shall be ~~in~~ OPERABLE~~operable~~:

1. Reactor Coolant Loop (A) and at least one associated reactor coolant pump.

2. Reactor Coolant Loop (B) and at least one associated reactor coolant pump.

b. At least one of the above Reactor Coolant Loops shall be in operation.*

APPLICABILITY: MODE 3.

ACTION:

a. With less than the above required reactor coolant loops OPERABLE~~operable~~, restore the required loops to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. With no reactor coolant loop in operation, suspend ~~all~~ operations that would cause~~involving~~ introduction of coolant into the RCS with~~a reduction in~~ boron concentration less than required to meet SDM of LCO 3.1.1.1~~of the Reactor Coolant System~~ and immediately initiate corrective action to return the required loop to operation.

SURVEILLANCE REQUIREMENTS

4.4.1.2.1 At least the above required reactor coolant pumps, if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.2.2 At least one cooling loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

* All reactor coolant pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause introduction of coolant into the RCS~~dilution of the reactor coolant~~ with~~system~~ boron concentration less than required to meet SDM of LCO 3.1.1.1, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

REACTOR COOLANT SYSTEM

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.4.1.3 a. At least two of the coolant loops listed below shall be OPERABLE:

1. Reactor Coolant Loop (A) and its associated steam generator and at least one associated reactor coolant pump.

2. Reactor Coolant Loop (B) and its associated steam generator and at least one associated reactor coolant pump.

3. Shutdown Cooling Loop (A) #.

4. Shutdown Cooling Loop (B) #.

b. At least one of the above coolant loops shall be in operation.*

APPLICABILITY: Modes 4 and 5.

ACTION:

a. With less than the above required coolant loops OPERABLE, immediately initiate corrective action to return the required coolant loops to OPERABLE status as soon as possible; be in COLD SHUTDOWN within 20 hours.

b. With no coolant loop in operation, suspend all operations that would causeinvolving a reduction introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.1 or LCO 3.1.1.2, as applicable,of the Reactor Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

SURVEILLANCE REQUIREMENTS

4.4.1.3.1 The required shutdown cooling loop(s) shall be determined OPERABLE per the Inservice Testing Program.

4.4.1.3.2 The required reactor coolant pump(s), if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.3.3 The required steam generator(s) shall be determined OPERABLE by verifying the secondary side water level to be ≥ 23% indicated level at least once per 12 hours.

4.4.1.3.4 At least one coolant loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

---

* All reactor coolant pumps and decay heat removal pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause introduction of coolant intodilution of the RCSreactor coolant system with boron concentration less than required to meet SDM of LCO 3.1.1.1 or LCO 3.1.1.2, as applicable, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

The normal or emergency power source may be inoperable in Mode 5.

3/4.7.6 CONTROL ROOM EMERGENCY VENTILATION AND AIR CONDITIONING SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.6.1 Two independent control room emergency ventilation and air conditioning systems shall be OPERABLE. (Note 1)

APPLICABILITY: MODES 1, 2, 3, 4, or during movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

MODES 1, 2, 3, and 4

a. With one control room emergency air conditioning system (CREACS) inoperable, restore the inoperable system to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one control room emergency ventilation system (CREVS) inoperable for reasons other than ACTION d, restore the inoperable system to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With one CREVS inoperable for reasons other than ACTION d and one CREACS inoperable, restore the inoperable CREVS to OPERABLE status within 7 days and restore the inoperable CREACS to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. With one or more CREVS inoperable due to an inoperable CRE boundary:

   1. Immediately initiate action to implement mitigating actions, and

   2. Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits within 24 hours, and

   3. Restore the CRE boundary to OPERABLE status within 90 days

   Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

e. With two CREVS inoperable for reasons other than ACTION d or with two CREACS inoperable, enter Specification 3.0.3.

Note 1: The control room envelope (CRE) boundary may be open intermittently under administrative controls.

During Movement~~Handling~~ of Irradiated Fuel Assemblies or Movement of New Fuel Assemblies over Irradiated Fuel Assemblies

f. With one CREACS inoperable, restore the inoperable system to OPERABLE status within 30 days or immediately place the OPERABLE system in operation; otherwise, suspend all activities involving the movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

g. With one CREVS inoperable, restore the inoperable system to OPERABLE status within 7 days or immediately place the control room in the emergency recirc mode of operation; otherwise, suspend all activities involving the movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

h. With one CREVS inoperable for reasons other than ACTION d and one CREACS inoperable:

   1. restore the inoperable CREVS to OPERABLE status within 7 days or immediately place the CRE in the emergency recirc mode of operation, and

   2. restore the inoperable CREACS to OPERABLE status within 30 days or immediately place the OPERABLE system in operation;

   3. otherwise, suspend all activities involving the movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

i. With both CREACS inoperable, immediately suspend all activities involving the movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

j. With both CREVS inoperable or with one or more CREVS inoperable due to an inoperable CRE boundary, immediately suspend all activities involving the movement~~handling~~ of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ELECTRICAL POWER SYSTEMS

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and

b. One diesel generator with:

1. A day fuel tank containing a minimum volume of 300 gallons of fuel,

2. A fuel storage system, and

3. A fuel transfer pump.

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend ~~all operations involving~~ the movement of irradiated fuel assemblies~~CORE ALTERATIONS~~, the movement of new fuel assemblies over irradiated fuel assemblies, ~~or~~and operations involving positive reactivity additions that could result in loss of required SDM or boron concentration~~changes~~.

SURVEILLANCE REQUIREMENT

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the Surveillance Requirements of 4.8.1.1.1 and 4.8.1.1.2 except for Requirement 4.8.1.1.2a.5.

ELECTRICAL POWER SYSTEMS

A.C. DISTRIBUTION – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE:

1 - 4160 volt Emergency Bus

1 - 480 volt Emergency Load Center Bus

4 - 480 volt Motor Control Center Busses

2 - 120 volt A.C. Vital Busses

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

With less than the above complement of A.C. busses OPERABLE ~~and energized~~, immediately suspend ~~core alterations,~~ the movement of irradiated fuel assemblies, the movement of new fuel assemblies over irradiated fuel assemblies, and ~~any~~ operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

SURVEILLANCE REQUIREMENTS

4.8.2.2 The specified A.C. busses shall be determined OPERABLE at least once per 7 days by verifying correct breaker alignment and indicated power availability.

ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTION – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

1 - 125-volt D.C. bus, and

1 - 125-volt battery bank and charger supplying the above D.C. bus.

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

With less than the above complement of D.C. equipment and bus OPERABLE, immediately suspend ~~core alterations,~~ the movement of irradiated fuel assemblies, the movement of new fuel assemblies over irradiated fuel assemblies, and ~~any~~ operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 125-volt D.C. bus shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 125-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.3.

3/4.9 REFUELING OPERATIONS

BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 With the reactor vessel head unbolted or removed, Tthe boron concentration of the reactor coolant system, and the refueling canal, and the reactor cavity shall be maintained uniform and sufficient to ensure that the more restrictive of following reactivity conditions is met:

a. Either a K_{eff} of 0.95 or less, which includes a 1% $\Delta k/k$ conservative allowance for uncertainties, or

b. A boron concentration of ≥ 2500 ppm, which includes a 50 ppm conservative allowance for uncertainties.

APPLICABILITY: MODE 6*.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and initiate and continue boration at ≥ 40 gpm of ≥ 2500 ppm boric acid solution until K_{eff} is reduced to ≤ 0.95 or the boron concentration is restored to ≥ 2500 ppm, whichever is the more restrictive. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The more restrictive of the above two reactivity conditions shall be determined prior to:

a. Removing or unbolting the reactor vessel head, and

b. Withdrawal of any CEA in excess of 3 feet from its fully inserted position within the reactor pressure vessel.

4.9.1.2 The boron concentration of the reactor coolant and the refueling canal shall be determined by chemical analysis at least once per 72 hours.

* The reactor shall be maintained in MODE 6 when the reactor vessel head is unbolted or removedOnly applicable to the refueling canal and reactor cavity when connected to the RCS.

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

APPLICABILITY: MODE 6.

ACTION:

a. With one of the above required monitors inoperable, immediately suspend ~~all~~ operations ~~involving~~ that~~CORE ALTERATIONS or~~ would cause introduction of coolant into the RCS with~~positive reactivity~~ boron concentration less than required to meet the boron concentration of LCO 3.9.1~~changes~~.

b. With both of the above required monitors inoperable, determine the boron concentration of the reactor coolant system at least once per 12 hours.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.2 Each source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

a. A CHANNEL CHECK at least once per 12 hours,

b. A CHANNEL FUNCTIONAL TEST at least once per 7 days, and

c. A CHANNEL FUNCTIONAL TEST within 8 hours prior to the initial start of the movement of recently irradiated fuel assemblies or the movement of new fuel assemblies over recently irradiated fuel assemblies~~CORE ALTERATIONS~~.

CONTAINMENT BUILDING PENETRATION

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door is capable* of being closed,

b. A minimum of one door in each airlock is capable* of being closed, and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed* by a manual or automatic isolation valve, blind flange, or equivalent, or

2. Capable* of being closed by an OPERABLE containment purge and exhaust isolation system.

APPLICABILITY: During ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies within the C~~c~~ontainment Building.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the C~~c~~ontainment Building. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.4.1 Each of the above required containment penetrations shall be determined to be in its above required conditions within 72 hours prior to the start of and at least once per 7 days during ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the C~~c~~ontainment Building.

* Penetration flow path(s) providing direct access from the containment atmosphere to the outside atmosphere may be unisolated under administrative controls. Administrative controls shall ensure that appropriate personnel are aware that when containment penetrations, including both personnel airlock doors and/or the equipment door are open, a specific individual(s) is designated and available to close the penetration following a required evacuation of containment, and any obstruction(s) (e.g., cables and hoses) that could prevent closure of an airlock door and/or the equipment door be capable of being quickly removed.

Next page is 3/4 9-6

REFUELING OPERATIONS

COMMUNICATIONS

LIMITING CONDITION FOR OPERATION

3.9.5 Direct communications shall be maintained between the control room and personnel at the refueling station.

APPLICABILITY: During ~~CORE ALTERATIONS~~ movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel.

ACTION:

When direct communications between the control room and personnel at the refueling station cannot be maintained, suspend movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel~~all CORE ALTERATIONS~~. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.5 Direct communications between the control room and personnel at the refueling station shall be demonstrated within one hour prior to the start of and at least once per 12 hours during movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel~~CORE ALTERATIONS~~.

REFUELING OPERATIONS

SHUTDOWN COOLING AND COOLANT CIRCULATION

SHUTDOWN COOLING – ONE LOOP

LIMITING CONDITION FOR OPERATION

3.9.8.1 At least one shutdown cooling loop shall be in operation.

APPLICABILITY: MODE 6.

ACTION:

a. With less than one shutdown cooling loop in operation, except as provided in b. below, suspend ~~all~~ operations involving an increase in the reactor decay heat load or that would cause introduction of coolant into the RCS with~~a reduction in~~ boron concentration less than required to meet the boron concentration of LCO 3.9.1~~of the Reactor Coolant System~~. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

b. The shutdown cooling loop may be removed from operation for up to 1 hour per 8 hour period provided no operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.9.1~~during the performance of CORE ALTERATIONS~~.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.1 A shutdown cooling loop shall be determined to be in operation and circulating reactor coolant at a flow rate of ≥ 2000 gpm at least once per 24 hours.

REFUELING OPERATIONS

WATER LEVEL – REACTOR VESSEL

LIMITING CONDITION FOR OPERATION

3.9.9 At least 23 feet of water shall be maintained over the elevation corresponding to the top of irradiated fuel assemblies seated within the reactor pressure vessel.

APPLICABILITY: During movement of fuel assemblies ~~or CEAs~~ within the Containment Building~~the reactor pressure vessel while in MODE 6, except during latching and unlatching of CEAs~~.

ACTION:

With the requirements of the above specification not satisfied, suspend all operations involving movement of fuel assemblies ~~or CEAs~~ within the Containment Building~~the pressure vessel~~. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.9 The water level shall be determined to be at least its minimum required depth within 2 hours prior to the start of and at least once per 24 hours thereafter during movement of fuel assemblies within the Containment Building~~or CEAs~~.

The bistable for the operating bypasses for the CPC and Logarithmic Power Level - High trips is required to be set within the two decade range allowed by Table 3.3-1 notations (a) and (c) and Table 2.2-1 notations (1) and (5). These limits provide the bistable with the appropriate range to account for the bistable hysteresis and to provide margin for the applicable uncertainties. Regardless of the actual bistable setpoint within the two decade band, the single bistable design ensures that either the CPC or the Logarithmic Power Level - High trips are available to provide reactor trip protection. During testing pursuant to Special Test Exception 3.10.3, the bistable setpoint for these operating bypasses is increased to automatically remove the CPCs from bypass before the logarithmic power level exceeds 1% power.

Tables 2.2-1 notation (2), 3.3-1 notation (b), 3.3-3 notation (a), and 3.3-4 notation (1) allow the Pressurizer Pressure – Low function to be manually bypassed below 400 psia when the operating bypass permissive has been enabled. The margin between the pressurizer pressure and the setpoint is maintained ≤ 200 psia as pressurizer pressure is reduced during controlled plant cooldowns. This allows for controlled depressurization of the RCS while still maintaining an active trip setpoint until the trip is no longer needed to protect the plant. Since the Pressurizer Pressure - Low bistable is shared with RPS, SIAS, and CCAS an inadvertent actuation of these systems due to low pressurizer pressure is prevented while bypassed. The Pressurizer Pressure – Low bypass is required to be automatically removed before RCS pressure exceeds 500 psia. The difference between the 400 psia allowance for the manual bypass and 500 psia automatic bypass removal feature allows for the bistable hysteresis.

3/4.3.3 MONITORING INSTRUMENTATION

3/4.3.3.1 RADIATION MONITORING INSTRUMENTATION

The OPERABILITY of the radiation monitoring channels ensures that 1) the radiation levels are continually measured in the areas served by the individual channels and 2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded.

The PURGE as defined in the definitions section is a release under a purge permit, whereas continuous ventilation is defined as operation of the purge system after the requirements of the purge permit have been satisfied. When securing the containment purge system to meet the ACTION requirements of this Specification, at least one supply valve and one exhaust valve is to be closed, and the supply and exhaust fans secured. Because SPING 5 is utilized to fulfill offsite dose monitoring for this pathway, the SPING must undergo a CHANNEL FUNCTIONAL TEST within 31 days prior to and a CHANNEL CHECK within 8 hours prior to the performance of a PURGE. The ANO ODCM describes required actions associated with an inoperable SPING 5 relevant to PURGE operations, the ventilation mode of operation, and operations during the movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) or movement of new fuel assemblies over recently irradiated fuel assemblies within the Containment Building.

The principal function of the control room intake duct monitors is to provide an enclosed environment from which the unit can be operated following an uncontrolled release of radioactivity. Due to the unique arrangement of the shared control room envelope, one control room isolation channel receives a high radiation signal from the ANO-1 control room ventilation intake duct monitor and the redundant channel receives a high radiation signal from the ANO-2 control room ventilation intake duct monitor. With neither channel of the control room radiation monitoring system operable, the CREVS must be placed in a condition that does not require the isolation to occur (i.e., one operable train of CREVS is placed in the emergency recirculation mode of operation). Reactor operation may continue indefinitely in this state.

3/4.4.1 REACTOR COOLANT LOOPS AND COOLANT CIRCULATION

The plant is designed to operate with both reactor coolant loops and associated reactor coolant pumps in operation, and maintain DNBR above the limits specified by Specification 3.2.4 during all normal operations and anticipated transients.

In MODE 3, a single reactor coolant loop provides sufficient heat removal capability for removing decay heat; however, single failure considerations require that two loops be OPERABLE.

In MODES 4 and 5, a single reactor coolant loop or shutdown cooling loop provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops be OPERABLE. Thus, if the reactor coolant loops are not OPERABLE, this specification requires two shutdown cooling loops to be OPERABLE.

The operation of one Reactor Coolant Pump or one shutdown cooling pump provides adequate flow to ensure mixing, prevent stratification and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reductions will, therefore, be within the capability of operator recognition and control.

With no reactor coolant loop in operation, suspending the introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1.1 or LCO 3.1.1.2, as applicable, is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core; however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

3/4.4.2 and 3/4.4.3 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psia. Each safety valve is designed to relieve 453,817 lbs. per hour of saturated steam at 3% overpressure. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown.

Two safety valves are required in MODES 1, 2 and 3. One safety valve is required in MODE 4 with T_c > 220 °F. For the remainder of MODES 4, 5 and 6 with the reactor vessel head in place, overpressure protection is provided by the operating procedures and LCO 3.4.12, “Low Temperature Overpressure Protection (LTOP) System”.

During operation, all pressurizer code safety valves must be OPERABLE to prevent the RCS from being pressurized above its safety limit of 2750 psia. The combined relief capacity of these valves is sufficient to limit the Reactor Coolant System pressure to within its Safety Limit of 2750 psia following a complete loss of turbine generator load while operating at RATED THERMAL POWER and assuming no reactor trip until the first Reactor Protective System trip setpoint (Pressurizer Pressure-High) is reached (i.e., no credit is taken for a direct reactor trip on the loss of turbine) and also assuming no operation of the steam dump valves.

Demonstration of the safety valves' lift setting will occur only during shutdown and will be performed in accordance with the provisions of the ASME Operation and Maintenance Code.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CREVS and CREACS must be OPERABLE to ensure that the CRE will remain habitable during and following a DBA.

During movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies, the CREVS must be OPERABLE to cope with a release due to a fuel handling accident.

Unit 1 and Unit 2 control rooms are a single environment for emergency ventilation and air conditioning concerns. Since the control room emergency ventilation and air conditioning equipment is shared between units, the plant status of both units must be considered when determining applicability of the specification.

ACTIONS

a.

With one CREACS train inoperable, action must be taken to restore OPERABLE status within 30 days. In this ACTION, the remaining OPERABLE CREACS train is adequate to maintain the control room temperature within limits. However, the overall reliability is reduced because a failure in the OPERABLE CREACS train could result in a loss of CREACS function. The 30-day ACTION statement is based on the low probability of an event occurring requiring control room isolation, the consideration that the remaining train can provide the required capabilities, and alternate non-safety related cooling means that are available.

b.

With one CREVS train inoperable for reasons other than the loss of capability for automatic actuation on a high radiation signal or for reasons other than an inoperable CRE boundary, action must be taken to restore the OPERABLE status within 7 days. In this ACTION, the remaining OPERABLE CREVS train is adequate to perform the CRE radiation protection function. However, the overall reliability is reduced because a failure in the OPERABLE CREVS train could result in loss of CREVS function. The 7 day ACTION statement is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability. If automatic actuation on high radiation is lost, the ACTIONS of LOC 3.3.3.1 provide sufficient actions to ensure continued safe operation.

c.

With one CREVS train inoperable for reasons other than ACTION d and one CREACS train inoperable, actions must be taken to restore the CREVS to an OPERABLE status within 7 days and to restore the CREACS train to an OPERABLE status within 30 days.

d.

If the unfiltered inleakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 5 rem TEDE, or inadequate protection of CRE occupants from hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

e.

With both trains of CREVS for reasons other than ACTION d and/or both trains of the CREACS inoperable, the function of the systems has been lost, requiring immediate action to place the unit in a MODE where the specification does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within the following 30 hours. The allowed outage times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

f.

If during movement~~handling~~ of irradiated fuel assemblies or during movement of new fuel assemblies over irradiated fuel assemblies~~,~~ the system cannot be restored within 30 days, then either the OPERABLE CREACS train must be immediately placed in service or all activities involving the movement~~handling~~ of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies must be suspended. Placing the OPERABLE CREACS train in service ensures any active failure will be readily detected. The alternative to immediately suspend movement of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies is acceptable since movement~~handling~~ of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies could release radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

g.

If during movement~~handling~~ of irradiated fuel assemblies or during movement of new fuel assemblies over irradiated fuel assemblies~~,~~ the system cannot be restored within 7 days, then either the OPERABLE CREVS train must be immediately placed in emergency recirculation mode or all activities the movement~~handling~~ of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies must be suspended. Placing the OPERABLE CREVS train in emergency recirculation mode ensures that no failures preventing automatic actuation will occur, and that any active failure will be readily detected. The alternative to immediately suspend movement of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies is acceptable since movement~~handling~~ of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies could release radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

h.

If during movement~~handling~~ of irradiated fuel assemblies or during movement of new fuel assemblies over irradiated fuel assemblies~~,~~ one CREVS train is inoperable for reasons other than ACTION d and one CREACS train are inoperable, actions must be taken to restore the CREVS to an OPERABLE status within 7 days or immediately place the OPERABLE CREVS in the emergency recirculation mode and actions must be taken to restore the CREACS train to an OPERABLE status within 30 days or immediately place the OPERABLE CREACS train in service. If these actions cannot be accomplished, then all activities involving the movement~~handling~~ of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies must be suspended. This does not preclude movement of fuel to a safe position.

i.

If during movement~~handling~~ of irradiated fuel assemblies or during movement of new fuel assemblies over irradiated fuel assemblies~~,~~ both CREACS trains are inoperable, actions must be taken immediately to suspend movement of irradiated fuel assemblies or the movement of new fuel assemblies over irradiated fuel assemblies since this is an activity that could release radioactivity that could enter the CRE. This places the unit in a condition that minimizes the accident risk. This does not preclude movement of fuel to a safe position.

j.

If during the movement~~handling~~ of irradiated fuel assemblies or during movement of new fuel assemblies over irradiated fuel assemblies both CREVS trains are inoperable or with one or more CREVS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.~~ This does not preclude the movement of fuel to a safe position.~~

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criteria 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. ACTION requirements are consistent with Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability" and the Revised Standard Technical Specifications (NUREG 1432). The evaluation of a common cause failure (degradation that may affect the OPERABILITY of the remaining diesel generator) should be completed within 24 hours from when the affected diesel generator is determined to be inoperable.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods, ~~and~~ 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status, and 3) mitigating systems (such as CREVS) will be available following a fuel handling accident. Upon loss of a required power source, suspension of ~~core alterations,~~ the movement~~handling~~ of irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours), the movement of new fuel assemblies over irradiated fuel assemblies, and activities that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6)~~involving positive reactivity additions~~ act to minimize the probability of the occurrence of postulated events. Suspension of these activities shall not preclude placing fuel assemblies in a safe position.

Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

A Note prohibits the application of LCO 3.0.4.b to an inoperable emergency diesel generator (DG). There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable EDG and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

3/4.9 REFUELING OPERATIONS

BASES

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: 1) the reactor will remain subcritical during refueling activities~~CORE ALTERATIONS~~, and 2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the accident analyses.

The Applicability is modified by a Note. The Note states that the limits on boron concentration are only applicable to the refueling canal and the refueling cavity when those volumes are connected to the RCS. When the refueling canal and the refueling cavity are isolated from the RCS, no potential path for boron dilution exists.

Operations that individually add limited positive reactivity (e.g., temperature fluctuations from inventory addition or temperature control fluctuations), but when combined with all other operations affecting core reactivity (e.g., intentional boration) result in overall net negative reactivity addition, are not precluded by the ACTION.

Surveillance Requirement (SR) 4.9.1.2 ensures the coolant boron in the RCS, and connected portions of the refueling canal and the refueling cavity, is within limits. The boron concentration of the coolant in each required volume is determined periodically by chemical analysis. Prior to reconnecting portions of the refueling canal or the refueling cavity to the RCS, this SR must be met per SR 3.0.4. If any dilution activity has occurred while the cavity or canal were disconnected from the RCS, this SR ensures the correct boron concentration prior to communication with the RCS.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

Suspending positive reactivity additions that could result in failure to meet the minimum boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the accident analyses.

3/4.9.4 CONTAINMENT PENETRATIONS

The requirements on containment penetration closure ensure that a release of radioactive material within containment will be restricted from leakage to the environment. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel handling accident (FHA)~~element rupture~~ during movement of recently irradiated fuel or movement of new fuel assemblies over irradiated fuel assemblies based upon the lack of containment pressurization potential while in the REFUELING MODE. Due to radioactive decay, a FHA which does not involve movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) or the movement of new fuel assemblies over recently irradiated fuel assemblies will result in doses that are well within the guideline values specified in 10 CFR 50.67 even without containment closure capability.

Containment penetrations, the personnel airlock doors, and/or the equipment door may be open during movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) or movement of new fuel assemblies over irradiated fuel assemblies within the containment ~~and during CORE ALTERATIONS~~ provided a minimum of one closure method (manual or automatic valve, blind flange, or equivalent) in each penetration, one door in each airlock, and the equipment door are capable of being closed in the event of a FHA~~fuel handling accident~~. This allowance assumes that 23 feet of water is maintained above the fuel seated within the reactor vessel to ensure any offsite dose consequence remains within 10 CFR 50.67 limits in the event of a FHA~~fuel handling accident~~. Note that e~~E~~quivalent isolation methods must be approved and may include use of a material that can provide a temporary atmospheric pressure ventilation barrier. For closure, the equipment door will be held in place by a minimum of four bolts.

During the movement of irradiated fuel, ventilation system and radiation monitor availability (as defined in NUMARC 91-06) should be assessed with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the fuel decays away fairly rapidly. The basis for inclusion of the “recently” term as it relates to the movement of irradiated fuel is the reduction in dose consequences due to such decay. Likewise, the goal of maintaining ventilation system and radiation monitoring availability is to reduce dose consequences even further below that provided by natural decay. Therefore, the availability of ventilation systems and radiation monitors that serve this purpose should be considered commensurate with their contribution to public safety, regardless of whether the analyzed decay time (100 hours) has passed.

In addition to the above, a single normal or contingency method to promptly close containment penetrations should be established regardless of whether the analyzed decay time (100 hours) has passed. Such prompt methods need not completely block the penetration or be capable of resisting pressure. The purpose of establishing such prompt methods of containment closure is to is to enable ventilation systems to draw release gases from a postulated FHA in the proper direction such that it can be treated and monitored.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity condition during the movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) or the movement of new fuel assemblies over recently irradiated fuel assembliesCORE ALTERATIONS.

3/4.9.6 REFUELING MACHINE OPERABILITY

The OPERABILITY requirements for the refueling machine ensure that: 1) the refueling machine will be used for movement of CEAs with fuel assemblies and that it has sufficient load capacity to lift a fuel assembly, and 2) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL – SPENT FUEL STORAGE BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly, CEA and associated handling tool over other fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses.

For the spent fuel storage building crane, the normal configuration is with the power disconnect and travel interlock in place to ensure that a load in excess of 2000 pounds is not inadvertently carried over spent fuel. The use of the spent fuel storage building crane to lift the fuel pool gates requires travel beyond the area where the power disconnect and travel interlock provide protection. In this configuration additional controls are required to ensure the limiting condition for operation is met. The safe load path and heavy load permit provide the necessary controls to ensure loads in excess of 2000 pounds are not carried over spent fuel when the fuel pool gates are being lifted. Before the lift is made the surveillance requirement must still be satisfied.

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

The requirement that at least one shutdown cooling loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140 °F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification.

The requirement to have two shutdown cooling loops OPERABLE when there is less than 23 feet of water above the core ensures that a single failure of the operating shutdown cooling loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the core, a large heat sink is available for core cooling, thus in the event of a failure of the operating shutdown cooling loop, adequate time is provided to initiate emergency procedures to cool the core.

Suspending positive reactivity additions that could result in failure to meet the minimum boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.

3/4.9.9 and 3/4.9.10 WATER LEVEL-REACTOR VESSEL AND SPENT FUEL POOL WATER LEVEL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 12% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

~~3/4.9.11 DELETED~~

3/4.9.12 FUEL STORAGE

The spent fuel storage racks are designed to assure that when fuel assemblies of less than or equal to 4.95 w/o U-235 enrichment are stored within the limits of Table 3.9.1 subcritical array with $K_{eff} \leq 0.95$ will be maintained when a concentration of 452 ppm of soluble boron is present in the spent fuel water. These conditions have been verified by criticality analyses.

The requirement for 2000 ppm boron concentration is to assure the fuel assemblies will be maintained in a subcritical array with $K_{eff} \leq 0.95$ in the event of a postulated accident. Analysis has shown that, during a postulated accident with the fuel stored within the limits of this specification, that a K_{eff} of ≤ 0.95 will be maintained when the boron concentration is at or above 881 ppm.

The peripheral cells are defined as those storage cells closest to the spent fuel pool wall that have fuel assemblies located in them. Therefore, if the storage cell closest to the spent fuel pool wall is kept empty, then the second storage cell from the spent fuel pool wall may be filled with lower burnup fuel meeting the requirements of Table 3.9-1.

Attachment 3 to

2CAN061302

Revised (clean) Technical Specification Pages

CHANNEL FUNCTIONAL TEST

1.11 A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels – The injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions.

b. Bistable channels – The injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

c. Digital computer channels – The exercising of the digital computer hardware using diagnostic programs and the injection of simulated process data into the channel to verify OPERABILITY.

SHUTDOWN MARGIN

1.13 SHUTDOWN MARGIN shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming all control element assemblies are fully inserted except for the single assembly of highest reactivity worth which is assumed to be fully withdrawn.

IDENTIFIED LEAKAGE

1.14 IDENTIFIED LEAKAGE shall be:

a. Leakage (except controlled leakage) into closed systems, such as pump seal or valve packing leaks that are captured, and conducted to a sump or collecting tank, or

b. Leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be PRESSURE BOUNDARY LEAKAGE, or

c. Reactor coolant system leakage through a steam generator to the secondary system (primary to secondary leakage).

BORON DILUTION

LIMITING CONDITION FOR OPERATION

3.1.1.3 The flow rate of reactor coolant through the Reactor Coolant System (RCS) shall be ≥ 2000 gpm whenever a reduction in RCS boron concentration is being made.

APPLICABILITY: ALL MODES.

ACTION:

With the flow rate of reactor coolant through the RCS < 2000 gpm, immediately suspend all operations that would cause introduction of coolant into the RCS with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.1.1.1, LCO 3.1.1.2, or LCO 3.9.1, as applicable.

SURVEILLANCE REQUIREMENTS

4.1.1.3 The flow rate of reactor coolant through the reactor coolant system shall be determined to be ≥ 2000 gpm within one hour prior to the start of and at least once per hour during a reduction in the RCS boron concentration by either:

a. Verifying at least one reactor coolant pump is in operation, or

b. Verifying that at least one low pressure safety injection pump or containment spray pump is in operation as a shutdown cooling pump and supplying ≥ 2000 gpm through the RCS.

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1. AREA MONITORS					
a. Spent Fuel Pool Area Monitor	1	Note 1	$\leq 1.5 \times 10^{-2}$ R/hr	$10^{-4} - 10^{1}$ R/hr	13
b. Containment High Range	2	1, 2, 3, & 4	Not Applicable	$1 - 10^{7}$ R/hr	18
2. PROCESS MONITORS					
a. Containment Purge and Exhaust Isolation	1	Note 3	$\leq$ 2 x background	$10 - 10^{6}$ cpm	16
b. Control Room Ventilation Intake Duct Monitors	2	Note 2	$\leq$ 2 x background	$10 - 10^{6}$ cpm	17,20,21
c. Main Steam Line Radiation Monitors	1/Steam Line	1, 2, 3, & 4	Not Applicable	$10^{-1} - 10^{4}$ mR/hr	19

Note 1 – With fuel in the spent fuel pool or building.

Note 2 – MODES 1, 2, 3, 4, and during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

Note 3 – Applicable during:

a. PURGE of the Containment Building or,

b. Containment Building continuous ventilation operations when moving recently irradiated fuel assemblies or moving new fuel assemblies over recently irradiated fuel assemblies in the Containment Building.

TABLE 3.3-6 (Continued)

TABLE NOTATION

ACTION 13 – With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

ACTION 16 – With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, complete the following:

a. If moving recently irradiated fuel assemblies or moving new fuel assemblies over recently irradiated fuel assemblies within the Containment Building, secure the Containment Purge System or suspend the movement of recently irradiated fuel assemblies and movement of new fuel assemblies over recently irradiated fuel assemblies within the Containment Building.

b. If a Containment PURGE is in progress, secure the Containment Purge System.

c. If continuously ventilating the Containment Building, verify the associated SPING monitor operable or perform the applicable ACTION(s) of the Offsite Dose Calculation Manual; otherwise, secure the Containment Purge System.

ACTION 17 – In MODE 1, 2, 3, or 4, with no channels OPERABLE, within 1 hour initiate and maintain operation of the control room emergency ventilation system (CREVS) in the recirculation mode of operation or be in HOT STANDBY within the next 6 hours and COLD SHUTDOWN in the following 30 hours.

ACTION 18 – With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, (1) either restore the inoperable channel to OPERABLE status within 7 days or (2) prepare and submit a Special Report to the NRC within 30 days following the event, outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the system to OPERABLE status. With both channels inoperable, initiate alternate methods of monitoring the containment radiation level within 72 hours in addition to the actions described above.

ACTION 19 – With the number of OPERABLE Channels less than required by the Minimum Channels OPERABLE requirements, initiate the preplanned alternate method of monitoring the appropriate parameter(s), within 72 hours, and:

1) either restore the inoperable Channel(s) to OPERABLE status within 7 days of the event, or

2) prepare and submit a Special Report to the NRC within 14 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

ACTION 20 – In MODE 1, 2, 3, or 4 with the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, within 7 days restore the inoperable channel to OPERABLE status or initiate and maintain the CREVS in the recirculation mode of operation. Otherwise, be in HOT STANDBY within the next 6 hours and COLD SHUTDOWN in the following 30 hours.

ACTION 21 - During movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies with one or two channels inoperable, immediately place one OPERABLE CREVS train in the emergency recirculation mode or immediately suspend the movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

<u>TABLE 4.3-3</u>

<u>RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS</u>

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. AREA MONITORS				
a. Spent Fuel Pool Area Monitor	S	R	M	Note 1
b. Containment High Range	S	R Note 4	M	1, 2, 3, & 4
2. PROCESS MONITORS				
a. Containment Purge and Exhaust Isolation	Note 2	R Note 7	Note 3	In accordance with applicable Notes
b. Control Room Ventilation Intake Duct Monitors	S	R	M Note 6	Note 5
c. Main Steam Line Radiation Monitors	S	R	M	1, 2, 3, & 4

Note 1 – With fuel in the spent fuel pool or building.

Note 2 – Within 8 hours prior to initiating Containment PURGE operations and at least once per 12 hours during Containment PURGE or continuous ventilation operations.

Note 3 – Within 31 days prior to initiating Containment PURGE operations and, at least once per 31 days during continuous ventilating operations when moving recently irradiated fuel assemblies or moving new fuel assemblies over recently irradiated fuel assemblies in the Containment Building.

Note 4 – Acceptable criteria for calibration are provided in Table II.F.1-3 of NUREG-0737.

Note 5 – MODES 1, 2, 3, 4, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

Note 6 - When the Control Room Ventilation Intake Duct Monitor is placed in an inoperable status solely for performance of this Surveillance, entry into associated ACTIONS may be delayed up to 3 hours.

Note 7 – Once every 18 months within 31 days prior to initiating Containment PURGE operations.

HOT STANDBY

LIMITING CONDITION FOR OPERATION

3.4.1.2 a. The reactor coolant loops listed below shall be OPERABLE:

1. Reactor Coolant Loop (A) and at least one associated reactor coolant pump.
2. Reactor Coolant Loop (B) and at least one associated reactor coolant pump.

b. At least one of the above Reactor Coolant Loops shall be in operation.*

APPLICABILITY: MODE 3.

ACTION:

a. With less than the above required reactor coolant loops OPERABLE, restore the required loops to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. With no reactor coolant loop in operation, suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.1 and immediately initiate corrective action to return the required loop to operation.

SURVEILLANCE REQUIREMENTS

4.4.1.2.1 At least the above required reactor coolant pumps, if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.2.2 At least one cooling loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

---

* All reactor coolant pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.1, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

REACTOR COOLANT SYSTEM

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.4.1.3 a. At least two of the coolant loops listed below shall be OPERABLE:

1. Reactor Coolant Loop (A) and its associated steam generator and at least one associated reactor coolant pump.

2. Reactor Coolant Loop (B) and its associated steam generator and at least one associated reactor coolant pump.

3. Shutdown Cooling Loop (A) #.

4. Shutdown Cooling Loop (B) #.

b. At least one of the above coolant loops shall be in operation.*

APPLICABILITY: Modes 4 and 5.

ACTION:

a. With less than the above required coolant loops OPERABLE, immediately initiate corrective action to return the required coolant loops to OPERABLE status as soon as possible; be in COLD SHUTDOWN within 20 hours.

b. With no coolant loop in operation, suspend all operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.1 or LCO 3.1.1.2, as applicable, and immediately initiate corrective action to return the required coolant loop to operation.

SURVEILLANCE REQUIREMENTS

4.4.1.3.1 The required shutdown cooling loop(s) shall be determined OPERABLE per the Inservice Testing Program.

4.4.1.3.2 The required reactor coolant pump(s), if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.3.3 The required steam generator(s) shall be determined OPERABLE by verifying the secondary side water level to be ≥ 23% indicated level at least once per 12 hours.

4.4.1.3.4 At least one coolant loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

---

* All reactor coolant pumps and decay heat removal pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.1 or LCO 3.1.1.2, as applicable, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

The normal or emergency power source may be inoperable in Mode 5.

3/4.7.6 CONTROL ROOM EMERGENCY VENTILATION AND AIR CONDITIONING SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.6.1 Two independent control room emergency ventilation and air conditioning systems shall be OPERABLE. (Note 1)

APPLICABILITY: MODES 1, 2, 3, 4, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

MODES 1, 2, 3, and 4

a. With one control room emergency air conditioning system (CREACS) inoperable, restore the inoperable system to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one control room emergency ventilation system (CREVS) inoperable for reasons other than ACTION d, restore the inoperable system to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With one CREVS inoperable for reasons other than ACTION d and one CREACS inoperable, restore the inoperable CREVS to OPERABLE status within 7 days and restore the inoperable CREACS to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. With one or more CREVS inoperable due to an inoperable CRE boundary:

1. Immediately initiate action to implement mitigating actions, and

2. Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits within 24 hours, and

3. Restore the CRE boundary to OPERABLE status within 90 days

Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

e. With two CREVS inoperable for reasons other than ACTION d or with two CREACS inoperable, enter Specification 3.0.3.

Note 1: The control room envelope (CRE) boundary may be open intermittently under administrative controls.

3/4.7.6 CONTROL ROOM EMERGENCY VENTILATION AND AIR CONDITIONING SYSTEM

LIMITING CONDITION FOR OPERATION

During Movement of Irradiated Fuel Assemblies or Movement of New Fuel Assemblies over Irradiated Fuel Assemblies

f. With one CREACS inoperable, restore the inoperable system to OPERABLE status within 30 days or immediately place the OPERABLE system in operation; otherwise, suspend all activities involving the movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

g. With one CREVS inoperable, restore the inoperable system to OPERABLE status within 7 days or immediately place the control room in the emergency recirc mode of operation; otherwise, suspend all activities involving the movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

h. With one CREVS inoperable for reasons other than ACTION d and one CREACS inoperable:

   1. restore the inoperable CREVS to OPERABLE status within 7 days or immediately place the CRE in the emergency recirc mode of operation, and

   2. restore the inoperable CREACS to OPERABLE status within 30 days or immediately place the OPERABLE system in operation;

   3. otherwise, suspend all activities involving the movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

i. With both CREACS inoperable, immediately suspend all activities involving the movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

j. With both CREVS inoperable or with one or more CREVS inoperable due to an inoperable CRE boundary, immediately suspend all activities involving the movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ELECTRICAL POWER SYSTEMS

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and

b. One diesel generator with:

1. A day fuel tank containing a minimum volume of 300 gallons of fuel,

2. A fuel storage system, and

3. A fuel transfer pump.

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend the movement of irradiated fuel assemblies, the movement of new fuel assemblies over irradiated fuel assemblies, and operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

SURVEILLANCE REQUIREMENT

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the Surveillance Requirements of 4.8.1.1.1 and 4.8.1.1.2 except for Requirement 4.8.1.1.2a.5.

ELECTRICAL POWER SYSTEMS

A.C. DISTRIBUTION – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.2 As a minimum, the following A.C. electrical busses shall be OPERABLE:

1 - 4160 volt Emergency Bus

1 - 480 volt Emergency Load Center Bus

4 - 480 volt Motor Control Center Busses

2 - 120 volt A.C. Vital Busses

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

With less than the above complement of A.C. busses OPERABLE, immediately suspend the movement of irradiated fuel assemblies, the movement of new fuel assemblies over irradiated fuel assemblies, and operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

SURVEILLANCE REQUIREMENTS

4.8.2.2 The specified A.C. busses shall be determined OPERABLE at least once per 7 days by verifying correct breaker alignment and indicated power availability.

ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTION – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following D.C. electrical equipment and bus shall be energized and OPERABLE:

1 - 125-volt D.C. bus, and

1 - 125-volt battery bank and charger supplying the above D.C. bus.

APPLICABILITY: MODES 5 and 6, or during movement of irradiated fuel assemblies or movement of new fuel assemblies over irradiated fuel assemblies.

ACTION:

With less than the above complement of D.C. equipment and bus OPERABLE, immediately suspend the movement of irradiated fuel assemblies, the movement of new fuel assemblies over irradiated fuel assemblies, and operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 125-volt D.C. bus shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 125-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.3.

3/4.9 REFUELING OPERATIONS

BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 The boron concentration of the reactor coolant system, the refueling canal, and the reactor cavity shall be maintained uniform and sufficient to ensure that the more restrictive of following reactivity conditions is met:

a. Either a K_{eff} of 0.95 or less, which includes a 1% $\Delta k/k$ conservative allowance for uncertainties, or

b. A boron concentration of ≥ 2500 ppm, which includes a 50 ppm conservative allowance for uncertainties.

APPLICABILITY: MODE 6*.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving positive reactivity changes and initiate and continue boration at ≥ 40 gpm of ≥ 2500 ppm boric acid solution until K_{eff} is reduced to ≤ 0.95 or the boron concentration is restored to ≥ 2500 ppm, whichever is the more restrictive. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The more restrictive of the above two reactivity conditions shall be determined prior to:

a. Removing or unbolting the reactor vessel head, and

b. Withdrawal of any CEA in excess of 3 feet from its fully inserted position within the reactor pressure vessel.

4.9.1.2 The boron concentration of the reactor coolant and the refueling canal shall be determined by chemical analysis at least once per 72 hours.

---

* Only applicable to the refueling canal and refueling cavity when connected to the RCS.

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

APPLICABILITY: MODE 6.

ACTION:

a. With one of the above required monitors inoperable, immediately suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet the boron concentration of LCO 3.9.1.

b. With both of the above required monitors inoperable, determine the boron concentration of the reactor coolant system at least once per 12 hours.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.2 Each source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

a. A CHANNEL CHECK at least once per 12 hours,

b. A CHANNEL FUNCTIONAL TEST at least once per 7 days, and

c. A CHANNEL FUNCTIONAL TEST within 8 hours prior to the initial start of the movement of recently irradiated fuel assemblies or the movement of new fuel assemblies over recently irradiated fuel assemblies.

CONTAINMENT BUILDING PENETRATION

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door is capable* of being closed,

b. A minimum of one door in each airlock is capable* of being closed, and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed* by a manual or automatic isolation valve, blind flange, or equivalent, or

2. Capable* of being closed by an OPERABLE containment purge and exhaust isolation system.

APPLICABILITY: During movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies within the Containment Building.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the Containment Building. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.4.1 Each of the above required containment penetrations shall be determined to be in its above required conditions within 72 hours prior to the start of and at least once per 7 days during movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the Containment Building.

---

* Penetration flow path(s) providing direct access from the containment atmosphere to the outside atmosphere may be unisolated under administrative controls. Administrative controls shall ensure that appropriate personnel are aware that when containment penetrations, including both personnel airlock doors and/or the equipment door are open, a specific individual(s) is designated and available to close the penetration following a required evacuation of containment, and any obstruction(s) (e.g., cables and hoses) that could prevent closure of an airlock door and/or the equipment door be capable of being quickly removed.

Next page is 3/4 9-6

COMMUNICATIONS

LIMITING CONDITION FOR OPERATION

3.9.5 Direct communications shall be maintained between the control room and personnel at the refueling station.

APPLICABILITY: During movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel.

ACTION:

When direct communications between the control room and personnel at the refueling station cannot be maintained, suspend movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.5 Direct communications between the control room and personnel at the refueling station shall be demonstrated within one hour prior to the start of and at least once per 12 hours during movement of recently irradiated fuel assemblies or movement of new fuel assemblies over recently irradiated fuel assemblies in the reactor pressure vessel.

REFUELING OPERATIONS

SHUTDOWN COOLING AND COOLANT CIRCULATION

SHUTDOWN COOLING – ONE LOOP

LIMITING CONDITION FOR OPERATION

3.9.8.1 At least one shutdown cooling loop shall be in operation.

APPLICABILITY: MODE 6.

ACTION:

a. With less than one shutdown cooling loop in operation, except as provided in b. below, suspend operations involving an increase in the reactor decay heat load or that would cause introduction of coolant into the RCS with boron concentration less than required to meet the boron concentration of LCO 3.9.1. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

b. The shutdown cooling loop may be removed from operation for up to 1 hour per 8 hour period provided no operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.9.1.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.1 A shutdown cooling loop shall be determined to be in operation and circulating reactor coolant at a flow rate of $\geq$ 2000 gpm at least once per 24 hours.

REFUELING OPERATIONS

WATER LEVEL – REACTOR VESSEL

LIMITING CONDITION FOR OPERATION

3.9.9 At least 23 feet of water shall be maintained over the elevation corresponding to the top of irradiated fuel assemblies seated within the reactor pressure vessel.

APPLICABILITY: During movement of fuel assemblies within the Containment Building.

ACTION:

With the requirements of the above specification not satisfied, suspend all operations involving movement of fuel assemblies within the Containment Building. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.9 The water level shall be determined to be at least its minimum required depth within 2 hours prior to the start of and at least once per 24 hours thereafter during movement of fuel assemblies within the Containment Building.

Attachment 4

2CAN061302

List of Regulatory Commitments

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
The affected TS Bases shall be revised in accordance with 10 CFR 50.59 in support of the changes described in Attachment 3 of this amendment request.	✓		Concurrent with implementation of the amendment request
During the movement of irradiated or recently irradiated fuel assemblies, availability of ventilation and radiation monitoring systems that aid in minimizing offsite dose consequences in the event of a fuel handling accident will be considered.		✓	Concurrent with implementation of the amendment request
During the movement of irradiated or recently irradiated fuel assemblies, methods will be established that permit prompt closure of the containment building in the event of a fuel handling accident.		✓	Concurrent with implementation of the amendment request